

7 September 2009

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Australia's Future Tax System Review
AFTS Secretariat
Treasury
Langton Cres
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Dear Dr Henry

This is the third submission on retirement incomes from Challenger to the Review of Australia's Future Tax System. It addresses the three questions set out in Chapter 7 of the Report on Strategic Issues of May 2009, in particular that; *In developing proposals relating to longevity insurance it will be necessary to consider whether (or to what extent) the insurance:*

1. *is mandatory or voluntary;*
2. *provides guaranteed or non-guaranteed income; and*
3. *is provided by the public or the private sector.*

Challenger has already made a submission to AFTS proposing that retirees be required to take a proportion of their superannuation benefit in the form of a guaranteed lifetime annuity. In making that submission it was our presumption that those lifetime annuities should be provided privately.

This submission addresses each of those questions in turn. We have undertaken a significant amount of work internally, exploring relevant academic literature from the field of behavioural economics, as well as the relative pricing of traditional annuity products and more complex variable annuities. We commissioned work from actuaries Watson Wyatt on the performance of annuities relative to bonds as the defensive component of a reinvestment portfolio and the potential to segment the pricing of annuities based on their UK experience. We have also commissioned reports from both Access Economics and Chris Dalton, the former Managing Director of Standard & Poor's in Australia, which both examine the wider implications of public provision from a public finance perspective.

These reports are summarised below and attached as part of this submission:

1. Challenger, *The Determinants of Annuity Demand: A Literature Survey*, 7 September 2009
2. Watson Wyatt, *Differences in Mortality Experience by Health Status and Postcode*, 2 September 2009
3. Watson Wyatt, *Retirement Scheme Modelling*, 2 September 2009
4. Challenger, *Annuity Product Overview*, 7 September 2009
5. Access Economics, *Public and Private Provision in Australia*, 27 August 2009
6. Chris Dalton Consulting Pty Ltd, *The Rating of Australia and the Proposal for Public Provision of Annuities*, August 2009

Mandatory or Voluntary

Behavioural inhibitors to voluntary annuitisation

In our previous submission we cited work by Rawlinson and Cater of Towers Perrin, which found that there is a point well short of life expectancy where it is economically rational to convert superannuation benefits into a lifetime annuity, regardless of the retiree's appetite for risk. That this analysis is in contrast to the relatively low take up of annuities in Australia is a manifestation of the globally recognised "annuity puzzle" - that retirees do not act rationally to maximise their retirement income (or any reasonable construction of expected utility).



There is a very significant and growing body of academic literature in the field of behavioural economics, pointing to a predisposition for irrational behaviour by retirees with respect to the decision to provide for their longevity risk. The evidence is sufficiently compelling to reject the contention that the problem could be solved with increased financial education alone, even if current structural impediments to annuity product development in Australia were removed.

By trading a stock of wealth for a life contingent income stream, healthy individuals are able to sustain a higher level of consumption than in the absence of annuities, and are assured this income cannot be outlived. In 1965 Yaari published a seminal piece of work focussing on expected utility, in which he found that certain consumers should fully annuitise. This work has been reinforced by Davidoff, Brown and Diamond in recent years testing the significance of various assumptions such as:

- The bequest motion;
- Completeness of markets; and
- Preferences for earlier over later consumption.

Their simulations showed it is “extremely difficult” to find situations where less than two thirds of retirement wealth should be invested in annuities. Davidoff et al concluded;

The near absence of voluntary annuitisation is puzzling in the face of theoretical result that suggest large benefits to annuitisation...These results suggest that lack of annuity demand may arise from behavioural considerations, and that some mandatory annuitisation may be welfare increasing.

The recent work which explores these behavioural considerations is important in considering the issue from a public policy perspective and what policy responses would prove effective.

In 2008 Brown, Kling, Mullainathan and Wrobel studied how retirees respond differently depending on whether the decision to annuitise is framed in an investment or consumption context. If the issue is framed in the risk return trade-off terms of an investment the retiree is less likely to annuitise than if the issue is framed in terms of the level of ongoing consumption they provide through retirement. In 2009 Brown, Kling, Mullainathan, Wiens and Wrobel extended this work and found that the framing language was more important than the purchase price.

In 2009 Adler published a paper confirming these findings in relation to framing and noted that retirees view an annuity as a risky gamble; “if I die early, I lose: if I live a long time, I win,” rather than insurance against the risk of outliving your wealth. This attitude was reflected by the cartoonist Tandberg illustrating a story on the front page of The Age (13 August 2009) regarding the possibility of public provision of annuities, where the retiree asks; “will the government invest my money wisely?” and the government answers; “we are hoping you aren’t intending to live too long.” Perhaps whimsical but it isn’t just life offices that retirees may choose not to bet against.

Another strand of this research is Cumulative Prospect Theory (“CPT”) which argues that objective probabilities are weighted by a subjective function which results in the overweighting of low-probability events and underweighting of more frequent events.

Other research has examined “mental accounting” of economic outcomes, in which people frame assets as belonging to one of current income, current wealth or future income. This has implications for their behaviour because these accounts are largely non-fungible and have different marginal utilities. Risk taking is not evaluated in terms of potential outcomes for total wealth, so an annuity evaluated narrowly as a gamble in its own mental account will look less attractive because an annuity pushes current income into the future.

In 2007 Gazzale & Walker described the risk ordering bias of retirees overweighting the early risk of death relative to the later risk of longevity simply due to their temporal order.

In 1983 Tversky & Kahneman described the conjunction fallacy where individuals assign a greater likelihood to two events occurring than to either event occurring alone, arguing that this inability to properly evaluate probabilities can lead to an over estimation of the likelihood of early death.



In 2007 Hu & Scott described the availability heuristic where easily imagined events, such as dying shortly after an annuity is purchased, are assigned a higher probability. They noted that the conjunction fallacy combined with the availability heuristic can lead to a greater emphasis on the potential losses due to early death, without a similar overemphasis on the potential gains from outliving one's life expectancy.

It can be inferred that retirees who are uncertain about their survival probabilities will be more averse to 'gambling' on an annuity than is optimal.

Many individuals avoid thinking about unpleasant events such as dying or being old but poor. This phenomena is described by psychologists as denial and would account for some individuals not even considering the annuitisation decision.

There are also some explanations for the low voluntary take up of annuities which are rational, although at least partially self defeating; adverse selection increasing prices; risk sharing by couples resulting in a lower propensity to take up joint or survivor annuities than for an individual to annuitise; complexity and information problems are a rational barrier to individuals taking annuities they do not fully understand; the bequest motive; incomplete annuity markets which do not cover all the risks a retiree may face; poor health; and pre-existing annuitisation through the government social security system.

Given these well documented behavioural issues, there is little prospect of individuals changing their behaviour to substantially address their own longevity risk in the absence of some compulsion or strong financial incentive. The experience is no different in other jurisdictions, demonstrating that the "build it and they will come" argument is a fallacy.

These behavioural issues represent a market failure which can be most effectively and economically addressed with an element of compulsion. The outcome will be welfare increasing.

Local mythology about the cost of annuities and their performance relative to account-based alternatives

There are widely held industry views that guaranteed lifetime products represent poor value. Those commonly held industry views are based on three incorrect assumptions.

The first incorrect assumption is that market linked allocated pensions which are not guaranteed will outperform a guaranteed lifetime annuity. This is too frequently not the case. Unless a retiree is a high wealth individual, they will not have the financial capacity to withstand a combination of adverse longevity and market events. In all probability most retirees will not have the financial capacity to deal with an adverse outcome on one of them. These issues were covered in depth in our previous submission.

The second incorrect assumption is that with the removal of the Assets Test Exemption lifetime annuities lost the basis of their competitiveness. Certainly, lifetime annuities lost traction in the market with the abolition of the ATE, which reduced a value proposition that included concessional Age Pension treatment. However, the loss of traction may have more to do with the fact that they were sold as a product whose value was based on the social security concession rather than their inherent characteristics of an attractive return for negligible risk. Advisers used to selling the product on the basis of the ATE did not focus on the benefits of guarantees against longevity and market risk, and made their recommendations using simple comparisons with average equity returns and returns available on higher-yielding high risk alternatives in a bull market.

The third incorrect assumption is that annuities can not be provided economically because they are too capital intensive. The indicative pricing contained in this submission is based on current capital standards and is not unattractive in terms of annuity rates. Assumptions about excessive capital requirements are typically not well informed and reflect the preferences of providers of non-guaranteed products for their own business models, which are based on capital requirements only to cover operational risk, clients carrying all investment and longevity risk, and fee based remuneration.



Superannuation, the bequest motive and access to capital

While retirees may have a preference to maintain control of their capital and ultimately bequeath it to their families, estate planning, and use of superannuation structures to defer tax should not be objectives of retirement incomes policy.

High wealth individuals currently have the financial capacity to use superannuation to defer tax, for estate planning and to provide retirement incomes. People who are not high wealth individuals don't have that financial capacity. They will typically find that a combination of either or both adverse outcomes for market and longevity risk will result in them exhausting their private retirement savings and having to resort to using non-super assets, including reverse mortgages, to support their retirement consumption needs. If retirees don't make adequate provision for their longevity they are less likely to maintain control of their non-superannuation assets and be able to bequeath any estate to their dependents or families. Compulsory longevity cover would work for rather than against the bequest motive for most non-high wealth individuals.

Later in this paper we present analysis by Watson Wyatt which simulates the draw, under expected investment outcome scenarios, on non-superannuation assets through a reverse mortgage as a result of a retiree maintaining their living standard when superannuation assets are inadequate.

The need for retirees to access a lump sum for capital items such as to replace washing machines, home repairs or for health care is often cited as a reason not to annuitise. Partial annuitisation removes this objection. In reality if a retiree has annuitised a sufficient portion of their superannuation benefit to cover most or all of the living expenses they are more likely to have funds available in an allocated pension to cover the cost of unexpected contingencies.

Poverty alleviation

The OECD has published a comparative study demonstrating that of OECD countries, Australia has the fourth highest rate of poverty amongst the elderly. Given the inability of large numbers of retirees to deal with their own market and longevity risks, partial compulsory annuitisation of superannuation benefits is the most effective means of using superannuation assets to address poverty amongst the elderly. This will otherwise become a growing social problem.

Public finance imperatives

There are powerful public finance arguments for requiring retirees to make proper provision for their own longevity risk, where they are able. The case for compulsion is reinforced by the fact that superannuation benefits are not just deferred consumption but are in large part accumulated tax concessions. Generally tax concessions are provided for public policy purposes, which in this case are to increase retirement incomes above the Age Pension and to reduce the future call on the budget for Age Pension costs as intergenerational fiscal pressures mount. It is reasonable for government to ensure that, as far as possible, these tax concessions are required to be used for the purposes for which they were provided. Without an element of compulsion it will not be possible for the government to capture more of what should be the offsetting savings from its superannuation tax concessions. In this context it needs to be noted that tax concessions are paid for by other taxpayers in the form of higher tax rates.

Capturing and distributing the mortality premium

In our submission in March Challenger provided a letter from actuaries Towers Perrin on the Impact of Compulsion on Annuitant Mortality Rates. The letter pointed to the improvement in annuity rates which could be offered retirees if an element of compulsion were used to overcome the problem of adverse selection. In a voluntary system those who have good reason to believe they will exceed average life expectancy will be more likely to choose a lifetime annuity, so increasing the life expectancy of the annuitized pool and therefore reducing the annuity rates a life office can safely offer annuitants. Given Australia's small lifetime annuity market the conclusions which could be drawn about the effect on rates in the Australian context were limited by the available data.



Chapter 7 of the AFTS Report on Strategic Issues subsequently said:

“In a mandatory scheme, people who die before or shortly after the age at which the annuity commences support the income of those who live longer. Consequently, there are potential equity issues, especially for groups in the community who tend to have lower life expectancies, such as low income earners and Indigenous Australians.”

We assume the reference to death before an annuity commences to apply to deferred annuities. Deaths in the first few years of a lifetime annuity are already commonly dealt with by providing a guarantee period although that is at the expense of the rate offered.

Challenger commissioned Watson Wyatt to further explore some of these issues on the basis of experience in a larger and more mature annuity market, the UK.

First Watson Wyatt examined mortality experience by health status. This was done by identifying a group of individuals with experience of 36 specific diseases as indicative of an “unhealthy” group and comparing their mortality experience with that of a “healthy” group who had not experienced those diseases, as well as the mortality experience of all lives in the combined population.

Watson Wyatt have provided:

- the mortality experience of the healthy group and the unhealthy group as ratios of the population;
- life expectancies for the healthy group, the unhealthy group and the population;
- indicative rates on a £50,000 lifetime annuity for the healthy group, the unhealthy group and the population; and
- indicative rates for a term certain annuity for the average life expectancy of the healthy group, the unhealthy group and the population.

The tables below show the mortality experience of the unhealthy group and the healthy group, expressed as ratios of the mortality experience of the combined population.

Ratio of mortality experience for “healthy” group vs entire population for different calendar years after selection on `1 January 2000

Age group at start of period	Calendar year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Avg
Men										
45-54	66.5%	74.7%	78.1%	79.3%	82.3%	81.2%	80.7%	87.1%	86.3%	79.6%
50-59	63.9%	70.6%	77.2%	75.2%	82.1%	81.2%	81.1%	82.9%	83.7%	77.5%
55-64	61.5%	67.2%	73.1%	72.7%	76.9%	77.1%	78.2%	75.8%	79.9%	73.6%
60-69	58.8%	63.9%	70.7%	70.4%	73.2%	73.3%	74.5%	76.5%	78.0%	71.0%
65-74	57.4%	64.0%	68.7%	69.0%	74.8%	71.7%	74.1%	78.1%	78.6%	70.7%
Women										
45-54	58.7%	67.0%	69.0%	75.0%	83.1%	80.4%	83.2%	84.6%	82.3%	75.9%
50-59	57.8%	64.4%	69.8%	72.6%	79.3%	73.7%	83.1%	80.4%	82.8%	73.8%
55-64	56.6%	67.7%	70.1%	69.8%	76.7%	71.2%	79.7%	77.2%	81.0%	72.2%
60-69	57.3%	68.1%	68.3%	70.6%	75.7%	74.6%	74.4%	79.1%	77.7%	71.8%
65-74	58.4%	64.6%	69.5%	70.6%	74.1%	74.0%	75.3%	78.5%	79.1%	71.6%



Ratio of mortality experience for “unhealthy” group vs entire population for different calendar years after selection on 1 January 2000

Age group at start of period	Calendar year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Avg
Men										
45-54	325.5%	271.3%	249.1%	241.5%	221.6%	230.6%	235.0%	190.4%	195.1%	240.0%
50-59	275.3%	243.9%	212.3%	223.1%	189.4%	194.8%	195.8%	187.3%	182.8%	211.6%
55-64	221.7%	204.8%	187.0%	188.9%	176.0%	176.3%	173.4%	181.7%	168.2%	186.4%
60-69	185.5%	175.9%	162.4%	163.8%	158.6%	159.5%	157.7%	153.7%	150.6%	163.1%
65-74	162.9%	154.3%	148.2%	148.8%	140.5%	146.6%	143.8%	137.9%	137.6%	146.7%
Women										
45-54	453.9%	384.7%	368.3%	318.2%	248.1%	272.6%	248.8%	237.2%	256.7%	309.8%
50-59	363.6%	324.2%	290.9%	274.5%	233.0%	270.4%	210.8%	228.7%	212.5%	267.6%
55-64	286.0%	240.0%	230.6%	232.9%	204.1%	229.9%	192.8%	204.8%	187.2%	223.2%
60-69	229.8%	198.6%	199.3%	193.1%	178.2%	183.0%	184.8%	170.0%	175.0%	190.2%
65-74	194.8%	182.6%	172.6%	171.7%	164.8%	166.3%	164.5%	157.0%	156.3%	170.1%

Complete cohort life expectancy for different groups for selected ages

Starting age	Life expectancy			
	All	Healthy	Unhealthy	Healthy - All
Men				
50	37.9	38.7	33.5	0.8
55	32.9	33.8	29.0	1.0
60	27.8	29.1	24.6	1.2
65	23.0	24.4	20.4	1.4
70	18.4	19.9	16.4	1.5
Women				
50	39.9	40.8	34.3	0.9
55	34.8	35.7	30.4	0.9
60	29.6	30.7	26.0	1.0
65	24.6	25.9	21.4	1.3
70	19.8	21.1	17.1	1.3

There are substantial differences between the life expectancies of healthy and unhealthy lives. However, the difference in life expectancies between healthy and all lives is smaller, and would be expected to increase if the unhealthy population included other lesser diseases, such as hypertension, or other predisposing risk factors such as high cholesterol or smoking. These comparisons could be taken as a proxy for the effect of adverse selection if an insurer was pricing annuities on the assumption of aggregate mortality experience whereas in fact the policyholders were all healthy.



Lifetime annuity payments for a £50,000 pension fund for different groups for selected ages

Starting age	Annual annuity payment			
	All £	Healthy £	Unhealthy £	Healthy – All £
Men				
50	2660.9	2626.8	2881.2	-34.1
55	2832.4	2781.9	3069.4	-50.5
60	3077.0	2991.5	3344.5	-85.5
65	3426.4	3287.3	3724.3	-139.0
70	3928.1	3715.2	4274.1	-212.9
Women				
50	2592.0	2559.1	2849.4	-32.9
55	2742.7	2700.7	2988.7	-41.9
60	2961.1	2897.1	3226.9	-63.9
65	3279.6	3170.6	3613.6	-109.1
70	3738.2	3570.5	4154.0	-167.7

Conscious of the equity issues identified in Chapter 7 of the AFTS Report on Strategic Issues, Challenger commissioned Watson Wyatt to provide information on relative mortality experience and indicative pricing using its propriety modelling based on socio-economic profiling by post code in the UK.

Mortality comparisons between different deciles for men and women in age groups 50-59 to 70-79

Decile grouping	Men			Women		
	50-59	60-69	70-79	50-59	60-69	70-79
1	145%	144%	145%	135%	134%	134%
2	127%	127%	127%	120%	121%	121%
3	117%	117%	117%	112%	113%	114%
4	109%	110%	109%	107%	107%	109%
5	102%	103%	103%	102%	102%	104%
6	97%	97%	97%	97%	98%	99%
7	92%	92%	92%	92%	93%	95%
8	86%	86%	86%	87%	88%	89%
9	80%	80%	80%	82%	83%	84%
10	70%	70%	69%	73%	74%	75%

This shows mortality rates in post codes in the lowest decile of the socio-economic profile being around double that of the highest decile.

Direct comparisons of annuity rates between different socio-economic groupings and health-based groupings are not possible because of the need to make different assumptions as to continued mortality differences at older ages. However, it is likely that postcode groupings will act as a proxy for a wider range of mortality risk factors than consideration of diagnosed disease, and could therefore support a wider range of annuity rates.



Lifetime annuity payments for a £50,000 pension fund for different deciles for selected ages

Starting age	Annual annuity payment				
	All £	Decile 1 £	Decile 10 £	Dec 1 – All £	Dec 10 – All £
Men					
60	3077.0	3304.1	2902.8	227.1	-174.2
65	3426.4	3738.5	3185.5	312.1	-240.9
Women					
60	2961.1	3107.4	2832.9	146.3	-128.2
65	3279.6	3483.5	3102.3	203.9	-177.3

The difference between the indicative annuity pricing for post codes in the lowest decile and the highest decile in the UK is substantial (17.4% higher annual income in the case of a 65 year old male on the assumption of continued mortality differentials between the different deciles at older ages).

These results demonstrate both the pricing for selected groups on the basis of population-wide assumptions and the opportunity to allow competition in a fully annuitized market to provide price advantages (higher payments) to less advantaged socio-economic groups.

Challenger also asked Watson Wyatt to provide a comparison of indicative rates between lifetime annuities and term certain annuities with a duration equal to life expectancy. This demonstrates that in the absence of a bequest motive lifetime annuities provide higher payments than term certain annuities.

Annuity payments from term-certain annuity of equivalent term for a £50,000 pension fund for different groups for selected ages

Starting age	Annual annuity payment			
	All £	Healthy £	Unhealthy £	Healthy – All £
Men				
50	2561.5	2540.2	2701.2	-21.3
55	2723.0	2687.9	2890.8	-35.1
60	2951.9	2887.6	3158.7	-64.3
65	3282.2	3170.9	3527.8	-111.2
70	3767.2	3587.0	4070.8	-180.2
Women				
50	2511.8	2491.4	2673.2	-20.4
55	2655.2	2626.7	2825.5	-28.5
60	2859.6	2812.3	3060.9	-47.3
65	3157.3	3070.9	3430.2	-86.4
70	3595.1	3455.8	3954.0	-139.3

The comparison of indicative rates between lifetime annuities and term certain annuities with a duration equal to life expectancy demonstrate the effect of future mortality through a reducing number of policyholders receiving annuity payments in future years.

These findings are consistent with the indicative pricing provided by Challenger detailed later.



Guaranteed or Non-guaranteed

Watson Wyatt Modelling of Guaranteed and Non-Guaranteed Asset Allocations

Our previous submission included a paper written by Challenger entitled “The Market Risks Associated with Equity Based Retirement Income Plans”. The paper examined the performance of hypothetical retirement income streams over the 138 years to December 2008. The paper added to an extensive body of literature which concludes that equity-heavy retirement portfolios reliant on equity market risk premiums greater than long term averages (less than 4% over this period) will often fail to meet retirement plan objectives, frequently to an alarming extent. The paper also demonstrated the significantly reduced capacity to absorb market risk in retirement relative to the accumulation phase of an investor’s life in so far as market losses early in retirement together with ongoing capital draws for consumption can irrecoverably impair the ability of the portfolio to deliver the original retirement objectives.

In order to reinforce these findings (or otherwise), Challenger commissioned Watson Wyatt to carry out a detailed investigation into the impact of using lifetime annuities as a replacement for bonds and cash as the defensive element of an individual’s asset allocation. Specifically, Challenger asked Watson Wyatt to extend the work underlying their April 2009 report entitled “Investment and Spending in Retirement – the Longevity Risk Impact”¹ to include lifetime annuities in place of the current defensive component of a retiree’s investment portfolio, and to allow for the impact of platform and administration fees in line with the Rice Warner Superannuation Fees Report 2008. Watson Wyatt was also asked to develop risk measures to capture the variability of outcomes for retirees under differing market scenarios.

Methodology

Watson Wyatt has developed a retirement income model to perform stochastic projections of a new retiree’s income and wealth. Underlying the model are simulated rates of investment returns and other market outcomes such as inflation generated using the Watson Wyatt Global Asset Model. The rates of return and other market variables have averages and variability which represent Watson Wyatt’s long term expectations for returns of various asset classes over full market cycles, derived through a blend of economic theory, historical analysis and the views of investment managers.

The core scenario used in the modelling process is based on the following key non-market assumptions:

- The investor is a single female who retires at 65;
- The initial account balance is \$500,000;
- The asset allocation is 70% growth assets and 30% defensive assets; and
- A target level of income is set at the ASFA-Westpac Comfortable Income level.

The model is run to simulate the performance of two types of portfolios. The first portfolio type (“the non-annuity strategy”) follows current industry practice in that the defensive allocation comprises a diversified portfolio of cash and bonds. Under the second portfolio type (the “annuity strategy”), the defensive allocation is instead used to purchase a lifetime annuity at retirement. Market dependent annuity purchase prices were provided to Watson Wyatt by Challenger. The modelled annuity price is determined by reference to market swap rates which are, in turn, determined from the interest rates at the purchase date generated by the stochastic investment model. In this way, the annuity price varies for each stochastic outcome in the same fashion as the other variables.

Metrics

Watson Wyatt has developed a number of innovative metrics in carrying out this work and previous work to measure outcomes for retirees. Its April 2009 paper focussed on the concept of “ruin”, being the risk that the retiree runs out of money in their account based pension before death. The key metric was the “probability of ruin” which measures the likelihood of this adverse event happening under various portfolio scenarios.

¹ Available at www.watsonwyatt.com



The work that Challenger commissioned saw Watson Wyatt introduce a new concept of “inadequacy”, being the event where retirement income, including the age pension, falls below a predetermined “adequate” level (being the AFSA-Westpac modest income for the purposes of this report). The key metric, the “probability of inadequacy”, then measures the likelihood of income falling below this level prior to death. This measure was introduced since the possibility of ruin does not exist in a portfolio containing a lifetime annuity - the annuity, by design, does not “run out”.

The analysis also examined the remaining account based pension balance at each future age. This amount represents the bequest that the retiree would leave to their estate if they died at that age. This balance is used as a measure of risk. Specifically, the balance under the “worst” and “best” outcomes for a particular portfolio (being the 5th percentile and 95th percentiles respectively) shows the inherent risk, both downside and upside, in a portfolio strategy. Innovatively, Watson Wyatt permits a negative balance to emerge in the modelling which reflects the cumulative amount of income shortfall relative to the target income level. Viewed in the context of reverse mortgage products available in the market, a negative balance takes on a more practical meaning as the amount that would be drawn under such a product to fund target consumption.

Results

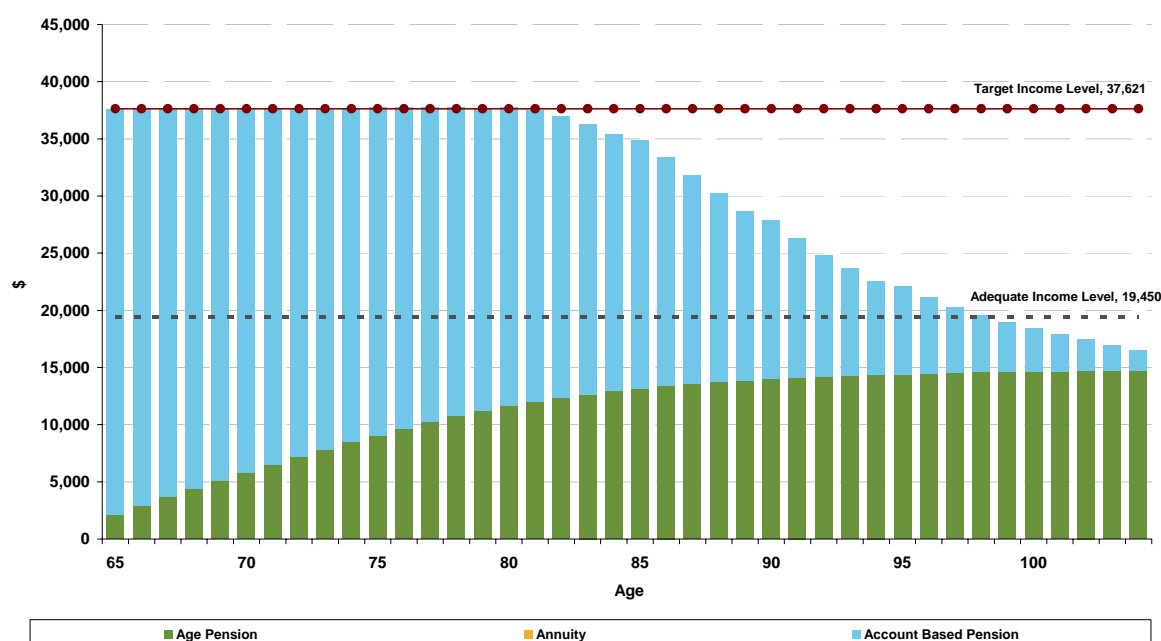
The results for the core scenario are shown in the following table and Figures 1.1 to 1.3 below.

Core scenario results – impact of purchasing an annuity

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
500,000	37,621	19,450	Non-annuity	42%	-167,867	18,682	348,781
500,000	37,621	19,450	Annuity	4%	-121,776	98,179	563,188

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; High Fees.

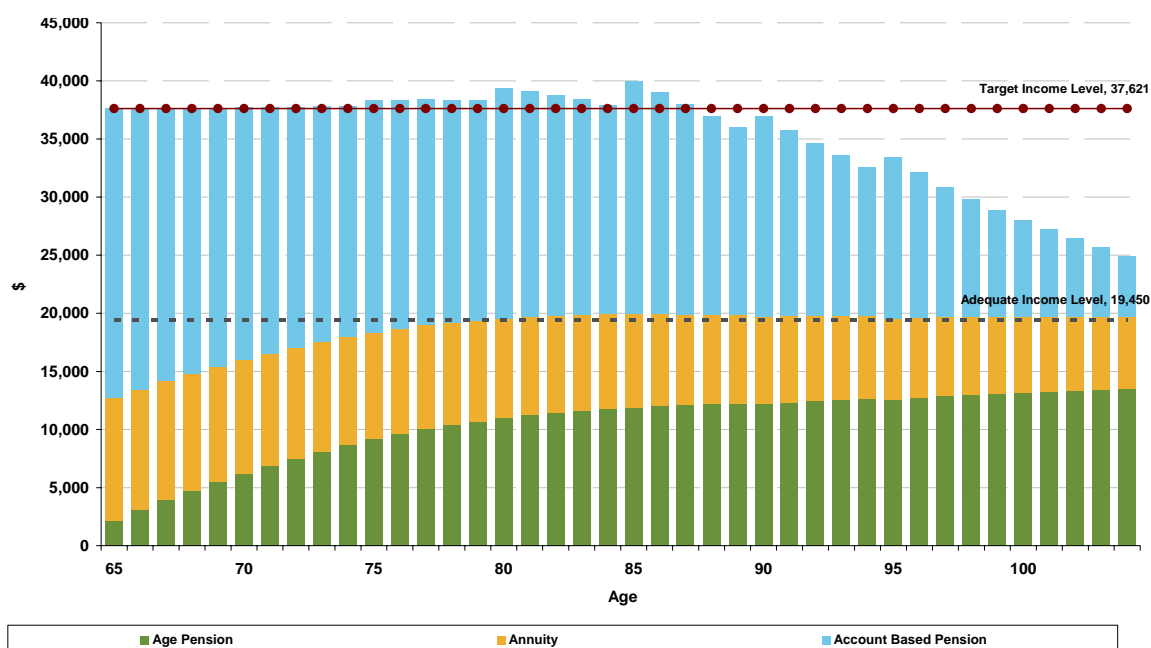
Figure 1.1: Average retirement income - No lifetime annuity purchased at retirement





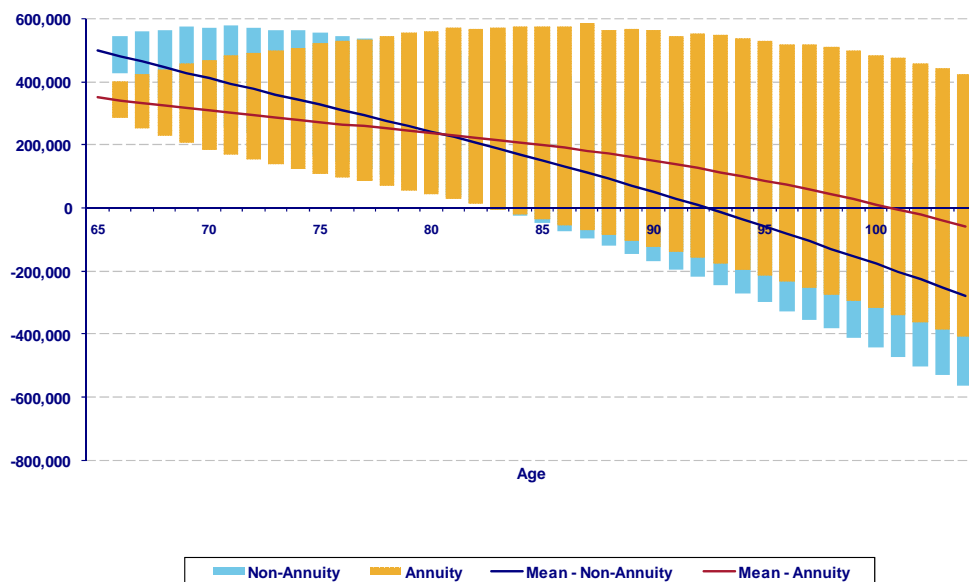
Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; High Fees

Figure 1.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; High Fees

Figure 1.3: Remaining account balance - 90% Confidence interval



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; High Fees



These core results show that replacing the defensive component of an account based pension with a lifetime annuity on the terms modelled, materially lowers the probability of inadequacy. It also results in a larger remaining account balance at age 90.

From Figure 1.3, we can see that at earlier ages, larger account balances remain under the non-annuity strategy relative to the annuity strategy (a direct consequence of spending 30% of savings on an annuity). Moreover, as evident from an inspection of Figures 1.1 and 1.2, target income is still expected to be maintained until at least age 81 under both strategies. Consequently, if the retiree does not expect to live beyond 81 (and ignoring any selective pricing that may be available from the annuity provider if there is a reasonable basis for this view) then the non-annuity strategy delivers a better result (at least in terms of the bequest for her estate).

However, beyond age 82, the annuity strategy performs better than the non-annuity strategy, with an expectation of higher account balances, target income maintained for a further 6 years, income maintained above the “adequate” level until after age 100 (a test not met by the non-annuity strategy), and a reduction in the amount of income sourced from the aged pension.

Watson Wyatt investigated the sensitivity of these results to variations in initial account balance, asset allocation and platform and administration fees. While there are some interesting results (most notably in relation to comparing the risk and return outcomes of a 100% annuity strategy to more risky alternatives), the broad conclusions outlined above continue to hold.

These results are driven by many factors but an important contributor is the higher returns generated by the annuity relative to the account based defensive option. It is interesting to note that a government provided annuity (without subsidy) would be priced using yields in line with government bonds. This is likely to result in erosion of a considerable portion of the annuity outperformance.

Implications

Conventional wisdom, at least that propagated by industry incumbents with a vested interest in the ongoing popularity of account based products, is that annuities are expensive. Watson Wyatt’s investigation demonstrates that including lifetime annuities in retirement portfolios can be an effective strategy in addressing longevity risk and, more generally, can generate favourable risk and return outcomes. In Challenger’s opinion, the results in the paper very clearly support the argument that retirees will be better off under a system which incorporates compulsory annuitisation.

Annuity Product Set

There are a range of products which take the legal form of an annuity. No one annuity type is unilaterally better than others. Rather, product differences cater to varying objectives and risk-profiles.

The important annuity product variants are as follows:

- Fixed-rate term-certain annuities are the simplest annuity offering a known regular fixed payment for a set period of time. Upon death of the annuitant, any value remaining passes to the annuitant’s estate.
- Lifetime fixed annuities pay a known regular fixed payment for the rest of the annuitant’s life.
- Both lifetime and term-certain annuities can be available as inflation-indexed annuities. This has the result of reducing payments early in the annuitant’s remaining life in return for growth in these payments in line with CPI.
- Both lifetime and term-certain annuities can be made available as deferred annuities meaning that they commence after a deferral period. Deferred annuities will generally carry higher payments due to the time value of money and, in the case of deferred lifetime annuities, a reduced expected number of payments.
- Lifetime annuities can be available with a guarantee period which sees an account balance pass to the annuitant’s estate if he or she dies during the guarantee period. Guarantee periods have the effect of lowering the payment that would otherwise be available.
- Variable annuities come in many different forms and can include features designed to provide the annuitant with exposure to an underlying portfolio of assets or market index. Variable annuities can result in higher



returns earned by the annuitant relative to fixed annuities but this will be at the cost of either higher risk or reduced estate planning outcomes.

Variable annuities are a relatively recent addition to the annuity product set and have grown in popularity in the US, in particular, over the last decade. They can be structured in a variety of ways and contain various product features which carry names such as GMAB (guaranteed minimum accumulation benefit), GMDDB (guaranteed minimum death benefit), GMIB (guaranteed minimum income benefit), GMWB (guaranteed minimum withdrawal benefit), and ratchets (under which the guarantee follows the underlying market up thereby protecting gains in the underlying portfolio).

These product features purport to give the annuitant the benefits of both traditional annuities and account-based pensions, however they come at a cost. The direct costs come in the form of reduced guaranteed payments. Indirect costs sometimes derive from their complexity. A natural consequence of complexity is higher fees and greater risk of loss due to lack of consumer product knowledge. This complexity also has challenges for prudential regulation since variable annuities can create difficult risk management problems for providers.

It is also important to note that the product features which variable annuities provide are not a substitute for compulsion. Offshore experience shows that these product features are balanced against cost resulting in limited uptake. The “build it and they will come” mantra is no more appropriate here than for any other financial product or service. Interestingly it is possible, albeit a little cumbersome, to offer variable annuities wrapped inside an allocated pension under the current rules. If the underlying demand for such products were significant, one would have expected that they would already be offered in this “wrapped” form.

To the extent that variable annuities are part of a retirement incomes policy prescription involving compulsory annuitisation, it is vital that they be required to include a high level of either capital or lifetime income protection. Otherwise the policy change will fail to address a key shortcoming of the current system being the excessive exposure that Australian retirees have to market risk. Australian retirees have the highest equity exposure of any OECD country.

For a number of reasons we caution against solutions which allow funds to pool longevity risk without a guarantee for a number of reasons. Since such arrangements do not address increases in the average longevity of the population, they will not address the public finance issues created by population mortality improvements beyond current expectations. From an individual retiree perspective unguaranteed pools will vary in their effectiveness in reducing longevity risk, since such effectiveness is a function of the size and heterogeneity of the specific pool. Unguaranteed pools are also subject to market risk. Unguaranteed pooling also invites complexity which has implications for regulation and particularly consumer protection (both in terms of fees and the likelihood consumers will not appreciate the risks that they will continue to carry).

Indicative Pricing

Pricing basis

The Commonwealth borrows, by definition, at rates given by the government bond curve. Current market rates (as at 31 August 2009) are shown below together with corresponding rates from the swap curve.

Current market interest rates

Maturity	Government Bond Yield	Swap Yield
15-Apr-2015	5.36	6.01
15-Feb-2017	5.62	6.16
15-Mar-2019	5.78	6.24
15-May-2021	5.80	6.26

As shown, swap yields are between 40 and 70 above the corresponding government bond yields.



Term certain fixed annuities

The Australian retail term certain annuity market prices at a margin above the swap curve. The resulting yields and annual payments to the annuitant, are shown in the table below. **Annuity payments in all tables assume an initial premium of \$100,000.**

Term	NIL RCV* Govt Bond Yield**	NIL RCV Swap- equivalent yield	NIL RCV Annuity yield	Annual Annuity Payment (\$100,000 policy)	
				Private provider	Government provided without subsidy
10 years	5.36	5.94	6.63	\$13,993	\$13,179
15 years	5.46	6.03	6.78	\$10,828	\$9,937
20 years	5.48	6.04	6.82	\$9,311	\$8,357
Life expectancy (60 male)	5.46	5.89	6.71	\$7,747	\$6,759
Life expectancy (65 male)	5.48	5.99	6.79	\$8,419	\$7,437
Life expectancy (60 female)	5.44	5.84	6.66	\$7,383	\$6,390
Life expectancy (65 female)	5.46	5.91	6.73	\$7,840	\$6,850

* RCV = Residual capital value.

** Derived using generally accepted market practice (zero-curve methodology) from the government bond yield curve

As can be seen from the table, the retail annuitant is currently able to earn approximately 130 basis points above the government bond yield. Were such annuities to be provided by the government, the annual payments would be lower than those provided privately since they should reflect the government borrowing cost which is 130 basis points below yields available in the private annuity market. That is unless either the rates are subsidized, or the government accepts the market risk in funding the annuities (which amounts to the same thing).

Term-certain annuities are also available as inflation-indexed annuities. In this case pricing reflects annuity yields approximately 100 basis points above the real government bond curve.

Lifetime annuities

Challenger has calculated the corresponding indicative annual annuity payments that it would be willing to offer consumers for lifetime annuities under a compulsory regime. The table below presents these rates:

Annuitant	Life expectancy	Annual Annuity Payment		First Annual Inflation-Indexed Annuity Payment	
		Private Sector Provision	Govt Provision without subsidy	Private Sector Provision	Govt Provision without subsidy
60 year old male	31 years	\$8,238	\$7,156	\$5,904	\$5,059
60 year old female	36 years	\$7,658	\$6,604	\$5,336	\$4,495
65 year old male	25 years	\$9,039	\$7,923	\$6,726	\$5,874
65 year old female	30 years	\$8,250	\$7,202	\$5,964	\$5,139

Deferred annuities

Life-time deferred annuity prices on a fixed and inflation-indexed basis are presented below and assume taxation and other regulatory impediments are removed. Notably, annuity income would be taxed during the deferral period under the current rules.



Annuitant*	Payment commencement date (Life expectancy*)	Annual Annuity Payment (\$100,000 Policy)		Inflation-Indexed Annuity Payment (2009 dollars, \$100,000 policy)	
		Private Sector Provision	Annuity Payments available from Govt without subsidy	Private Sector Provision	Annuity Payments available from Govt without subsidy
60 year old male	31 years	\$207,101	\$146,869	\$79,146	\$52,405
60 year old female	37 years	\$320,507	\$210,003	\$104,122	\$64,207
65 year old male	26 years	\$182,261	\$137,095	\$80,297	\$58,105
65 year old female	30 years	\$208,370	\$150,358	\$82,032	\$55,455

*Characteristics at time of purchase

Large payments are attainable with deferred lifetime annuities. This is driven by the joint impact of the time value of money and the chance of not being alive to collect the benefit. Clearly, even modest investments would provide a very meaningful top-up to the age pension.

Variable Annuities

Below we present indicative pricing for a variable annuity providing a Guaranteed Minimum Income Benefit or GMIB. As noted earlier, it is the GMIB variable annuity which is the closest to being a true hybrid between an account-based pension and a traditional lifetime annuity.

Annuitant	Life expectancy	Traditional lifetime annuity payment	Death benefit (no market risk)		GMIB variable annuity	
			Benefit fee*	Annual Payment	Benefit fee*	Annual Guaranteed Payment
60 year old male	30 years	\$8,238	40 bp	\$7,432	160 bp	\$6,535
60 year old female	36 years	\$7,658	30 bp	\$7,185	150 bp	\$6,204
65 year old male	24 years	\$9,039	70 bp	\$7,934	190 bp	\$7,106
65 year old female	29 years	\$8,250	50 bp	\$7,565	170 bp	\$6,669

* Deducted from account balance annually

The table shows that the inclusion of a death benefit for estate planning and protected market risk comes at the cost of reduced income in retirement. It is a reasonable claim that variable annuities provide the benefits of protected income and market upside but such benefits come at a cost. There is no free lunch – an appropriately structured GMIB variable annuity could reasonably expect to deliver a 20% lower guaranteed set of payments than a traditional lifetime annuity.

Public or Private Provision

The proposals put forward in submissions for public provision are in three forms:

1. The government provides higher Age Pension payments to retirees over 80-85 years of age, either means tested or as a universal entitlement.
2. The government offers credits for a larger means tested Age Pension to retirees who forego means tested Age Pension entitlements for a period.
3. The government becomes a product provider by allowing retirees to use their superannuation benefits to buy an un-means tested top up to their Age Pension.

The first two of these proposals encourage retirees to use their superannuation benefits more heavily and therefore earlier. This would meet two public finance objectives. First, using superannuation benefits more heavily will result in some reduction in Age Pension as a result of the means test. Second, if superannuation benefits are exhausted they



will not be available for estate planning. However, the resulting reduction in Age Pension costs in the early years of retirement would be replaced by larger later budgetary costs with taxpayers carrying a significantly increased burden of longevity risk. Compared to the use by retirees of privately provided annuities, both proposals would see the government accepting additional market and longevity risk, through the Age Pension.

The third proposal could be done either on budget or funded. If it were done on budget the return to retirees would reflect the risk free rate for issuing new government bonds that the purchase price for the additional income stream would replace. Without a subsidy this would be lower than the rate a private life office could offer the same annuitant for a lifetime product reflecting the higher yielding assets it would purchase to fund the annuity. If the government decided to “fund” the annuity with other assets it would have to accept the same market risks as a life office. The government would also carry the implementation risk of integrating the new annuity system with its existing delivery of Age Pensions as well as the operational risk. The government would carry the same market and longevity risk as a life office on an ongoing basis.

The shareholders of life offices have to meet the requirements of APRA’s prudential standards to hold significant amounts of capital against market, longevity and operational risks. In the case of retirees purchasing from the government a top up to their Age Pension, this capital would have to be provided by taxpayers or the costs associated with these risks would be additional budget expenses.

The proponents of this proposal argue that it has a number of benefits over private provision: *“The Government has greater capacity to invest assets in a risky portfolio against long term liabilities of this kind, and it has the lowest possible default risk and cost of capital. By utilizing the existing social security administration, the product would also benefit significantly from economies of scale and scope for extremely cost-effective delivery.”*

The question of relative efficiency of administration is a highly contestable point. Modern life offices, like Challenger, already have low costs and are highly scaleable. On August 27 the Minister for Finance and Deregulation announced that the government had before it a scoping study on its options to improve the efficiency of ComSuper. It has administrative costs for both its defined benefits and defined contributions scheme which are well above industry norms. Challenger is sure it could provide either or both pension top up annuities or inflation indexed ComSuper defined benefits at a lower cost than could be provided by the government. Given the complexity, grafting defined benefit pension arrangements onto the existing Age Pension administrative arrangements is likely to be both risky and costly. It might also have ongoing implications adding complexity to the systems providing Age Pension administrative arrangements.

The proponents of purchased top up Age Pension correctly note that *“the very low uptake of lifetime annuity products results in more rapid run down of retirement savings than is desirable.”* They contend that; *“If the product was fairly priced, which is the intention, the initiative would be revenue neutral from the outset. In the long term, public finances would benefit from the partial transfer of longevity risk; in effect a partial replacement of unfunded public pensions with funded pensions. Fair pricing (and an absence of product options) could minimize the risk of precluding the development of the private annuities market.”*

The statement that *“if the product was fairly priced, which is the intention”* is somewhat at odds with the previous statement that *“the Government has greater capacity to invest assets in a risky portfolio against long term liabilities of this kind, and it has the lowest possible default risk and cost of capital.”* The suggestion that the product should be fairly priced has three dimensions, each of which require careful analysis.

We have already noted above that if the returns reflect the government’s risk free cost of capital they will be lower than the returns on the same investment in an annuity provided by a life office which earns higher returns. That does not seem to be a fair price for the retiree, unless they are explicitly buying the Age Pension top up because they are seeking a government guarantee. If this is the value proposition the government intends to offer it should first consider carefully whether it is appropriate, given other current and future fiscal pressures, for it to become a provider of a government guaranteed annuity product offering a low rate.

If as is proposed, the government were to fund the scheme with more risky assets than a life office, it would need to hold capital against all of the related market, longevity and operational risks. While the government may be able to borrow at a lower rate than a life office, a proposition which will be dealt with in more detail below, it would be



necessary for the government to hold a much larger quantum of capital against a portfolio of riskier assets, and the cost of that additional capital would have the effect of reducing the extra return to the retiree promised by the government from those riskier assets. It would only not be the case if the government funded the top up to the Age Pension on the basis that it provided weaker provisioning than the capital standards APRA applies to a life office. That would be a major departure from the principle of competitive neutrality and, as such, would not be fair pricing.

Unfair pricing, which does not recognise the actual capital requirements, would eventually result in losses being born by taxpayers. An obvious precedent is the South Australian Government's SGIC (State Government Insurance Commission) which was established with insufficient capital, relied on a government guarantee, and failed resulting in very heavy losses. This was not fair to taxpayers.

The proponents of the purchased Age Pension top up are correct in saying that the government has "*the lowest possible default risk*" as evidenced by the fact that the Australian Government has a sovereign AAA credit rating. As discussed below, retirement incomes policy will have a significant bearing on future ratings agency assessments.

Cost of Capital

Challenger commissioned Access Economics to examine the implications of using the government's AAA rating and therefore low cost of capital to provide an advantage in pricing a publicly provided annuity. Their report is attached as part of this submission.

In summary, Access Economics concluded that the government could use its capacity to borrow at the risk free rate in the short term to benefit buyers of publicly provided annuities but that would not benefit Australians as a whole and the funding advantage would be eroded over time.

The central issue is that labelling borrowing as 'public' or 'private' does not change the inherent risk in a transaction, but only who bears that risk. The cost of the marginal transaction – paying upfront now for an income stream to follow – is the same regardless of whether done publicly or privately. Over time, public provision would either draw directly on the Budget or tend to dilute the cost of capital advantage to public sector borrowing as a whole.

Access considers two theoretical economies.

The first with no net government debt, and all private borrowing subject to the full risk inherent in its underlying economic activities.

The second economy is identical in structure to the first, except for a government guarantee on all debt transactions, funded through an efficient income taxation system.

The first economy faces credit defaults on occasion, which are absorbed as costs by creditors, resulting in a higher pre-tax private cost of capital to cover those risks.

The second economy has no defaults because they are covered by the government guarantee, so it has a lower pre-tax private cost of capital, but higher taxation which constrains the level of economic activity.

With this simple comparison Access demonstrates that;

"Some of the costs of default risk can be covered by governments, but only at the cost of externalising the risks toward other parts of the economy...the initial apparent 'savings' on interest payments are in fact matched by costs elsewhere in the economy over time – it is just that the savings are more obvious and the costs more diffuse."

Debt markets prefer government debt over private borrowing because governments are less likely to default than corporations, governments enjoy superior credit ratings in part because they have the ability to pass on the cost of debt to taxpayers. Access notes;



“Such a transfer of costs is a key benefit for debt investors, who are only interested in recovering their money. It does, however, come at a price – lower living standards for taxpayers and collateral damage to the economy as higher taxes discourage investment and workforce participation.”

If markets are well informed, the cost of capital advantage enjoyed by governments is likely to be eroded as more borrowing increases the risk attaching to government debt. Even if markets do not fully adjust, the actual resulting risks are passed to taxpayers.

While markets hold the view that government activities are better risks than business activities, Access says;

“when governments borrow in order to fund the purchase of business assets (as would be the case for a public annuity offering), then that view is diluted. Sophisticated markets are able to look through the public sector ‘label’ placed on borrowing to the assets underneath, attaching similar levels of risk to those for private borrowers.”

Access points out that there are serious implications in adding to the government’s debt exposures;

“Increased borrowing costs on all Government debt would offset the borrowing cost advantage on new debt – effectively negating the cost of capital advantage of public provision.

That means debt sustainability matters and that governments cannot borrow in a manner which steadily increases overall leverage in perpetuity. Doing so would threaten fiscal sustainability, and hence external stability, the government’s credit rating and the cost of credit. An iron rule of economies is that ‘somebody pays’.”

Access summarises the government’s current exposures from official sources, as follows;

“On official forecasts, the total stock of CGS on issue (which is a proxy for gross government debt) is expected to peak at \$301 billion by 2012-13 (over 20% of GDP). It is likely that this elevated level of debt will be with Australia for some years to come.

Contingent liabilities represent possible costs to the government arising from past events or decisions which will be confirmed or otherwise by the outcome of future events that are not within the Government’s ability to control. They include loan guarantees, non-loan guarantees, warranties, indemnities, uncalled capital and letters of comfort. These possible costs are in addition to those recognised as liabilities in the consolidated financial statements of the Australian Government general government sector.

Current quantified contingent liabilities are \$930 billion. This is around 78% of GDP in 2009-10. When outstanding gross debt is taken into account together with the contingent liabilities, this takes the total government potential exposure to over 90% of GDP in 2009-10.”

Access finds that there is no sustainable funding advantage from government provision of annuities;

“Even if markets have a degree of unmet thirst for Australian Government guaranteed debt as of today, there is less likely to be any such unmet demand in coming decades, when Government debt is projected to rise. That is important because markets tend to be less forgiving of governments which already have higher debt ratios. The intergenerational pressures associated with an ageing population threaten to produce significant primary deficits over coming decades.

The deterioration underway in the current and future creditworthiness of Australian Governments adds to the reasons to believe that there is no economy-wide ‘free lunch’ to be had in the Federal Government directly selling annuity products to Australians. The initial apparent ‘savings’ would disappear over time – public annuity provision is more likely to, for example, either add marginally to the overall cost of public sector borrowing and/or add marginally to the overall cost of commercial bank borrowing used to finance Australian home and business loans.”



Access concludes that;

“Given the direct and indirect costs of government borrowing, it is unclear that the public sector has or will continue to have a cost of capital advantage over the private sector.

Such a conclusion is supported by a number of papers which state that, in the absence of market imperfections, the cost of capital for public projects should be the same as the cost of capital for comparably risky private ventures.

These pressures will be most pronounced at precisely the time that a greater call on government resources would be needed to militate against longevity risk arising from an ageing population.”

Implications of Public Provision for Sovereign Credit Rating

Challenger commissioned Chris Dalton Consulting to evaluate the implications of public provision of annuities on the Commonwealth’s sovereign rating. It’s principal, Chris Dalton, was the Country Head of Standard & Poor’s in Australia until 2007.

The report provides background on the methodologies of the major credit rating agencies and the reasons for Australia’s current high sovereign ratings. Each ratings agency publishes separate criteria for rating sovereigns. The key factors are:

Resiliency to Withstand Shocks

- Political Risk & Institutional Strength
- Economic Structure
- Economic Growth Prospects

Government Fiscal Discipline

- Fiscal Flexibility
- General Government Debt Burden
- Contingent Liabilities
- Monetary Flexibility
- External Liquidity
- External Debt Burden

Ratings are forward looking measures, so the rating committee heavily weights trends and potential developments including political risks and economic shocks in forming a forward looking view of debt servicing capability.

Both Moody’s and Standard & Poor’s currently rate Australia at the highest level, Aaa and AAA respectively, while Fitch rates it one notch lower at AA+.

Dalton notes that the key strengths underlying Australia’s credit rating are:

- *Open trade policies, free-floating exchange rate, and a market orientated regulatory regime that provide a favourable environment for growth.*
- *A local economy that continues to show resilience to global slowdowns despite exposure to volatile agriculture and mining sectors.*
- *While near-term trends are not positive with deficits projected to continue beyond 2013, a history of long-standing fiscal prudence and previously strong budgetary position underlies expectations that fiscal discipline will return over the medium term.*
- *Low levels of general government debt - well below medians - provide a degree of fiscal flexibility. The rapid rise forecast in Commonwealth Government net debt over the near term is manageable due to a low starting point.*
- *Strong institutional frameworks with high levels of political consensus, strength and conservatism of Australian banks and banking system, and a well-developed domestic capital market.*

Dalton identifies the major risks to Australia’s rating as:

- *Persistent and widening current account deficits and heavy net external indebtedness well above median ranges for rating category, leaving Australia exposed to shifts in international confidence. Within this, high*



levels of household indebtedness are particularly noted by Fitch, which has Australia one notch below its highest rating.

- Rising social welfare spending and risks of long term shift in budget balances to address costs of an ageing population.

Dalton summarised the emphasis each of the rating agencies put on the fiscal implications of the ageing population:

“The impact of changing demographics on sovereign government’s creditworthiness is widely acknowledged as the greatest challenge facing global public finance.

And unlike the unpredictable nature of global recessions or localised impact of war, almost all developed economies will be affected by this well understood and highly predictable change.

Moody’s view a government’s ability to increase pension contributions, postpone retirement age and lower pensions as important tools in the management of public finance liabilities.

S&P has undertaken by far the most extensive analysis of the rising longevity risk and the impact of this megatrend on ratings over the longer term. In the years of 2004, 2005, 2006 and 2007, it published global graying reports which attempted to quantify the size of the challenge facing sovereign governments by the ageing population².”

As Government age-related spending grows, the economic weight of government increases with it. The key elements of age-related spending considered by S&P were the aged pension, healthcare and long-term care. Aged pensions are expected to exert the most pressure on government spending with an average of 8.7% of GDP across the sample in 2005 increasing to an estimate of 12.8% of GDP in 2050.

Under the ‘no policy change’ scenario, S&P has indicated that many highly rated sovereigns will be under pressure from early in the next decade.

Hypothetical Ratings Outcomes under No Policy Change Scenario

	2007	2020	2030	2040
Australia	AAA	AA	A	Spec.
Canada	AAA	AAA	A	A
Japan	AA	Spec.	Spec.	Spec.
Sweden	AAA	AAA	A	Spec.
USA	AAA	A	Spec.	Spec.

Source: S&P Global Graying Report 2007

S&P compared general government balances with the median for each rating category averaged over the period 2000 to 2008, and found that on this no policy change basis many “AAA” rated sovereigns will hypothetically fall to at least AA by 2020 and then to speculative grade by 2030. However, S&P went on to state, “It is inconceivable that governments will allow debt and deficit burdens to spiral out of control,”³ and that “The financial linkages between social security and fiscal policy call for decisive defensive steps now.”⁴

Dalton notes that this analysis is timely reminder to sovereigns that they need to take action now to address the looming fiscal burden of an ageing population and that a:

² M Kraemer “In the Long Run, We are All Debt: Aging Societies and Sovereign Ratings”, *Standard & Poor’s Global Graying Report 2005*, 28 June 2005; M Kraemer “Global Greying: Ageing Societies and Sovereign Ratings”, *Standard & Poor’s Global Graying Report 2006*, 27 June 2006; M Kraemer “What a Change a Year Makes: Standard & Poor’s 2007 Global Graying Progress Report”, *Standard & Poor’s Global Graying Report 2007*, 19 Sept 2007.

³ *ibid*

⁴ M Kraemer “Global Greying: Ageing Societies and Sovereign Ratings”, *Standard & Poor’s Global Graying Report 2006*, 27 June 2006;



“Continued demonstration of a commitment to ongoing principals of fiscal prudence including addressing the impending costs of aged-related services will be paramount to preserving the current rating.”

Dalton cites S&P’s Graying Report on the consequences of inaction:

“From a political perspective, as the general population ages, so does the proportion of the electorate that is entitled to aged pensions and other benefits. ‘If no fiscal or structural reforms occur, the resulting social inequities and tensions would have the potential to undermine the very foundations of solidarity and cohesion on which most societies are based.’⁵ Without reform, S&P have stated that this would likely lead to ‘a deterioration in economic prospects, as rising tax levels could cause the accelerated outward migration of ever more mobile factors of production (especially capital and skilled labour), endangering the very sources of growth and fiscal revenue’⁶ So while the key ratio of General Government Balance-to-GDP is driving the hypothetical ratings, this downwards trends would also be supported by high debt and debt servicing burdens, and potential weakening in economic prospects and institutional stability.”

And a Moody’s credit opinion on Australia as recently as May 2009:

“Moody’s has highlighted the long term risk that longevity and aging pose to their current rating of the Commonwealth when they noted ‘any trend or event that caused a long term shift in budget balances to significant deficits and an increasing public debt burden might put downward pressure on the rating. Such trends could include, for example, fiscal costs associated with an aging population’.⁷

‘While the fiscal burden is well into the future, policy measures to address it will have to be initiated in the near term’. Failure to manage costs of an ageing population as a key factor that may cause “a long term shift in budget balances to budget deficits and an increasing public debt burden might put downward pressure on the rating”⁸.

Dalton provides some useful perspective on the underlying demographic factors and policy initiatives of comparable countries as they seek to address the fiscal imperatives of an ageing population.

Australia is one of a few countries that has taken steps to prefund a portion of retirement income streams for its ageing population. In addition, the Future Fund was established in 2004 to fund the government’s own employer pension obligations. However Australia also faces the prospect of a dependency ratio of nearly 40% by 2050, which is only slightly below Canada and Sweden.

Canada acted to reform the tax payer obligations arising from its public sector pension plans in the late 1990’s. Contributions were increased and the benefit formulae adjusted. Cash flow surpluses were increasingly given over to investment boards with mandates to develop higher longer term returns through diversified portfolios, rather than the previous investment plans of government only debt.

Sweden has built up assets in the National Pension Fund of around 30% of GDP, and the private pension funds have assets of above 50% of GDP. In order to address this significant obligation, a balancing mechanism has been implemented in the Swedish pension system, which indexes pensions to restore any imbalance of assets (fund balances and estimated contribution revenues) below liabilities (pensions). Sweden has also indexed benefits to current life expectancy, providing a significant buffer to future obligations.

The USA, from a significantly younger average starting point, is forecast to have a retirement population of only a third of the working age population, led in part by the increasing inward migration and the higher fertility rates of the

⁵ M Kraemer “Global Greying: Ageing Societies and Sovereign Ratings” , *Standard & Poor’s Global Graying Report 2006*, 27 June 2006

⁶ Ibid

⁷ Moody’s Investors Service Credit Opinion: Government of Australia, 5 May 2009

⁸ Ibid



growing Hispanic and Latino population. One of the key strengths underlying the US rating is the key international role of the US dollar that provides the US with substantially more fiscal flexibility than other countries.

Risks of Public Provision

Dalton points out that the government's withdrawal from direct participation in various businesses has been viewed positively by ratings agencies:

"Over the last two decades rating agencies have increasingly factored in the bi-partisan approach by the two main Australian political parties of removing commercial business enterprise risks from the Government's balance sheet. Privatisation of the Commonwealth Bank, Qantas and Telstra has been a positive factor in the rating of Australia. Rating agencies have viewed favourably the policy of various Australian Governments to contain Government activity to traditional provision of services such as defence, healthcare, education and income and age support.

Government policies which introduce a greater degree of fiscal risk or introduce new risks to the balance sheet will weigh heavily in the determination of the rating. The fiscal conservatism of Australia's major political parties and the ongoing policies to remove commercial risk from the balance sheet of the government have been positive factors in Australia's credit rating."

Dalton makes it equally clear that the rating agencies would take a negative view of public provision of annuities:

"Introducing investment in annuity products as a key part of Australia's retirement income policy would be considered as a positive response to the issue of adequacy of income in retirement. However, any consideration by the Commonwealth to directly create and provide annuity products would indicate to rating agencies a significant change in the philosophy of the role of government from that followed over the last two decades.

Rating analysts could be expected to view negatively any move by the Government sector to enter into a new financial services business providing annuity products to retirees. Rating analysts would consider the investment, administration and longevity risks the Commonwealth would take on to enter into the annuity market as contingent liabilities of government. This view would be held regardless of whether the annuity scheme was provided directly through a Government department or agency (eg. Centrelink) or via an investment fund such as the Future Fund."

Dalton specifically names a number of adverse precedents that would support that view:

"The history of Australian governments being directly involved in the financial services sector has not been stellar. The collapse of financial institutions owned by Australian state governments in the 1980's such as State Bank of Victoria, Tricontinental Corporation and State Bank of South Australia are examples of the significant risk government can take on when using the balance sheet of government in the financial services sector."

Dalton notes that the implications for the rating of public provision of annuities would be the same whether the annuities were provided on or off the government's balance sheet:

"Prior to the GFC it was common for many financial institutions to fund assets off-balance sheet. The experience of the GFC has demonstrated how quickly the risk and liability of such financial strategies can come back on balance sheet.

Rating analysts look closely at off-balance sheet and contingent liabilities when evaluating credit risk. In the case of Australia's rating the contingent risk of the credit guarantees given by the Export Finance and Insurance Corporation, a statutory authority, is factored into the modelling of Australia's liabilities even though the absolute risk of these is a modest 1% of GDP.



If the Government decided to directly provide annuities, the credit risks of such a policy would also be modelled and evaluated by rating analysts. While annuities will be backed by assets transferred from retirees, there is a significant degree of market and investment risk that will need to be managed by the Government in order to meet the contractual obligations under the annuities.”

Dalton provides two scenarios to demonstrate the additional contingent risk the government could be carrying if it embarked on public provision of annuities. In providing these scenarios he makes it clear that contingent liabilities are not treated the same as the liability of Commonwealth Government Securities but they are still analysed based on the exposure at risk and probability of that risk materialising: :

“Scenario A (worst case) is an indicative representation of the potential absolute increase in the size of Government liabilities should it commit to a policy of public provision of annuities, with only a 10% take up of government annuities. For the purpose of comparing relative orders of magnitude, these potential new contingent liabilities of \$103billion are presented in the table alongside the Budget estimate of net debt of \$188 billion in 2013. This is an amount equal to 54% of the estimated 2013 net debt.

Scenario B (base case) recognises that the actual contingent risk transfer would occur over time as superannuation assets are moved from accumulation to pension phase. In this scenario it is assumed in 2013 that 20% of the \$1.03 trillion in superannuation assets belong to retirees, and that 10% of those assets have been used to purchase a government annuity. In that case the Government’s contingent liability would rise by \$21 billion. This represents an additional 11% of the forecast net position taking this comparison of government liabilities to almost \$209 billion in 2013.

The risk to the Government in providing annuities will be crystallised when markets and investment risk materialises as it did in the GFC. In this situation the contingent liability of a public provision of annuities policy can turn into a real liability. The GFC has demonstrated the drastic impact on investment markets and valuation of retirement assets. Australian superannuation funds lost around 27% of value during the GFC. If we stress the contingent liability of \$20.6 billion in Scenario B, a future 25% decline in the market value of retiree assets transferred to government, could result in an actual liability of \$5.15 billion reducing the value of assets to meet annuity obligations to \$15.45 billion.”

Hypothetical Net Debt with Contingent Liabilities from Public Annuities

Whole of Government Liabilities	Scenario A \$million Worst case	Scenario B \$million Base Case
General Government Net Debt Est. 2012-13	188,175	188,175
Assets backing public annuities based on \$1.03 trillion Superannuation (Mar 2009)	103,000	20,600
Total estimate debt plus contingent annuity liability		208,775

Sources: Budget Papers and APRA

Dalton also draws attention to the inherent risks of the government being a direct and active participant in markets on a scale sufficient to operate as a very large scale annuity provider:

“If the Commonwealth Government were to directly provide annuities it would have to become a major market maker in the primary domestic equity, fixed income, property and derivative markets. This would arise simply due the quantum of funds it would need to invest to back the long term obligations under the annuities. This is in addition to the already significant impact the Commonwealth Government will have as a borrower to fund the increased deficit and new infrastructure plans. Such an active and significant role in asset markets would likely be viewed negatively by international investors and rating analysts who currently view Australia as an open well regulated capital market free from government intervention.”

Dalton summarises the implications for Australia’s sovereign rating of public provision of annuities in the following terms:



“A policy of public provision of annuities to retirees, while addressing ageing and longevity, is likely to be viewed by rating agencies as failing to adequately safeguard public finances by imposing both large contingent and real risks to future fiscal policy. Rating agencies are looking for ‘AAA/Aaa’ rated countries to have policies that generate budget surpluses. Policies that weaken the fiscal position or potentially introduce structural budget deficits are likely to lead to rating views with downgrades to the Outlook of the sovereign rating or the rating itself.

A policy of public provision of annuities either for all retirees or those with small superannuation balances can be expected to be considered by rating agencies as a sub optimal use of the Government’s capital to maintain fiscal solvency.”

Merits of Private Provision and Partial Annuitisation of Superannuation Benefits

In contrast, Dalton notes that the private sector in Australia is much better placed in terms of experience, skills and infrastructure to provide annuity products:

“Australia’s insurance and investment markets comprise a competitive landscape of local and global insurance companies and financial services firms who could relatively easily mobilise to provide a choice of annuity products.

The financial services and superannuation markets in Australia are well regulated and could take responsibility for overseeing and regulating an expansion of the annuity market as part of a revised retirement income policy. Australia already has an established and tested regime of prudential supervision of both life insurance and superannuation. APRA and other regulatory bodies of Government have the skills and experience to administer an expanded market of private sector annuity providers. The fact that Australia has this regulatory infrastructure already in place would allow the Government to relatively quickly implement a policy of private sector annuities as part of a revamp of its retirement income policy.

In implementing a policy of including an annuity component in retirement income policy it seems logical to utilise the infrastructure in the private sector. Competition among private sector providers would generate a wide selection of competitively priced annuity products with competition driving ongoing innovation, product enhancement and customer service.”

Dalton recognises that retirement income policies must address both the accumulation phase and the retirement phase. He cites analysis by Mercer portraying the prevalence of lump sum benefits negatively as a feature of Australia’s retirement income policy and says it can be expected that ratings analysts would have a similar concern. Mercer argues that enhancements are required to limit access to, or reduce the tax effectiveness of, lump sum payments and to increase the amount required to be taken in income form such as annuities. He notes this view coincides with the OECD view that there is a growing need for insurance based products, such as annuities, to provide retirees with a guaranteed income as long as they are alive. The OECD suggests a high degree of annuitisation preserves retirement incomes and therefore works to protect public finances. Further the OECD also suggests a spin off benefit of annuitisation is that it increases the sophistication of the country’s financial services markets which would further assist the Government’s aspirational objective to promote Australia as a financial services centre.

Dalton makes a number of observations about proposals to require annuitisation of part of retirement benefits:

“The Government needs to formulate policies now to provide incomes for retirees that are not funded from the public purse.

The proposal, to require Australian retirees to take a sizeable proportion (30%) of their retirement savings either as an immediate or deferred lifetime annuity, would be of positive significance to credit rating agencies in considering the policy settings of the Government to maintain a conservative fiscal strategy over the longer term.



To require 30% of all superannuation withdrawals to be taken as an annuity stream would contribute to a solution to the ageing population without a cost to the budget and without weakening the income available to the post working age population. Access Economics research indicates that if 30% of retirement savings were invested in annuity products, a saving of up to 5% in the cost of the age pension could be achieved by 2040.

The proposal will also result in immediate qualitative benefits. A significant increase in retirement incomes above the full aged pension will reduce pressure on government to justify the sustainability of current aged pension arrangements. With less people dependant on the aged pension over the near term, there should be less pressure to increase the base rate over the near term. And the government remains free to use financial capacity to provide incentives for people on low incomes to increase their retirement savings, ahead of the impending dependency bulge from 2020.”

Conclusion

In its submissions Challenger has taken the view that retirement incomes policy has two major dimensions that must both be addressed together:

1. the adequacy and effective use of retirement savings to increase retirement incomes and cover longevity risk; and
2. the major public finance pressures arising from the ageing of the population.

Any retirement incomes policy solution must address both sets of issues to be sustainable. The fact that Standard & Poor's has assessed Australia, amongst a number of other developed economies, as being on a path that without retirement incomes policy change, will lead to a succession of downgrades to a Speculative rating is evidence of the need for substantial reform. That message was reflected by the IMF which in their 2009 Article IV Consultation on Australia Concluding Statement said;

“Looking further out, while some pension and health care reform has been included in the budget, remaining longer-term pressures from aging and rising health care costs argue for more policy action.”

Given the size of the fiscal pressures in these areas, which have been well documented by Treasury in successive Intergenerational Reports, it is evident that there is a need for policies which will reduce future budget pressure from Age Pension requirements and minimise the government's exposure to market and longevity risk through the broader retirement income system.

Challenger has been conscious of these needs from the outset and has proposed that retirees be required to take part of their superannuation benefits in a form which adequately addresses their own exposure to market and longevity risk. In our previous submission we provided independent actuarial analysis that demonstrated that this could be done effectively using traditional lifetime products in the form of either immediate or deferred annuities.

Much has been made by others in the course of the current public debate of Australia's relatively small and underdeveloped annuity market. Since current tax, pension and prudential rules severely inhibit the ability of life companies to provide deferred or market linked products, that is a matter which in the first instance must be addressed by government.

In our previous submission we demonstrated that the allocated pension products currently being offered to retirees are typically failing them even before they reach average life expectancy. The research summarised in this submission shows that there are significant behavioural barriers which will inhibit widespread take up of longevity cover to address those defects, without inducement, either in the form of incentives or an element of compulsion. Given the fiscal pressures and the related need that the inducements be effective, we have framed our proposals around compulsion.



The need to address both the future level of aged poverty and government fiscal imperatives justify changes to the pension rules to ensure sustained retirement income above full Age Pension levels, some protection from market risk, and adequate longevity cover.

This submission presents new independent actuarial evidence which demonstrates that if an asset allocation includes a guaranteed component it will outperform a portfolio with an allocation of the same size to traditional defensive assets. The outperformance of this asset allocation strategy is attributable to a number of factors:

- capital guarantees underwritten by the life office;
- access to part of the liquidity premium;
- absence of fees on the defensive portion of the portfolio; and
- expected higher performance of the growth component of the portfolio because there is no need to rebalance.

While there is a relatively small group of very affluent retirees for whom such strategies are unnecessary because they have sufficient private wealth to cover their retirement income needs, longevity risk and estate planning objectives, for the majority of current and future retirees adequate protection from market and longevity risk is an imperative to avoid increasing levels of aged poverty.

As the Superannuation Guarantee system matures there will be a large and growing group of part Age Pensioners for whom market and longevity risk protection on their private superannuation income will maintain higher living standards in later retirement. This is the group whose behaviours are critical in terms of the fiscal pressures facing the government. If their private income is sustained late in retirement because they have adequate market and longevity cover, they will make less call on the means tested Age Pension and will have greater financial capacity to contribute to the cost of quality aged care.

In our previous submission we provided modelling that showed potential budget savings from partial annuitisation in 2040 at a significant 5% of the cost of the Age Pension or 0.2% of GDP. That did not include an assessment of the potential saving to the taxpayer of that group having the financial capacity to make a greater contribution the cost of their own means tested aged care.

The deferred annuity showed superior performance in terms of providing a relatively smooth profile over the course of retirement, a high total income over the course of retirement and higher savings to the taxpayer on the Age Pension. Annuitisation at around 30% of superannuation benefits provides significant market and longevity risk protection and leaves retirees with a substantial pool of assets on which they can seek a risked return or on which they can draw for contingencies.

In this submission we have explored the option of a deferred annuity which only starts to pay at average life expectancy on retirement. This could provide a pure form of longevity protection with an investment of as little as 10% of superannuation benefits to provide a substantial income to those who outlive life expectancy. However it would provide no protection from market risk for income in the early years of retirement.

Many in the industry suggest that it would be uneconomic or pointless for retirees with relatively limited superannuation balances to annuitise a portion of them. In our previous submission we showed how most jurisdictions with compulsory annuitisation allowed very small balances (such as €20,000) to be taken as a lump sum. From an economic perspective we would have no difficulty providing an annuity with a purchase value as low as \$5,000.

We note that for a retiree who is entirely dependent on the Age Pension, income from an annuity of as little as \$20,000 indexed at the CPI would amount to a significant percentage increase in lifetime income. For high wealth retirees there is little fiscal impact and only equity considerations in requiring annuitisation. However, if the government were to require 30% annuitisation of superannuation benefits that would provide a disincentive to the use superannuation for tax deferral and estate planning purposes.

If the annuity rules are altered to ensure a significant level of market and longevity protection, that protection should be provided by a life office. That should be the case whether it is provided as a stand alone product or as part of a



complete retirement income solution. The essential element is ensuring a sufficient quantum of the retirement benefit is subject to market and longevity protection.

In our previous submission we explored the benefits of improving annuity rates by using compulsion to remove adverse selection. Compulsion has the additional benefit of securing a fiscal dividend which could be applied to improving adequacy, such as our proposal for a 30% refundable rebate on all voluntary contributions.

The Report on Strategic Issues raised a question of equity for those groups in the community with lower life expectancies if annuity rates reflect average population mortality. In this submission we have presented material which shows that annuity rates can be set to reflect differences in expected mortality according to socio-economic profile. The actuarial advice suggested a 17.4% higher annuity rate for the most disadvantaged decile over the most advantaged decile. This is an area where an absence of regulation of pricing would allow the market to provide a progressive distribution of annuity rates.

We believe there would be significant political barriers to the government providing this type of pricing if it entered the annuity market.

Less prescriptive arrangements would also provide scope for guarantee periods as well as joint and survivor benefits which would be needed to meet individual circumstances.

Private life offices have a critical role to play in reducing the governments' exposure to market and longevity risk and so supporting the sustainability of Australia's retirement income system. Life offices are efficient and have the necessary financial and operational expertise to provide an array of attractive competitively products to meet the needs of current and future generations of retirees. This can be done without the need for additional subsidy. With appropriate pension rules requiring retirees to cover some of their own longevity risk life offices can provide higher and more secure lifetime retirement incomes with lower budget costs for the Age Pension.

Yours sincerely

David Cox
Head of Government Relations

The Determinants of Annuity Demand: A Literature Survey

Stephen Kidd
7th September 2009

Abstract

Decades of economic analysis starting with Yaari (1965) have pointed to annuities as a major component of optimal retirement consumption plans. Yaari showed that a retiree with no desire to leave a bequest should annuitise all retirement savings. However, the insurance industry has long faced the dilemma that most retirees do not convert any retirement assets into annuities: the so called annuity puzzle.

The paper begins by presenting the key theoretical models and their normative implications. Following this, the literature explaining the annuity puzzle is reviewed. The paper concludes that, given the rational explanations, full annuitisation is unlikely to be optimal; however the irrational or behavioural biases evident in consumers facing the annuitisation decision are more than sufficient to prevent an optimal welfare outcome.

Given Australia's ageing population, and the effects of the Global Financial Crises on Superannuation balances, the importance of understanding the annuity puzzle is clear: if individuals are irrationally undervaluing annuities then there exists the potential to implement policy which is particularly welfare increasing.



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1. Introduction

The economic literature provides a strong theoretical foundation for the normative conclusion that annuities ought to be of substantial value to retirees. It also has the positive empirical implication that we should observe annuities comprising a large component of individual and household portfolios (Brown, 2007).

However, it is clear that there is a large discrepancy between the theoretical result and empirical findings: the demand for annuities is particularly thin, implying that individuals do not value annuities highly; and therein lies the 'annuity puzzle.'

Annuities play a central role in the economic theory of wealth decumulation. By trading a stock of wealth for a life contingent income stream, or a 'life annuity', healthy individuals are able to sustain a higher level of consumption than in the absence of annuities, and are assured that this income cannot be outlived.

If individuals do not have access to annuitisation, then they must allocate their retirement wealth in a manner that trades off two competing risks. The first is the risk that if they consume too aggressively, they increase the likelihood of facing a future period in which they are alive with little or no income. The second is the risk that if they self-insure by setting aside enough wealth to be certain it cannot be outlived, then they risk dying with assets that could have been used to increase consumption while alive (Brown & Warshawsky, 2004).

Also, increasing average longevity and the trend towards earlier retirement presumably makes the problem of ensuring adequate resources throughout individuals' old age more widespread among the population. The adequacy of old age income directly affects the extent of poverty rates among the elderly (Brown & Warshawsky, 2004). In addition, if individuals fail to adequately provide for retirement consumption needs, this could increase the financial pressure on social welfare programs.

Understanding why the annuity puzzle exists is important because there are large potential gains to annuitisation. Mitchell, Poterba, Warshawsky and Brown (1999) have shown substantial gains to annuitisation 'even if the present discounted value of payments from the annuity is no more than 75% of the purchase price'. Typical results suggest that a 65 year old man who does not have access to an actuarially fair annuity market would be willing to forgo roughly one third of his wealth so he could purchase an actuarially fair annuity with his remaining wealth (Brown & Poterba, 2000). Also advocating the welfare benefits on annuities, a sample calculation by Scott (2008), using actual annuity prices, found that a 65 year old male retiree could increase his guaranteed spending by over twenty-one percent by allocating less than eight percent of his portfolio to an age 85 longevity annuity.

The importance of these results is clear: if individuals are irrationally undervaluing annuities then there exists the potential to implement policy which is particularly welfare increasing. The remainder of the paper is divided into 4 sections. Section 2 summarises the theoretical literature pertaining to the optimal level of annuitisation. Section 3 details the irrational, or behavioural, factors which help to explain why individuals (incorrectly) undervalue annuities. Section 4 summarises the reasons explaining the annuity puzzle which are considered rational within the theoretical framework. Concluding remarks are the content of section 5.



2. Theoretical Findings

Yaari (1965) noted that few discussions of consumer allocation over time consider the problem that consumers do not know for how long they will live. As such Yaari set out to address this problem specifically by employing an expected utility framework in which the investment term (i.e. life expectancy) is a random variable with a known distribution. The consumer's optimal choice is then the strategy that maximises his expected utility. Considered a seminal work in this area, Yaari's widely cited result is that certain consumers should fully annuitise all of their savings. To understand this result, Brown (2007) provides the following explanation:

Consider an individual without a bequest motive who cares only about his consumption in the current period and one period hence. If this individual invests \$1,000 in a non-annuitized asset with a rate of return 8 percent, then next period he will be able to consume \$1,080. On the other hand, if the individual invests \$1,000 in an annuity, and if with probability 0.03 the individual will not survive to receive the payment next period, then the insurer is able to pay $\$1,080/(1-0.03) = \$1,102$ to the annuitant, conditional on survival. The extra return provided to surviving annuitants is sometimes called the 'mortality premium' or 'mortality credit', because it is provided in return for giving up one's right to the wealth upon death. For an individual who does not value bequests, the fact that the rate of return on the annuity is greater than the rate of return on the non-annuitized asset for individuals who survive, the decision to fully annuitize is rational.

Critics suggest, however, that these consumers were supposed to satisfy several very restrictive assumptions. In response, numerous studies (Brown, 2003; Brown & Poterba, 2000; Dushi & Webb, 2004; Milevsky, 1998; Turra & Mitchell, 2004) have explored the gains from annuitisation under a less restrictive range of assumptions. These papers find that there are substantial gains to annuitisation, but that full annuitisation is not always optimal.

In what is perhaps the best response, Davidoff, Brown and Diamond (2005) note that the literature subsequent to Yaari's result occasionally relaxed one or two of these assumptions, however the generality of his result had not been formally shown in the literature. Davidoff et al. (2005) present sufficient conditions, substantially weaker than Yaari's, under which full annuitisation is still optimal.

In a world where only individual mortality is uncertain, Davidoff et al. (2005) find that there may be considerable individual heterogeneity in the value of annuitisation. Heterogeneity in annuity valuations is driven by variation in the willingness to substitute late consumption for early consumption. Davidoff et al. (2005) find that even for preferences that stretch the bounds of plausible impatience, a large fraction of wealth is optimally placed in a constant real annuity.

Furthermore, Davidoff et al. (2005) relax the market completeness assumption¹ and find that positive annuitisation remains optimal widely, but complete annuitisation does not. By extending the framework to incorporate other considerations of consumers, Davidoff et al. (2005) find that the rational agents will still demonstrate a considerable preference for annuitisation. Their simulations show that it is "extremely difficult" to find situations where less than two thirds of retirement wealth should be invested in annuities. Given their lack of success in explaining low annuitisation from a rational perspective, they suggest that the observed limited annuity purchases are plausibly due to psychological or behavioural biases.

The near absence of voluntary annuitization is puzzling in the face of theoretical results that suggest large benefits to annuitization... These results suggest that lack of annuity demand may arise from behavioural considerations, and that some mandatory annuitization may be welfare increasing.

(Davidoff, et al., 2005)

Brown (2007) agrees with these findings, stating that even when considering that the annuity market is incomplete, simulations still show that there is an extreme mismatch between the annuities provided by the market and the desired consumption path. That is, a risk averse consumer would still find it optimal to annuitise the majority of their wealth.

¹ A market is complete if agents can buy insurance contracts to protect themselves against any future time and state.



3. Behavioural Biases

The empirical evidence on annuitisation suggests that individuals do not behave as if they value annuities as highly as theory would predict. This section summarises the documented behavioural biases which have been proposed to explain this discrepancy.

3.1 Framing

Brown, Kling, Mullainathan and Wrobel (2008) argue that the context in which annuities are presented to consumers is crucial in explaining why so few choose annuities despite their welfare advantages.

Traditionally, economists have had the underlying view that people are hyper-rational and are trying to maximize their happiness (what economists call utility). If you believe that, then how you package the information shouldn't impact their decisions. But, you have huge swings in how people behave depending on how the information is packaged.

- Jeffrey Brown in Adler (2009)

In their paper, Brown et al. (2008) compare the responses to surveys which emphasize two competing frameworks: consumption and investment. The investment framework focuses on the classic risk and return characteristics of competing financial products, whereas the consumption framework seeks to present different investment options in terms of what level of ongoing consumption they provide through the annuitants' retirement.

The aim of their paper was to see whether the framing of the annuity decision had a material impact on the choices made by potential consumers and the authors find survey participants are significantly more likely to choose an annuity in a context that emphasized spending over the lifecycle as opposed to one that emphasized risk and return.

This line of work was extended by Brown, Kling, Mullainathan, Wiens and Wrobel (2009) in a more robust setting where purchase prices were also mentioned in the consumption frame. Their result confirmed that the main driver of the effect is the overall difference in framing language and not specifically the mention of the purchase price.

Adler (2009) agrees with these findings, commenting that consumers view annuities as risky gambles rather than insurance: "if I die early, I lose; if I live a long time, I win". On the other hand, economists, and insurance companies, view annuities as insurance: not against dying but against the risk of outliving your wealth.

3.2 Cumulative Prospect Theory and Mental Accounting

Over the past few decades researchers have accumulated a large body of experimental evidence on attitudes to risk. This evidence reveals that, when people evaluate risk, they often depart from the predictions implied by expected utility.

In an effort to capture the experimental data more accurately, economists have developed 'non-expected utility models'. Perhaps the most prominent of these is Kahneman and Tversky's (1992) Cumulative Prospect Theory (CPT). CPT's concepts of loss aversion and the subjective probability weighting can be used to explain why retirees avoid annuities even when longevity risk is the only risk.

CPT posits that gains and losses are valued through a nonlinear value function given which is concave for gains and convex for losses, thus yielding a property often called 'diminishing sensitivity'. The convexity in losses can give rise to risk-seeking behaviour, which is at odds with expected utility maximization with a concave utility function. CPT also argues that objective probabilities are weighted by a subjective function which results in the overweighting of low-probability events and underweighting more frequent events. Applied to the annuity puzzle, this suggests that people overweight the probability of dying early and hence losing money on an annuity investment.

Mental accounting attempts to describe the process whereby people code, categorize and evaluate economic outcomes. A now common interpretation of mental accounting, provided by Shefrin and Thaler (1988), is that people mentally frame assets as belonging to either current income, current wealth or future income and this has



implications for their behaviour as the accounts are largely non-fungible and the marginal utility received from consuming out of each account is different.

The notion of mental accounting suggests that risky outcomes are not always evaluated in terms of potential outcomes for total wealth, but often as outcomes more narrowly defined within their own subjective accounts. For example, a person considering a gamble which puts \$10 at risk should, according to expected utility theory, evaluate the overall impact on total wealth; however, behavioural research points to a pattern in which individuals are more likely to evaluate the \$10 gamble in isolation. Any annuity evaluated narrowly as a gamble in its own mental account will look more unattractive, because an annuity shifts money from the present into the future.

In focus groups conducted by the American Council of Life Insurers, some participants viewed the purchase of an immediate annuity as 'gambling on their lives' (Brown & Warshawsky, 2004) implying, incorrectly that annuities increase overall risk in retirement. Hu and Scott (2007) explain this by suggesting that mental accounting can cause a retiree to consider an annuity to be a distinct, risky gamble instead of a way of lessening of the risk of having to reduce spending if one lives beyond their life expectancy. Brown (2007) gives more depth to the explanation by suggesting that the result may be due to both mental accounting and CPT's loss aversion concept.

Rather than evaluating the annuity as part of an overall optimization exercise, individuals may use a narrow framing along the lines of 'will I live long enough to make back my initial investment?' If the question is framed in this manner, it is easy to then see why the product is viewed as a risky gamble. Without the annuity, the individual has \$100,000 for certain. With the annuity, in contrast, there is some positive probability that the individual will receive only a few thousand dollars in income (if he were to die within a few months), some probability that the individual will receive far more than \$100,000 (if he lives well past life expectancy), and a full distribution of possibilities in between. This line of reasoning suggests that if one applies the cumulative prospect theory approach to a narrow framing of the annuity, annuities do not look attractive because the "losses" from the annuity (if one dies young) loom larger in the individual's value function than do the potential "gains" from living a long time.

3.3 The Availability Heuristic and the Conjunction Fallacy

The availability heuristic describes the phenomenon whereby events or facts that are more easily imagined carry greater salience and hence are assigned greater likelihood (Hu & Scott, 2007). In the case of annuities, the availability heuristic may play a role in overemphasizing the possibility of dying shortly after the annuity is purchased, because there are many ways an individual can imagine their imminent demise. This exaggeration of the likelihood of early death would make annuities appear worse.

Gazzale and Walker (Gazzale & Walker, 2009) discuss similar, yet distinct bias referred to as the risk ordering bias. In this case, retirees effectively overweight the early risk (an early death) relative to the later risk (a longer than anticipated retirement) simply due to their temporal order.

The conjunction fallacy (Tversky & Kahneman, 1983) leads individuals to mistakenly believe that a combination of events is more likely than either event alone. In their classic experiment individuals were presented with the following description of a hypothetical woman: "Linda is 31 years old, single, outspoken, very bright and she majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations." Most individuals believed that it was more likely that Linda was both a bank teller and active in the feminist movement than that she was a bank teller. For an annuity purchaser, this anomaly in probability assessment can lead to an overstatement of the likelihood of early death.

Thus, the conjunction fallacy combined with the availability heuristic can lead to a greater emphasis on the potential losses due to early death, without a similar overemphasis on the potential gains from outliving one's life expectancy (Hu & Scott, 2007).

3.4 Ambiguity Aversion

Ambiguity aversion describes the phenomenon whereby individuals are more averse to uncertain gambles (where probabilities of outcomes are unknown) than to risky gambles (where probabilities of outcomes are known).



According to Langer (1974) people do not know the relevant probabilities of survival and so must be uncertain about the probability of potential outcomes. As such it is straightforward to infer that retirees who are uncertain about survival probabilities will be more averse than is optimal.

3.5 Fear of Illiquidity and the Illusion of Control

A significant feature of annuities is their illiquidity: once an investment is made, it is usually very costly to withdraw funds (beyond regularly scheduled payments). In a Society of Actuaries (2004) survey, among workers who were asked what factors were important in choosing a retirement plan payout option, 61% responded that “being able maintain control of your investments” was very important. While the potential requirement for liquidity is certainly a valid reason not to annuitise all retirement savings, it should not be a significant concern when evaluating whether to annuitise modest fractions of retirement wealth. However, similar to the behavioural mistakes individuals make when assessing probabilities of dying at early ages, it is quite possible that individuals also overstate the likelihood of catastrophic events that may require sudden spending that could not be met after annuitisation (Brown, 2007; Hu & Scott, 2007).

In regards to the desire to maintain control, to the extent that individuals are expressing a concern about liquidity, there is a rational element to this objection. It may also be rational to be concerned about control if one is concerned about entering into a long term contract with an insurance company that may go bankrupt sometime during the life of the annuity contract. However, the strength of the objections often registered about control suggests that there is something deeper than a rational concern about liquidity.

It is possible that these objections may be related to the large psychology literature on the “illusion of control” (Langer, 1974) or the tendency of individuals to believe they can control outcomes even when they have no such control. Individuals may well believe that they have more control over their financial future by holding wealth rather than by receiving income. Brown (2007) notes that during a person’s working life, much of the financial advice received emphasises individual choice and control. Thus, it would not be surprising to think that individuals would have a difficult time handing over their wealth to an insurance company in exchange for a monthly income stream over which they have little control.

3.6 Denial

A common psychological notion suggests that individuals do not like to think about unpleasant events (e.g., dying young, or being old but poor). As such, this bias will lead fewer individuals to even consider the annuitisation decision.



4. Rational Explanations

To this point the reasons given for the observed sub-optimal level of annuitisation have been behavioural, or reasons which are considered irrational within the theoretical framework. This section brings to light factors, which are considered rational, that are able to partially explain the relative lack of annuitisation. It is thus generally agreed that partial rather than full annuitisation is optimal (Davidoff, et al., 2005).

4.1 Adverse Selection and High Prices

It has been well documented that annuity prices tend to be higher than actuarially fair levels. These higher prices, sometimes referred to as the 'annuity load' are typically explained by constraints placed on annuity providers and adverse selection. As an example of institutional constraints, several authors cited in Brown (2007) argue that part of the annuity load may also arise from the fact that insurance companies are unable to adequately hedge aggregate mortality risk in the population, and therefore must charge a higher price to compensate for bearing this risk.

The term adverse selection was originally used in insurance and describes a situation where an individual's demand for insurance is positively correlated with the individual's risk of loss. In the case of annuities, it suggests that those who purchase annuities tend to live longer than average. While an in depth discussion of this point is beyond the scope of this paper, it can be understood by way of a simple example: wealthier people tend to purchase annuities; and, wealthier people tend to have access to better health care and hence live longer than average. As a result, annuity providers have to incorporate this phenomenon into the price of their annuities, and so the prices are higher than actuarially fair for the general population.

Regardless of the source of the price mark up, however, the implicit assumption behind the belief that prices drive down annuity demand is that consumers are sensitive to price. Indeed, Friedman and Warshawsky (1990) suggest that such high prices, and low average yields have, in the past, been sufficient to explain the absence of annuity purchases in early retirement. While very little empirical work has been conducted to determine an annuity's price elasticity of demand, there are several pieces of data that suggest that existing loads are not the most important explanation of limited demand. Contrary to the result of Friedman and Warshawsky (1990), the simulation work of Brown, et al. (1999) suggests that the loads are not large enough to offset the utility gains from annuitisation.

4.2 Risk Sharing in Couples

By pooling their resources, a married couple is able to capture a large share of the gains from a formal annuity market. As a result of this risk sharing potential, a couple's willingness to pay for joint and survivor annuities is substantially lower than a single individual's willingness to pay for an annuity (Brown & Poterba, 2000).

An auxiliary to this result is that annuity demand should be higher for single individuals than for couples, which is confirmed by Dushi and Webb (2004). One implication of this is that individuals choosing to annuitise upon the death of a spouse should be observed, yet it is not (Dushi & Webb, 2004).

4.3 Complexity and Confused Consumers

Asset allocation and consumption towards the end of the life cycle is complicated by the uncertainty associated with the length of life. Although this risk can be hedged with life annuities, empirical evidence suggests that voluntary annuitisation amongst the public is not very common, nor is it well understood (Milevsky & Young, 2007).

Behavioural economists and empirical researches have shown that the general population are not particularly good at handling their retirement savings, either because they lack the necessary cognitive ability to solve the optimization problem, because they have insufficient will power to execute it, or sometimes because they are overconfident (Tapia & Yerm, 2007).

An excerpt from Brown (2007) highlights that individuals do not fully understand the annuitisation decision:

In addition to the puzzle that individuals do not annuitize as often as theory would predict, a secondary puzzle pertains to those who do annuitize: the prevalence of guarantees. This feature is somewhat puzzling in the standard life-cycle framework because it is easy to show



that a life annuity with a 10-year period certain guarantee is simply a combination of a two distinct products: (i) a non-life contingent bond that pays back its principal plus interest over 10 years, and (ii) a life annuity with a deferred payout date of 10 years. Given that the loads charged for annuities with a 10-year guarantee are not substantially different from the loads charged for products that are entirely life contingent, it is not clear why individuals want to purchase the first of these products at existing loads, when plenty of alternative investments exist that would provide a better payout at comparable risk for the period of the guarantee.

Brown (2007) suggests that, in general, complexity and information problems may be a rational barrier to annuitisation if the transaction costs associated with obtaining the necessary information are sufficiently high. In this context, however, where the potential welfare gains from optimizing an individual's retirement income plan are quite large, it is unlikely that consumers are making a fully rational decision to forgo educating themselves about annuities because of the perceived costs of doing so. More likely, the average individual may simply lack the financial sophistication to make a fully informed decision about payouts. Smith and Stewart (2007) confirm this suspicion documenting that financial illiteracy is widespread.

Furthermore, anecdotal evidence suggests that the lack of clarity on the benefits of annuities in reducing longevity risk also applies to financial planners and others who are engaged in the business of advising clients on how to prepare for retirement (Brown, 2007). Many financial planners simply ignore the uncertainty about mortality, or they handle it in a naïve way, such as by creating a financial plan with a horizon equal to one's average remaining life expectancy plus five or ten years. Because these approaches ignore uncertainty, the retirement planning process becomes framed in a manner that does not provide a clear role for insurance against low consumption at advanced ages.

4.4 The Bequest Motive

Naturally, if a person wishes to leave an inheritance to a beneficiary, then the individual will not find it optimal to annuitise all of their wealth. This is why the classic full annuitisation result of Yaari (1965) requires that there be no bequest motive. Confirming this theoretical and intuitive result, many early empirical responses to the annuity puzzle, including Friedman and Warshawsky (1990) document that a bequest motive decreases the attractiveness of annuities.

There are problems, however, with viewing bequest motives as the only answer to the annuity puzzle. While bequests clearly lead one away from the full annuitisation result, it does not mean that individuals will not value partial annuitisation. Indeed, under certain assumptions, an individual will simply wish to divide their wealth between their 'own consumption' and their heir's consumption and then fully annuitised the 'own consumption' piece (Brown, 2007).

Simulation analysis by Davidoff, et al. (2005) show that while a bequest motive reduces the demand for annuities, it does not eliminate it in general. Agreeing with this result, Feldstein & Rangelova (2001) show that even in consideration of a bequest motive 'it is unequivocally clear that annuities enhance retiree wellbeing irrespective of risk aversion'. Contrary to the prevailing view, Lockwood (2009) demonstrates that people with plausible bequest motives are likely to be better off not annuitising any wealth at available rates, yet it is conceded that this result depends crucially on the degree to which people value the large bequests that may arise incidentally from self insuring lifespan risk.

4.5 Incomplete Annuity Markets

Recent theoretical work shows that as long as markets are complete, full annuitisation is optimal (Davidoff, et al., 2005). In reality, however, existing annuity markets are far from complete: most of the life annuity products that are sold today offer a fixed nominal payout, which leaves individuals exposed to other risks, such as from inflation or unexpected medical expenditures (Brown, 2007).

A second problem with incomplete markets is that most annuity contracts are structured in a manner that imposes constraints on the degree of liquidity provided. It is generally not possible to borrow against the future value of an annuity, or to alter the timing of annuity payouts once a contract has commenced. Reversing an annuity, such as by selling it to a third-party buyer, is quite costly and often is not possible (Brown, 2007).



4.6 Pre-Existing Annuitisation

Finkelstein & Poterba (2004) note that the small size of the voluntary annuity market could, in part, be explained by public sector social security programs and private deferred benefit and pension schemes.

Brown (2007) comments that numerous authors have made the point that high levels of pre-existing annuitisation from Social Security or private defined benefit plans may lead to low demand for additional annuitisation:

For individuals at the low end of the wealth distribution, this explanation certainly rings true. For example, the Social Security Administration states that 21% of married couples and 43% of unmarried persons rely on Social Security for more than 90% of their income. It should not be surprising that these households would not wish to annuitize what little savings they have remaining. Higher up the wealth distribution, however, where Social Security represents a much smaller portion of wealth, it is more difficult to argue that all private annuity purchases are crowded out. As recently noted, "it would be a miraculous coincidence if the optimal partial annuitization strategy equalled the amounts provided by Social Security and defined benefit pensions for the vast majority of retirees."

4.7 Poor Health

Turra and Mitchell (2004) show that annuities become less attractive to people facing uncertain medical expenses. They find that the value of annuities to those in poor health is much lower when compared to persons in good health.

Sinclair & Smetters (2004) report similar findings: individuals of poor health face a higher risk of health shocks which may incur large uninsured expenses and shorten the life expectancy. The value of a life annuity then decreases at the same time as the need for cash increases, undermining its effectiveness in providing financial security.



5. Conclusion

The arguments presented herein suggest that while full annuitisation result of Yaari (1965) is unlikely to be optimal, the behavioral biases evident in consumers facing the annuitisation decision result in a level of annuitisation that is lower than required for optimality.

As such it is proposed that measures which seek to increase the level of individual annuitisation be investigated, as this will likely lead to an increase in individual welfare.



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Differences in mortality experience by
health status and postcode

**Challenger Group
Services Pty. Ltd.**

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Section 1: Introduction

- 1.1 We have been commissioned by Challenger Group Services Pty. Ltd. ("Challenger") to provide mortality analyses based on UK population experience that quantify the differences in life expectancy between a "healthy" population and the entire population and between different clusters of postcodes.
- 1.2 If we assume that pension provision is compulsory then the standard annuity rates per unit pension fund that should be offered by annuity providers will be based on the expected mortality experience of the entire population, and there would be an implicit cross-subsidy between "healthy" and "unhealthy" lives such that "healthy" lives are receiving more generous annuity rates than they should otherwise obtain.
- 1.3 Our analysis compares these standard annuity rates per unit pension fund with the reduced annuity rates per unit pension fund that would be charged if only "healthy" lives purchased annuity policies. This change in annuity rates per unit pension fund could be regarded as a proxy for the impact of changing from voluntary to compulsory pension provision, if annuity providers were not allowed to offer better than standard annuity rates to "unhealthy" lives and "unhealthy" lives were prepared to purchase annuities at standard annuity rates.
- 1.4 We present a UK patient medical record database, the General Practice Research Database ("GPRD"), in section 2 that we have used extensively to quantify differences in mortality experience by prior health status. We then provide comparative analyses of life expectancy and annuity rates per unit pension fund for "healthy" lives, "unhealthy" lives and the entire population in section 3, and hence quantify the impact of inclusion or exclusion of "unhealthy" lives.
- 1.5 In section 4 we describe the development of a postcode mortality tool that uses generalised linear models ("GLM") on a large UK mortality experience dataset to define non-contiguous geographical areas that would be expected to have similar mortality. Section 5 then provides comparative analysis of the degree of variation in mortality experience between clusters of postcodes.
- 1.6 This Report is provided in hard copy and in electronic form. The Report should be read in its entirety, as parts of it, if read in isolation, may be misleading.



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Section 2: General Practice Research Database

2.1 UK actuaries have historically made use of the following data sources in developing current assumptions over mortality experience:

- Own experience on annuitant or assured portfolio
- Analyses of experience for different product classes from a number of different insurers presented by the Continuous Mortality Investigation Bureau ("CMI") in CMI Reports or Working Papers
- Databases of deaths and central exposures for assured lives as collected by the CMI for calendar years 1947 to 2005
- All-cause and cause-specific mortality experience on the general population from the Office for National Statistics ("ONS")

2.2 However, over the last couple of years there has been considerable interest in other UK data sources that provide data on cause-specific mortality rates and to a lesser extent on the diagnosis of disease and subsequent mortality as extracted from primary care medical records. There are four major databases that hold information on large longitudinal cohorts of patients:

- General Practice Research Database ("GPRD")
- The Health Improvement Network ("THIN")
- QRESEARCH
- Doctors Independent Network Database ("DIN")

2.3 The databases have developed from prior voluntary arrangements between General Practitioner ("GP") practices and providers of medical records software in the UK. The two largest databases are QRESEARCH and GPRD, but QRESEARCH is only available to academic researchers or non-commercial organisations. GPRD has a worldwide reputation for data accuracy and completeness, and is widely used by pharmaceutical companies, medical regulatory authorities, research service providers and government departments.

2.4 The GPRD consists of series of dated episodes for each patient in the contributing GP practices. Data collection software within the VISION IT software extracts the necessary data approximately every 6 weeks, and this is submitted to the GPRD. The GPRD requires that the following items of data, amongst others, should be recorded by GPs:

- Significant morbidity events (but not all events) including referrals and abnormal test results
- Date of original onset of chronic or recurrent conditions



- Deaths, including date and cause of death where known
 - Smoking status, alcohol intake and height/weight assessed every 3-5 years
- 2.5 The GPRD provides a practice-based quality marker for researchers, the Up-To-Standard ("UTS") date. This is the date that a particular practice first met quality standards set out by the GPRD. All analyses in this Report based on GPRD experience in a particular calendar year have been limited to that data which was collected by practices after their UTS date.
- 2.6 The GPRD provides data to external researchers in a number of different formats. The most comprehensive is an ongoing object-oriented database known as the Full Feature GPRD ("FF-GPRD") that enables users to carry out on-line queries on the entire database.
- 2.7 The FF-GPRD consists of compulsory core elements, covering diagnoses and treatments, and optional modules covering test results, further information on referrals, immunisation details, patient lifestyle and additional clinical details.
- 2.8 GPRD has developed a bespoke web-based interrogation tool for use by Watson Wyatt on a version of the FF-GPRD that contains core and optional elements. The web-based interrogation tool enables us to identify a population whose prior history either includes or excludes a specified disease or group of diseases, and then to track whether such individuals develop particular diseases or die within a pre-defined period. However, the interpretation and conclusions based on data extracted from the FF-GPRD are those of Watson Wyatt.



Section 3: Analysis of mortality experience by health status

- 3.1 We used our interrogation tool on the GPRD to identify individuals with a prior history of any of the following diseases as at 1 January 2000 that might lead to their inclusion in an “unhealthy” group of lives:
- Diabetes
 - Stroke, ischaemic heart disease, aneurysms & heart failure
 - Cancers of breast, cervix, larynx, prostate, uterus, colon, ovary, rectum, urinary system, brain, lung, oesophagus, pancreas and stomach, plus oral cancers, malignant melanoma, multiple myeloma, lymphomas and leukaemias
 - Alzheimer's disease, Parkinson's disease & dementia
 - Chronic obstructive pulmonary disease, pneumonia, tuberculosis, Crohn's disease, peptic ulcers, clostridium difficile infection, ulcerative colitis and diseases of liver and urinary system
- 3.2 We have carried out a series of runs for the “unhealthy” and “healthy” group of lives, each of which tracks deaths for different cohorts as defined on 1 January 2000 to the end of successive calendar years from 31 December 2000 to 31 December 2008. We then compare and disaggregate the different runs in each series to determine population exposures, number of deaths and mortality rates for each cohort for calendar years 2000 to 2008.
- 3.3 Table 3.1a & 3.1b sets out the number of lives and deaths in 5-year age cohorts in both groups of lives during each calendar year over the period 1 January 2000 to 31 December 2008 for men and women respectively.



Table 3.1a - Patient exposure and number of deaths for male lives over the period 2000 to 2008 for different groups

Age group at start of period	Calendar year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Avg
Patient exposures for “healthy” lives [1]										
50-54	83243	78995	75305	72642	70785	68096	64652	61411	47618	69194
55-59	63169	59962	57210	55167	53649	51478	48758	46102	35580	52342
60-64	47323	44810	42519	40698	39314	37494	35411	33442	25751	38529
65-69	36507	34427	32562	31051	29874	28406	26769	25119	19179	29321
70-74	27367	25655	24112	22805	21654	20281	18859	17422	13108	21251
TOTAL	257608	243849	231708	222362	215276	205754	194449	183497	141236	210638
Patient exposures for “unhealthy” lives [2]										
50-54	14084	13298	12621	12110	11735	11185	10520	9962	7758	11475
55-59	15907	15000	14189	13558	13063	12440	11716	11041	8507	12825
60-64	18788	17605	16534	15703	14982	14100	13170	12314	9432	14736
65-69	21214	19724	18385	17272	16343	15257	14125	13077	9905	16145
70-74	21411	19555	17920	16498	15267	13904	12522	11233	8255	15174
TOTAL	91404	85181	79649	75141	71390	66887	62052	57628	43857	70354
Patient exposure for “unhealthy” lives as % of all lives [2 / (1 + 2)]										
50-54	14.5%	14.4%	14.4%	14.3%	14.2%	14.1%	14.0%	14.0%	14.0%	14.2%
55-59	20.1%	20.0%	19.9%	19.7%	19.6%	19.5%	19.4%	19.3%	19.3%	19.7%
60-64	28.4%	28.2%	28.0%	27.8%	27.6%	27.3%	27.1%	26.9%	26.8%	27.7%
65-69	36.8%	36.4%	36.1%	35.7%	35.4%	34.9%	34.5%	34.2%	34.1%	35.5%
70-74	43.9%	43.3%	42.6%	42.0%	41.4%	40.7%	39.9%	39.2%	38.6%	41.7%
TOTAL	26.2%	25.9%	25.6%	25.3%	24.9%	24.5%	24.2%	23.9%	23.7%	25.0%
Number of deaths“ for healthy” lives [3]										
50-54	227	247	289	300	365	331	335	344	260	300
55-59	292	324	316	341	402	406	437	398	342	362
60-64	335	397	428	438	495	468	449	450	405	429
65-69	455	465	549	522	598	582	551	630	489	538
70-74	554	605	652	684	773	692	692	698	572	658
TOTAL	1863	2038	2234	2285	2633	2479	2464	2520	2068	2287
Number of deaths for “unhealthy” lives [4]										
50-54	185	164	134	140	148	139	143	112	93	140
55-59	276	240	204	244	206	212	224	217	165	221
60-64	439	449	386	378	417	388	361	384	298	389
65-69	763	680	666	658	665	640	577	566	452	630
70-74	1176	1028	1014	994	933	941	851	790	606	926
TOTAL	2839	2561	2404	2414	2369	2320	2156	2069	1614	2305
Number of deaths for “unhealthy” lives as % of all lives [4 / (3 + 4)]										
50-54	44.9%	39.9%	31.7%	31.8%	28.8%	29.6%	29.9%	24.6%	26.3%	31.8%
55-59	48.6%	42.6%	39.2%	41.7%	33.9%	34.3%	33.9%	35.3%	32.5%	37.9%
60-64	56.7%	53.1%	47.4%	46.3%	45.7%	45.3%	44.6%	46.0%	42.4%	47.5%
65-69	62.6%	59.4%	54.8%	55.8%	52.7%	52.4%	51.2%	47.3%	48.0%	53.9%
70-74	68.0%	63.0%	60.9%	59.2%	54.7%	57.6%	55.2%	53.1%	51.4%	58.5%
TOTAL	60.4%	55.7%	51.8%	51.4%	47.4%	48.3%	46.7%	45.1%	43.8%	50.2%



Table 3.1b - Patient exposure and number of deaths for female lives over the period 2000 to 2008 for different groups

Age group at start of period	Calendar year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Avg
Patient exposures for “healthy” lives [1]										
50-54	84346	80222	76639	74128	72431	69994	66795	63593	49464	70846
55-59	65108	62032	59260	57190	55815	53899	51437	48908	38014	54629
60-64	52372	49850	47656	46017	44863	43234	41203	39135	30374	43856
65-69	44375	42305	40538	39150	38105	36664	34927	33057	25514	37182
70-74	38858	36847	35074	33565	32385	30823	28995	27089	20661	31589
TOTAL	285059	271257	259168	250050	243598	234613	223358	211782	164028	238101
Patient exposures for “unhealthy” lives [2]										
50-54	11316	10690	10179	9787	9502	9122	8660	8229	6397	9320
55-59	12492	11784	11200	10744	10393	9916	9357	8860	6894	10182
60-64	14706	13839	13115	12524	12054	11482	10809	10203	7926	11851
65-69	16836	15781	14877	14133	13516	12808	11969	11191	8571	13298
70-74	19263	17814	16547	15415	14446	13378	12253	11207	8385	14301
TOTAL	74614	69909	65916	62604	59912	56705	53048	49690	38174	58952
Patient exposure for “unhealthy” lives as % of all lives [2 / (1 + 2)]										
50-54	11.8%	11.8%	11.7%	11.7%	11.6%	11.5%	11.5%	11.5%	11.5%	11.6%
55-59	16.1%	16.0%	15.9%	15.8%	15.7%	15.5%	15.4%	15.3%	15.4%	15.7%
60-64	21.9%	21.7%	21.6%	21.4%	21.2%	21.0%	20.8%	20.7%	20.7%	21.3%
65-69	27.5%	27.2%	26.8%	26.5%	26.2%	25.9%	25.5%	25.3%	25.1%	26.3%
70-74	33.1%	32.6%	32.1%	31.5%	30.8%	30.3%	29.7%	29.3%	28.9%	31.2%
TOTAL	20.7%	20.5%	20.3%	20.0%	19.7%	19.5%	19.2%	19.0%	18.9%	19.8%
Number of deaths“ for healthy” lives [3]										
50-54	164	166	162	195	221	253	215	229	198	200
55-59	176	224	239	241	273	239	303	278	234	245
60-64	225	310	265	318	352	357	360	376	320	320
65-69	324	350	397	446	485	465	465	533	408	430
70-74	485	515	641	635	677	677	711	728	581	628
TOTAL	1374	1565	1704	1835	2008	1991	2054	2144	1741	1824
Number of deaths for “unhealthy” lives [4]										
50-54	159	129	112	100	91	102	83	79	81	104
55-59	184	183	152	159	135	177	118	141	88	149
60-64	288	253	227	264	238	250	233	237	191	242
65-69	436	370	391	395	373	368	385	346	297	373
70-74	748	678	691	685	663	638	599	603	428	637
TOTAL	1815	1613	1573	1603	1500	1535	1418	1406	1085	1505
Number of deaths for “unhealthy” lives as % of all lives [4 / (3 + 4)]										
50-54	49.2%	43.7%	40.9%	33.9%	29.2%	28.7%	27.9%	25.6%	29.0%	34.2%
55-59	51.1%	45.0%	38.9%	39.8%	33.1%	42.5%	28.0%	33.7%	27.3%	37.7%
60-64	56.1%	44.9%	46.1%	45.4%	40.3%	41.2%	39.3%	38.7%	37.4%	43.1%
65-69	57.4%	51.4%	49.6%	47.0%	43.5%	44.2%	45.3%	39.4%	42.1%	46.5%
70-74	60.7%	56.8%	51.9%	51.9%	49.5%	48.5%	45.7%	45.3%	42.4%	50.4%
TOTAL	56.9%	50.8%	48.0%	46.6%	42.8%	43.5%	40.8%	39.6%	38.4%	45.2%



3.4 Tables 3.1a & 3.1b illustrate the higher proportions of deaths in individuals who have a prior history of the different selected diseases, and that approximately 35% of the male and 25% of the female population aged 65-69 had a prior history of one of the diseases or conditions that we have considered in this Report.

3.5 Tables 3.2 & 3.3 set out the ratio of mortality experience by 10-year age cohorts for the “healthy” and “unhealthy” groups as compared to the entire population for each calendar year over the period 2000 to 2008.

Table 3.2 - Ratio of mortality experience for “healthy” group vs entire population for different calendar years after selection on 1 January 2000

Age group at start of period	Calendar year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Avg
Men										
45-54	66.5%	74.7%	78.1%	79.3%	82.3%	81.2%	80.7%	87.1%	86.3%	79.6%
50-59	63.9%	70.6%	77.2%	75.2%	82.1%	81.2%	81.1%	82.9%	83.7%	77.5%
55-64	61.5%	67.2%	73.1%	72.7%	76.9%	77.1%	78.2%	75.8%	79.9%	73.6%
60-69	58.8%	63.9%	70.7%	70.4%	73.2%	73.3%	74.5%	76.5%	78.0%	71.0%
65-74	57.4%	64.0%	68.7%	69.0%	74.8%	71.7%	74.1%	78.1%	78.6%	70.7%
Women										
45-54	58.7%	67.0%	69.0%	75.0%	83.1%	80.4%	83.2%	84.6%	82.3%	75.9%
50-59	57.8%	64.4%	69.8%	72.6%	79.3%	73.7%	83.1%	80.4%	82.8%	73.8%
55-64	56.6%	67.7%	70.1%	69.8%	76.7%	71.2%	79.7%	77.2%	81.0%	72.2%
60-69	57.3%	68.1%	68.3%	70.6%	75.7%	74.6%	74.4%	79.1%	77.7%	71.8%
65-74	58.4%	64.6%	69.5%	70.6%	74.1%	74.0%	75.3%	78.5%	79.1%	71.6%

Table 3.3 - Ratio of mortality experience for “unhealthy” group vs entire population for different calendar years after selection on 1 January 2000

Age group at start of period	Calendar year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Avg
Men										
45-54	325.5%	271.3%	249.1%	241.5%	221.6%	230.6%	235.0%	190.4%	195.1%	240.0%
50-59	275.3%	243.9%	212.3%	223.1%	189.4%	194.8%	195.8%	187.3%	182.8%	211.6%
55-64	221.7%	204.8%	187.0%	188.9%	176.0%	176.3%	173.4%	181.7%	168.2%	186.4%
60-69	185.5%	175.9%	162.4%	163.8%	158.6%	159.5%	157.7%	153.7%	150.6%	163.1%
65-74	162.9%	154.3%	148.2%	148.8%	140.5%	146.6%	143.8%	137.9%	137.6%	146.7%
Women										
45-54	453.9%	384.7%	368.3%	318.2%	248.1%	272.6%	248.8%	237.2%	256.7%	309.8%
50-59	363.6%	324.2%	290.9%	274.5%	233.0%	270.4%	210.8%	228.7%	212.5%	267.6%
55-64	286.0%	240.0%	230.6%	232.9%	204.1%	229.9%	192.8%	204.8%	187.2%	223.2%
60-69	229.8%	198.6%	199.3%	193.1%	178.2%	183.0%	184.8%	170.0%	175.0%	190.2%
65-74	194.8%	182.6%	172.6%	171.7%	164.8%	166.3%	164.5%	157.0%	156.3%	170.1%



- 3.6 Tables 3.2 & 3.3 illustrate mortality experience for the “healthy” and “unhealthy” lives can be modelled by a multiple, where this multiple converges to 1 with increasing starting age and increasing duration.

Cohort life expectancies

- 3.7 The analyses from the GPRD only provide comparisons over a 9 year period. We have made the following assumptions to develop consistent sets of lifetime mortality rates from different starting ages:
- Multiples of mortality experience developed from the GPRD can be applied to an annuitant table to differentiate between “healthy” and “unhealthy” annuitants.
 - Multiples for years 2009 and later are assumed to trend towards 1 by age 100.
 - Starting mortality assumption for all annuitants is 100% PCMA00 with mortality improvements equal to the average of Medium and Long cohort over the period from 2000 to 2009 for men or 100% PCFA00 with mortality improvements equal to 75% of the average of Medium and Long cohort over the period from 2000 to 2009. Medium and Long cohorts are sets of mortality improvements introduced by the UK Continuous Mortality Investigation Bureau (“CMI”) in December 2002 in CMI Working Paper 1 and are in widespread usage by UK insurers.
 - Future mortality improvements for all annuitants group equal to the average of Medium and Long cohort for men or 75% of the average of Medium and Long cohorts for women, subject to a minimum floor of 1.5% pa up to age 90 and then tapering linearly to 0% pa by age 120.
- 3.8 Table 3.4 sets out complete cohort life expectancies for different selected ages for the different groups for men and women.

Table 3.4 - Complete cohort life expectancy for different groups for selected ages

Starting age	Life expectancy			
	All	Healthy	Unhealthy	Healthy - All
Men				
50	37.9	38.7	33.5	0.8
55	32.9	33.8	29.0	1.0
60	27.8	29.1	24.6	1.2
65	23.0	24.4	20.4	1.4
70	18.4	19.9	16.4	1.5
Women				
50	39.9	40.8	34.3	0.9
55	34.8	35.7	30.4	0.9
60	29.6	30.7	26.0	1.0
65	24.6	25.9	21.4	1.3
70	19.8	21.1	17.1	1.3

Annuity rate calculations

- 3.9 We have subsequently calculated annuity rates for a £50,000 pension fund based on constant interest rates of 4.5% pa, illustrative initial expenses of 2% of premium and £25 pa renewal expenses, inflating at 3% pa, with payments made annually in advance. The choice of interest rate was intended to provide an approximation to the current UK interest yield curve. The amounts of annual lifetime annuity payments expected from a £50,000 pension fund for different groups at selected ages are set out in Table 3.5 for men and women.

Table 3.5 - Lifetime annuity payments for a £50,000 pension fund for different groups for selected ages

Starting age	Annual annuity payment			
	All £	Healthy £	Unhealthy £	Healthy – All £
Men				
50	2660.9	2626.8	2881.2	-34.1
55	2832.4	2781.9	3069.4	-50.5
60	3077.0	2991.5	3344.5	-85.5
65	3426.4	3287.3	3724.3	-139.0
70	3928.1	3715.2	4274.1	-212.9
Women				
50	2592.0	2559.1	2849.4	-32.9
55	2742.7	2700.7	2988.7	-41.9
60	2961.1	2897.1	3226.9	-63.9
65	3279.6	3170.6	3613.6	-109.1
70	3738.2	3570.5	4154.0	-167.7

- 3.10 Challenger further asked us to calculate the equivalent annuity rate that would apply if an annuity certain had been purchased rather than a lifetime annuity, where the term of the annuity certain was equal to the complete life expectancy for that starting age. Table 3.6 sets out the amounts of annual annuity payments for an annuity certain of equivalent term for the different groups at selected ages for men and women on the same interest and expense assumptions as for Table 3.5. Table 3.7 sets out differences in the amounts of annual annuity payments between Tables 3.5 & 3.6.

Table 3.6 - Annuity payments from annuity certain of equivalent term for a £50,000 pension fund for different groups for selected ages

Starting age	Annual annuity payment			
	All £	Healthy £	Unhealthy £	Healthy – All £
Men				
50	2561.5	2540.2	2701.2	-21.3
55	2723.0	2687.9	2890.8	-35.1
60	2951.9	2887.6	3158.7	-64.3
65	3282.2	3170.9	3527.8	-111.2
70	3767.2	3587.0	4070.8	-180.2
Women				
50	2511.8	2491.4	2673.2	-20.4
55	2655.2	2626.7	2825.5	-28.5
60	2859.6	2812.3	3060.9	-47.3
65	3157.3	3070.9	3430.2	-86.4
70	3595.1	3455.8	3954.0	-139.3

Table 3.7 - Difference in annuity payments between lifetime annuity and annuity certain from Tables 3.5 & 3.6 for different groups for selected ages

Starting age	Annual annuity payment		
	All £	Healthy £	Unhealthy £
Men			
50	99.4	86.6	180.0
55	109.4	94.0	178.5
60	125.0	103.9	185.9
65	144.2	116.4	196.4
70	160.9	128.2	203.3
Women			
50	80.2	67.7	176.3
55	87.4	74.0	163.2
60	101.5	84.8	166.0
65	122.3	99.6	183.4
70	143.0	114.6	200.0

Commentary on results

- 3.11 Tables 3.4 & 3.5 indicate that differences in both life expectancy and annuity rates between the "healthy" population and the entire population increase with increasing starting age. The differences in the last column of each table indicate the potential impact of moving from a situation where annuities are purchased by those who are "healthy" to compulsory pension provision for the entire population.
- 3.12 We understand that the purpose of the comparisons of lifetime annuities and annuities certain with the term equal to the future expected life expectancy is to demonstrate the effect of future mortality on annuity rates. Tables 3.6 & 3.7 clearly illustrate that annuity rates on a lifetime annuity are relatively higher at older starting ages and for those with a prior history of disease.

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Section 4: Development of postcode mortality model

Introduction

- 4.1 Over the last few years there has been increased interest in the use of generalised linear models ("GLM") and survivor models in analysing mortality experience. In comparison to traditional actuarial mortality analyses that consider age, sex and calendar year, multi-factor models allow the simultaneous consideration of all factors for which data has been captured. In the case of a pension scheme these might include pension amount, final salary, type of retirement, occupational class and policy options such as escalation rates and guaranteed annuity rate options.
- 4.2 It has been clear from a number of recent multi-factor mortality investigations that we have carried out, together with related work by other UK insurance and pension actuaries that postcode has a strong influence on pensioner and annuitant mortality in the UK.
- 4.3 It is clearly impractical to seek to analyse the mortality of any postcode in isolation because of insufficient mortality experience. Any study of mortality variation by postcode therefore requires some form of combining postcodes. Although postcode is clearly only a proxy to the actual underlying drivers of mortality, such as perhaps health status and wealth, postcode groups combined according to some common feature often demonstrate a degree of mortality homogeneity amongst the residents of all postcodes in the group.
- 4.4 One approach to combining postcodes in a way intended to create such mortality homogeneity has been to use "off-the-shelf" demographic "lifestyle" clustering indices, whereby postcodes are grouped together according to perceived commonality of socio-economic, lifestyle or wealth characteristics.
- 4.5 This approach has been adopted by another actuarial consultancy, Richards Consulting, in developing an internet-based analytical tool, MortalityRating, that recommends appropriate percentages of a standard mortality table based on the distribution of members in a pension scheme by postcode. We understand that MortalityRating is based on analysis of mortality experience from several insurers and pension schemes and socio-economic indices that have been provided by Experian, a credit scoring company with detailed financial data at postcode level. The underlying assumptions and construction of MortalityRating are not available for examination.
- 4.6 We are in the process of developing an "open source" tool that uses a variety of clustering techniques on a range of different data sources to analyse grouped pension scheme data, and hence to provide postcode mortality rating factors for every postcode in the UK by age and pension amount. This provides a simple and robust tool to estimate the base level mortality of any pension scheme or annuitant portfolio using the postcode distribution of its members together with data on the members' age, sex and pension amount. We provide more description on the construction of the tool in the following paragraphs before presenting comparative analyses in section 5.



Method of cluster grouping

- 4.7 We have deliberately chosen to use a number of different methods to produce different versions of non-contiguous area clusters, and used the combination of these different non-contiguous area clusters to provide a basis for predicting mortality experience in a particular postcode based on pension scheme mortality experience.
- 4.8 We have collated mortality experience from a number of large pension schemes, with a combined population exposure of approximately 3 million years and approximately 100,000 deaths. These schemes had collected data on pension amount and current postcode, as well as in some cases type of retirement and occupational class. We have created non-contiguous postcode mortality clusters using a proprietary technique that deduces clusters with similar mortality characteristics after allowing for age, sex and other relevant factors, the clustering being influenced by a credibility measure to reflect the amount of data in any group of postcodes.
- 4.9 We have obtained population exposures and numbers of death for England, Wales & Scotland from the Office of National Statistics ("ONS") by 5-year age groups for the period 2001 to 2005 by lower layer super output area ("LSOA") in England & Wales and by datazone in Scotland. LSOA and datazones are small geographical areas that were introduced for the 2001 census to provide a basis for aggregating data from different census forms, and have a population of the order of 1,000 persons. We have produced separate non-contiguous area clusters based on population mortality experience for ages 50 to 89, as age 89 is the oldest age for which population estimates are provided for individual ages.
- 4.10 Finally we have purchased a licence for two external indices produced by CACI, a competitor to Experian. The external indices provide ratings down to the level of individual postcode. The first, ACORN, is similar to indices produced by Experian in that it is based on financial and census data, and each postcode is allocated to descriptive categorical groupings such as "older affluent professionals". The second, HealthACORN, seeks to sort postcodes according to the health status of residents by referencing the results of annually updated self-reported health status questionnaires. We have used the descriptive categorical groupings that underlie these indices as two further separate sets of initial non-contiguous postcode clusters.
- 4.11 We would note that all the external indices developed by CACI and Experian were not originally developed to aid mortality analysis, and their predictive power is based on the extent to which elements captured in the index are a good proxy for mortality experience. As such, we would expect an external index based in part on health status to have greater predictive power than one based on credit scoring.
- 4.12 We have grouped each of the different finely divided sets of categories into successively broader categories based on differences in the observed pension scheme mortality experience between categories and the width of confidence intervals calculated by GLM to apply to each category.



Section 5: Variation in mortality experience by postcode group

- 5.1 The purpose of this section is to segment different geographical areas based on expected mortality experience, using the results of our GLM and data for the individual lives in our collated pension schemes, and hence illustrate differences in mortality experience between different ranked segments.
- 5.2 We are able to state the particular category within each of the different broad categorical groupings to which each life in our collated pension schemes belongs. The GLM provides us with the relative mortality for each broad categorical grouping, and hence we can construct an expected mortality rate for each life. We have grouped different lives based on age group and sex, and then we have allocated all lives of a particular sex in a particular age group to different LSOA and datazones to produce average expected mortality rates. We have then ranked the different LSOA and datazones to provide comparative mortality analyses for different deciles for each age group and sex.
- 5.3 Table 5.1 sets out central mortality rates applying to the different deciles for men and women, and Table 5.2 provides comparative mortality analyses between the different deciles and an average mortality rate across lives in the collated pensions dataset by age group and sex.

Table 5.1 - Central mortality rates for different deciles for men and women in age groups 50-59 to 70-79

Decile grouping	Men			Women		
	50-59	60-69	70-79	50-59	60-69	70-79
1	0.00855	0.01936	0.05764	0.00641	0.01271	0.03647
2	0.00747	0.01698	0.05058	0.00571	0.01146	0.03301
3	0.00688	0.01575	0.04663	0.00534	0.01076	0.03113
4	0.00643	0.01473	0.04363	0.00506	0.01020	0.02966
5	0.00603	0.01377	0.04094	0.00484	0.00973	0.02829
6	0.00570	0.01302	0.03868	0.00462	0.00930	0.02708
7	0.00540	0.01231	0.03656	0.00439	0.00884	0.02581
8	0.00507	0.01154	0.03426	0.00414	0.00835	0.02437
9	0.00472	0.01076	0.03185	0.00389	0.00784	0.02285
10	0.00414	0.00944	0.02767	0.00348	0.00702	0.02049



Table 5.2 - Mortality comparisons between different deciles for men and women in age groups 50-59 to 70-79

Decile grouping	Men			Women		
	50-59	60-69	70-79	50-59	60-69	70-79
1	145%	144%	145%	135%	134%	134%
2	127%	127%	127%	120%	121%	121%
3	117%	117%	117%	112%	113%	114%
4	109%	110%	109%	107%	107%	109%
5	102%	103%	103%	102%	102%	104%
6	97%	97%	97%	97%	98%	99%
7	92%	92%	92%	92%	93%	95%
8	86%	86%	86%	87%	88%	89%
9	80%	80%	80%	82%	83%	84%
10	70%	70%	69%	73%	74%	75%

5.4 Table 5.2 illustrates that those in decile 1 have approximately twice the mortality experience of those in decile 10. These patterns are stable by age group and show marginally smaller differences for women than men.

5.5 We have used the same assumptions on aggregate mortality experience, interest rates and expenses as in Table 3.5 to illustrate differences in the amounts of annual lifetime annuity payments expected from a £50,000 pension fund for different deciles. For the purposes of illustration only we have assumed that the multiples in Table 5.2 for different starting age groups apply to all subsequent ages. Table 5.3 sets out comparisons for men and women at selected starting ages.

Table 5.3 - Lifetime annuity payments for a £50,000 pension fund for different deciles for selected ages

Starting age	Annual annuity payment				
	All £	Decile 1 £	Decile 10 £	Dec 1 – All £	Dec 10 – All £
Men					
60	3077.0	3304.1	2902.8	227.1	-174.2
65	3426.4	3738.5	3185.5	312.1	-240.9
Women					
60	2961.1	3107.4	2832.9	146.3	-128.2
65	3279.6	3483.5	3102.3	203.9	-177.3



Section 6: Reliances & limitations

Reliances

- 6.1 In carrying out our analysis and producing this Report we have relied without independent verification upon the accuracy and completeness of the data and information provided to us, both in written and oral form, by the organisations which produced the sources of information discussed in the Report. Where possible, we have reviewed some of the information provided for reasonableness and consistency with our knowledge of the insurance industry.
- 6.2 Reliance has been placed upon, but not limited to, the following information:
- Patient counts and exposure measures produced by the interrogation tool “Conditional Probability Report” as developed by the General Practice Research Database, United Kingdom

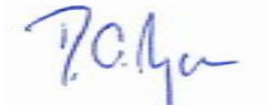
Limitations

- 6.3 The Report has been prepared by Watson Wyatt Limited on an agreed basis to meet the specific purposes of Challenger Group Services Pty. Ltd. must not be relied upon for any other purpose. The Report has been prepared for use by persons technically competent in the areas covered. Except with the written consent of Watson Wyatt Limited, the Report and any written or oral information or advice provided by Watson Wyatt Limited must not be reproduced, distributed or communicated in whole or in part to any other person, or be relied upon by any other person. Any reference to Watson Wyatt Limited in any report, accounts or other published documents is not authorised without our prior written consent.
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- 6.5 Assumptions are made about future experience, including mortality and morbidity. These assumptions have been made on the basis of reasonable estimates. However, actual future experience is likely to differ from these assumptions, due to random fluctuations, changes in the operating environment, differences in experience between the UK and other countries, and other factors. Such variations in experience could have a significant effect on the results and conclusions of this Report. No warranty is given by Watson Wyatt Limited that the assumptions made in this Report will be reflected in actual future experience.
- 6.6 This Report was based on data available to Watson Wyatt Limited at, or prior to, 2 September 2009, and takes no account of developments after that date. Watson Wyatt Limited is under no obligation to update or correct inaccuracies which may become apparent in the Report.
- 6.7 This Report is subject to the terms and limitations, including limitation of liability, set out in our engagement letter of 21 July 2009.



Legal jurisdiction

- 6.8 This Report will be governed by and construed in accordance with English law and the parties submit to the exclusive jurisdiction of the English courts in connection with all disputes and differences arising out of, under or in connection with this Report. If any part of a provision of this Report is held invalid, illegal or unenforceable then the remainder of such provision shall remain valid and enforceable to the fullest extent permitted by law.



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Retirement Income Modelling

Challenger Group Services Pty. Ltd.

2 September 2009

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Section 1: Introduction

- 1.1 Watson Wyatt has been commissioned by Challenger Group Services Pty. Ltd. (“Challenger”) to carry out a detailed investigation to assist in further understanding the impact of different asset allocations in the post-retirement phase of an individual’s life. This investigation focuses on the use of lifetime annuities as a replacement for bonds and cash as the defensive element of an individual’s asset allocation.
- 1.2 The scope of Watson Wyatt’s investigation is set out in this section.

Previous work

- 1.3 In April 2009 Watson Wyatt issued a report entitled “Investment and Spending in Retirement – the Longevity Risk Impact”¹. This report considered the risks associated with various investment and spending strategies in retirement. The investment strategies considered were portfolios of “growth” and “defensive” assets in varying proportions.

Project objectives

- 1.4 Challenger has asked us to extend our existing research and modelling of retirement incomes in the following ways:
- to consider the use of lifetime annuities in place of the current defensive component of the retiree’s investment portfolio;
 - to allow for the impact of different levels of platform and administration fees in the model; and
 - to investigate the effects of a market downturn early in the retirement period.
- 1.5 This report sets out the results of certain scenarios obtained using our projection model. In the process of producing the figures for this report, we have modelled a number of other scenarios to help understand the driving factors behind the presented outcomes. We would be happy to discuss further aspects of this work with you in due course and provide any further results you may require.

¹ Available at www.watsonwyatt.com



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Section 2: Methods and Assumptions

Methods

- 2.1 We have created a retirement income model which allows us to perform stochastic projections of a new retiree's income and wealth for a set of given starting assumptions. For each projected scenario, the initial starting conditions required to perform the projection modelling are:
- an initial amount of retirement savings (the "initial account balance");
 - a target income level to be drawn in aggregate from all sources; and
 - an asset allocation decision for the account (i.e. a growth and defensive percentage allocation).
- 2.2 Each scenario is then run through the projection model twice. Once with the defensive allocation invested in a diversified bonds and cash portfolio and then repeated with the defensive allocation used to purchase a lifetime annuity at retirement. These are referred to as the "non-annuity" strategy and "annuity" strategy respectively.
- 2.3 Underlying the retirement income model is the Watson Wyatt Global Asset Model. This is a projection tool which generates stochastic rates of investment returns and other market indicators such as the level of Consumer Price Indexation (CPI) and Average Weekly Ordinary Time Earnings (AWE). The model includes most of the major global asset classes and a correlation matrix has been developed as part of this model to ensure results are as consistent as possible with real world outcomes.
- 2.4 As agreed with Challenger, Watson Wyatt's standard asset model has been modified to remove some short term effects which have been recently incorporated to reflect the current state of financial markets. These adjustments were deemed appropriate as this research is intended to reflect a long-term view on the performance of annuities in providing for retirement and therefore should avoid any bias in outcomes as a result of the current financial crisis.
- 2.5 Under the annuity strategy, the retirement income model begins by calculating the annuity income which would be generated by purchasing an annuity with the assumed defensive allocation. The annuity purchase price is a function of the market swap rates which are determined from interest rates generated by the stochastic investment model. The result is that annuity price is allowed to vary for each stochastic outcome in a manner consistent with the other projected variables. Once the annuity income has been determined, it increases annually in line with projected CPI from the stochastic investment model.
- 2.6 After allowing for the annuity income (if any), the balance of the target income, under both annuity and non-annuity strategies, is drawn from a combination of the Age Pension and drawings from the account based pension. This is an iterative process due to the social security means tests. The model then calculates the remaining account based pension balance at the end of the projection year, allowing for investment returns, fees and any income drawn, and begins the calculations for the next projection year.
- 2.7 The stochastic nature of the underlying investment model means that our retirement income model results in a probabilistic range of retirement income results which we are then able to use to draw conclusions.



Assumptions

- 2.8 All investment returns and other market indicators used in the modelling in this report are generated using the Watson Wyatt Global Asset Model. Further details of that model and the underlying assumptions are contained in Appendix 2.
- 2.9 A summary of the non-investment related assumptions which drive the core results is set out below.

Core Results

- All modelled scenarios consider a single female who retires at age 65;
- The initial account balance (before annuity purchase) is \$500,000;
- The target retirement income drawn by the retiree from all sources (Age Pension, annuity income and account based pension) is assumed to be the December 2008 ASFA-Westpac Comfortable income of \$37,621 pa. We assume that the target income increases annually in line with Average Weekly Ordinary Time Earnings (AWE);
- The adequate retirement income used for calculating the probability of inadequacy metric (defined in 3.3) is assumed to be the December 2008 ASFA-Westpac Modest income of \$19,450. We assume that the adequate income increases annually in line with AWE;
- The Age Pension commences at age 65 and is assessed annually each year. The maximum Age Pension is assumed to increase annually in line with AWE;
- Account based pension platform and administration fees are in line with the Superannuation Fees Report 2008 published by Rice Warner Actuaries. These have been labelled as “High Fees” for the purpose of this report;
- The asset allocation assumption is 70% growth asset classes and 30% defensive asset classes. Under the non-annuity strategy the account based pension assets are annually rebalanced to maintain the asset allocation;
- The defensive allocation is assumed to be invested entirely in a lifetime annuity under the annuity strategy or in a diversified bonds and cash portfolio under the non-annuity strategy;
- Lifetime annuity rates have been provided by Challenger and are determined by reference to interest rates generated by the investment model. A summary of the annuity rates provided and a more detailed description of this process is set out in Appendix 1. The income from the annuities in our model increases annually in line with the Consumer Price index (CPI), with a minimum of 0%; and
- All dollar amounts have been discounted at AWE in order to present results in today's dollars.



Other Scenarios

Apart from the core scenario outlined above, we have also considered other scenarios to determine the sensitivity of the core result to variations in certain assumptions. The assumptions varied are:

- Initial account balance;
- Target and adequate income levels;
- Asset allocation;
- Account based pension fee levels; and

Further details of assumptions used are contained in Appendix 1.



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Section 3: Key Concepts and Metrics

Ruin vs Inadequacy

- 3.1 The fundamental metric which we examined in our April 2009 research paper was based on the concept of “Ruin”. Ruin is defined as the risk of running out of money before death (i.e. becoming reliant on the Age Pension as the only source of income). The “probability of ruin” metric allows for uncertain investment returns (via the stochastic investment model) and the uncertainty of the retiree’s lifespan (via a random lifespan based on the underlying retiree mortality assumptions).
- 3.2 When considering a strategy in which the retiree purchases a lifetime annuity at retirement, the concept of ruin falls away since under that strategy, while the retiree may still run out of money in their account based pension balance, the underlying annuity income means that they will never become reliant on the Age Pension as their only source of income.
- 3.3 We have therefore amended the concept of Ruin to become “Inadequacy”. This is defined as the event of the retirement income falling to (or below) a predetermined “adequate” income level at any time over the modelled lifetime. Using this concept, we can now use the “probability of inadequacy” metric to compare results under annuity and non-annuity strategies.
- 3.4 The metric is still not perfect since ultimately the income under the annuity strategy will stabilise at a level (Age Pension + annuity income), which is greater than a strategy with no annuity (Age Pension only). That is to say, while this metric captures the probability of income falling below an adequate level, it does not allow for the differing extent of that inadequacy under the annuity and non-annuity strategies.

Remaining account balance

- 3.5 In order to provide a comparable measure of the downside (and upside) risks associated with each scenario, we have also determined the remaining account based pension balance at each future age. This amount represents the bequest that the retiree would leave to their estate if they were to die at that age. Thus a larger dollar value could be viewed as leaving a larger bequest. Alternatively, it could be viewed as reflecting that a larger income (i.e. in excess of target) could have been drawn by the retiree up to that age.
- 3.6 If the account based pension balance is exhausted, this metric then shows a negative amount which reflects the cumulative amount of income shortfall relative to the target income level. In principle, this reflects the amount of money the retiree would need to borrow in order to continue receiving their target income level.
- 3.7 The concept of a cumulative shortfall could be viewed in the context of reverse mortgage products available in the market to homeowner retirees. In principle our retiree could access additional capital from their home to maintain the target retirement income when other sources are exhausted. One could therefore argue that interest should be added to these shortfall amounts at a rate similar to that charged in the reverse mortgage market. As an approximation to this, where a negative account balance arises we have allowed for interest to be added at cash rates.



Allowance for income in excess of target

- 3.8 The remaining account balance in a year (as described above) does not reflect the fact that income in any preceding year may have exceeded target. This “excess income” may occur due to the inflexibility of the annuity income (where applicable) in any year and/or the minimum drawdown rules applying to the account based pension.
- 3.9 Without making an appropriate allowance for these years of excess income, the remaining account balance measure is not directly comparable under annuity and non-annuity strategies as a different total income has been received in the past.
- 3.10 An adjusted remaining account balance has therefore been created which makes allowance for income in excess of target, as follows.
- Income in excess of target income in any year is identified and allocated to a new account (“savings account”), we assume the excess income is saved rather than spent. Interest at cash rates is added to this account.
 - The savings account is not used to supplement shortfalls in the income below target income where the account based pension balance has been depleted. Hence, the savings account would continue to roll up with interest even where the retiree’s account based pension assets are exhausted.
 - The savings account is added to the remaining account balance metric (described in 3.5 to 3.7 above), at each age.
 - The balance of the savings account is added to the individual's assets for the Age Pension means test calculation in each projection year.
- 3.11 The interpretation of the savings account is money set aside (outside the superannuation system) which adds to the individual's resources but is not used to supplement annual spending (and hence does not augment retirement income). While not a perfect representation of reality, within modelling constraints it is a reasonable means of allowing for years where income is in excess of the target level when calculating the remaining account balance metric. We have used this adjusted metric in the rest of this report.
- 3.12 We note also that the remaining account balance metric does not capture the fact that, under an annuity strategy, the retiree has the ongoing annuity income entitlement (as well as any positive remaining account balance) as support during any remaining years of life. Hence if the remaining account balance metric at a given retiree age has the same value under the annuity and non-annuity strategies, we would regard a retiree using an annuity strategy as being in a more secure financial position than one using a non-annuity strategy.

Section 4: Analysis of Results

Impact of purchasing an annuity (Core scenario results)

- 4.1 Our initial (core) results look at the impact of purchasing a lifetime annuity with the defensive allocation of the retiree's account balance. The results analysed here are based on the initial starting conditions and assumptions set out in 2.9.
- 4.2 The results for the core scenario are shown in Table 1 below and Figures 1.1 to 1.3 in Appendix 4.
- 4.3 Table 1 below shows the probability of inadequacy, and the "best" (95th percentile), median (50th percentile) and "worst" (5th percentile) outcomes of the remaining account balance (as discussed in sections 3.5 to 3.11) for our core scenario at age 90 (which is the assumed life expectancy for a 65 year old female).

Table 1: Core scenario results – impact of purchasing an annuity

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
500,000	37,621	19,450	Non-annuity	42%	-167,867	18,682	348,781
500,000	37,621	19,450	Annuity	4%	-121,776	98,179	563,188

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; High Fees.

- 4.4 These core results indicate that incorporating a lifetime annuity on the terms modelled into the retirement portfolio to replace a diversified bonds and cash allocation results in:
- a smaller risk of inadequacy; and
 - a larger remaining account balance (or a smaller shortfall) at age 90.
- 4.5 The charts in Appendix 4 show the progression of incomes and remaining account balances for various scenarios over time. Figure 1.3 shows the progression of the remaining account balance for each strategy under the core scenario presented in Table 1. The bars represent the 90% confidence interval with the "worst"/"best" outcomes in Table 1 being the bottom/top of the bar at age 90. The average modelled outcome is identified by the solid line.
- 4.6 From Figure 1.3, we can see that, at earlier ages, a larger remaining account balance is expected under the non-annuity strategy. This is due to the purchase of the annuity costing the member 30% of their initial account balance at retirement which would be non-refundable on early death. However, as time progresses the average modelled outcomes cross over as a result of the smaller income being drawn from the account based pension balance under the annuity strategy. On death anytime prior to age 81, the average remaining account balance is larger if an annuity is not purchased.

- 4.7 When these observations are considered along side Figures 1.1 and 1.2, we see that under both the annuity and non-annuity strategies the target income is still being received at age 81. If a retiree does not expect to live beyond age 81 we can therefore deduce that the non-annuity strategy would provide a better outcome for the retiree.
- 4.8 However, beyond age 82, Figure 1.3 shows that the average remaining account balance is larger under the annuity strategy. Furthermore, Figures 1.1 and 1.2 show that, on average, purchasing an annuity results in:
- target income being received for 6 years longer, with a larger income than target in some years due to the application of minimum drawdown rules for account based pensions;
 - income not falling below the adequate level, whereas under the non-annuity strategy the income becomes inadequate from age 99 onwards;
 - a reduction in the amount of income sourced by the Age Pension (visible by inspection); and
 - the sum of the average annuity income and the age pension providing an income which is greater than the adequate level until after age 100.
- 4.9 Table 1 also shows the probability of inadequacy over the retiree's lifetime. Adding an annuity on the terms modelled reduces the probability materially for the core scenario. The probability of inadequacy under the annuity strategy remains slightly greater than zero due to the stochastic annuity rates (which allows a possibility for the retiree purchasing annuities at unfavourable rates), and also the assumption that adequate income level is indexed with AWE, whereas annuity income is indexed with (lower) CPI.
- 4.10 Extending our analysis to look at more extreme outcomes, we can observe from Figure 1.3 that under the "best" outcome (95th percentile) the cross over of the annuity and non-annuity strategy occurs at age 77 - 4 years earlier than under the average result. Conversely, under the "worst" outcome (5th percentile) the cross over of the two strategies occur at age 83 - 2 years later than under the average result.
- 4.11 The reason that the "best" outcomes favour the annuity strategy (when the converse might have been expected) is the effective increase in growth exposure over time under the annuity strategy, as explained in 4.45 – 4.49 below.

Sensitivity to the initial account balance

- 4.12 We have considered the effect of varying the amount of the initial account balance at retirement. We have looked at scenarios with initial account balances of \$1 million, \$250,000 and \$100,000 in place of the "core" \$500,000. In each case we have retained the same target and adequate incomes as the core scenario.
- 4.13 We have also modelled two further scenarios for the \$1 million and \$100,000 initial account balances where the target and adequate income levels have been adjusted to reflect a more appropriate income given the size of the initial account balance.

- 4.14 Table 2 shows the same metrics as Table 1 but under these initial account balance sensitivity scenarios. The results for our Core assumptions are also included below for easy comparison.

Table 2: Sensitivities to variation in initial account balance

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
1,000,000	37,621	19,450	Non-Annuity	6%	179,815	721,061	1,982,340
			Annuity	1%	266,579	851,057	2,407,016
500,000	37,621	19,450	Non-Annuity	42%	-167,867	18,682	348,781
			Annuity	4%	-121,776	98,179	563,188
250,000	37,621	19,450	Non-Annuity	90%	-447,941	-344,376	-221,845
			Annuity	75%	-409,464	-314,140	-194,829
100,000	37,621	19,450	Non-Annuity	98%	-688,130	-546,661	-443,139
			Annuity	98%	-658,802	-525,762	-427,193
1,000,000	75,242	38,900	Non-Annuity	70%	-788,096	-422,117	417,291
			Annuity	66%	-712,485	-351,164	825,758
100,000	19,450	14,971	Non-Annuity	24%	-20,729	40,507	158,197
			Annuity	0%	-10,422	56,099	189,047

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; High Fees.

- 4.15 In all cases considered, adding an annuity on the terms modelled to the portfolio continues to result in improved “best” outcomes and less poor “worst” outcomes at age 90 than the corresponding non-annuity strategy. Figures 2.3, 3.3, 4.3, 5.3 and 6.3 show similar results to Figure 1.3 in that, in the years following retirement, the remaining account balance on death is larger under the non-annuity strategy. However, there is a cross over age in each chart beyond which a larger remaining account balance at each future age is provided under the annuity strategy.
- 4.16 Figures 1.1 to 6.3 in Appendix 4 contain all the corresponding charts to the scenarios set out in Table 2.



Sensitivity to asset allocation

4.17 We have considered the effect of varying the underlying asset allocation in our core scenario. The alternative allocations we have investigated are:

- 100% Defensive;
- 30% Growth / 70% Defensive;
- 50% Growth / 50% Defensive; and
- 90% Growth / 10% Defensive.

4.18 In each scenario the defensive allocation is either entirely used to purchase an annuity or entirely invested in a diversified bonds and cash portfolio. All other assumptions in the core scenario as set out in 2.9 have been retained.

4.19 The results to these sensitivities are set out in Table 3 which shows the usual metrics but under these asset allocation sensitivity scenarios. The results for our core assumptions are also included for easy comparison. Corresponding charts demonstrating these results are in Figures 7.1 to 10.3 of Appendix 4.

Table 3: Sensitivities to variation in asset allocation

Asset Allocation			Remaining account balance at age 90 (\$)			
Growth	Defensive	Strategy	Pr (Inadequacy)	Worst	Median	Best
0%	100%	Non-Annuity	67%	-180,359	-103,035	-2,698
		Annuity	0%	-115,676	28,296	254,911
30%	70%	Non-Annuity	57%	-157,853	-51,762	96,277
		Annuity	0%	-98,456	78,148	362,986
50%	50%	Non-Annuity	50%	-160,139	-18,006	204,226
		Annuity	0%	-102,315	96,905	462,624
70%	30%	Non-Annuity	42%	-167,867	18,682	348,781
		Annuity	4%	-121,776	98,179	563,188
90%	10%	Non-Annuity	36%	-183,093	55,496	594,990
		Annuity	32%	-163,898	84,891	691,012

Assumptions: Initial Balance \$500,000; Target income \$37,621 pa; Adequate income \$19,450 pa; High Fees.



- 4.20 The figures set out in Table 3 show that purchasing an annuity at retirement on the terms modelled provides a larger remaining account balance at age 90 over all asset allocation scenarios considered. This is consistent with our core scenario results and indicates that on the modelling assumptions used, purchasing an annuity improves this metric regardless of the asset allocation adopted. The improvement in this metric from purchasing an annuity is greater for high defensive asset allocations.
- 4.21 It is instructive also to examine the impact on this metric of varying asset allocation under an exclusively non-annuity (and alternatively, annuity) strategy. Under a non-annuity strategy, increasing the growth allocation in all cases improves the “best” and median outcomes. The “worst” outcome, conversely, deteriorates as the growth proportion is increased (with the exception of a shift from 0% to 30% growth assets), consistent with the greater downside risk of higher growth allocations. The results under an annuity strategy are broadly consistent, although the improvement in median outcomes is more marginal (and the metric actually worsens as the growth allocation is increased from 70% to 90%).
- 4.22 Figures 7.1 and 7.2 demonstrate an extreme scenario where the asset allocation is 100% defensive, and so the entire initial account balance is either invested in a bonds and cash portfolio or used to purchase an annuity. Under the annuity strategy, the income purchased, when combined with the Age Pension income, is sufficient to provide the target income until age 83. At that age, the impact of the annuity income being indexed with CPI rather than AWE means the income falls below the target level. However, the income never falls below the adequate level. Under the non-annuity strategy the target income is received until age 80 and then falls below the adequate level at around age 88.
- 4.23 Looking at the probability of inadequacy metric in Table 3, we see that an annuity strategy improves this metric relative to a non-annuity strategy under all asset allocations modelled. We note that the probabilities under the annuity strategy are zero when a proportion of greater than 30% of the initial account balance is used to purchase the annuity. This result is observed because the purchased level of annuity income proves to be larger than the benchmark adequate income used.
- 4.24 The probability of inadequacy metric demonstrates that, under a non-annuity strategy, the risk of achieving an inadequate income prior to death falls as the growth proportion in the account based pension is increased. This result is consistent with our previous results in our April 2009 report referred to in paragraph 1.3.
- 4.25 We have also modelled two further scenarios where we have assumed that the annuity allocation is capped at 30% of the initial account balance. In these scenarios the balance of the defensive portfolio remains in a diversified bonds and cash strategy. These scenarios are as follows:
- 30% Growth, 40% Bonds and Cash, 30% Annuities (Figure 11.1)
 - 50% Growth, 20% Bonds and Cash, 30% Annuities (Figure 12.1)

The corresponding tables for these scenarios are contained in Table 3.1 in Appendix 3.



Sensitivity to level of account based pension fees

- 4.26 We have considered the effect of varying the level of fees associated with the account based pension. The core scenario allowed for administration and platform fees on invested assets in line with the Rice Warner Superannuation Fee Report 2008. We have also looked at the impact of using fees which are lower than those set out in the Rice Warner Report, and a no fee environment. Further details of the fees assumed are set out in Appendix 1. In each case we have retained all other assumptions as the core scenario as set out in 2.9.
- 4.27 The scenarios modelled to demonstrate the fee sensitivity are a repeat of our core scenario and the variations in initial account balance. This sensitivity has been modelled in order to capture the dependency of fees on the size of the account balance.
- 4.28 Table 4 shows the usual metrics for the fee sensitivity under our core scenario for easy comparison. The remaining fee sensitivity scenarios under the various initial account balances are contained in tables 4.1 to 4.3 in Appendix 3. We have only produced corresponding charts for the low fee scenario and these are contained in Figures 13.1 to 18.3.

Table 4: Sensitivities to variation in account based pension fees

Fee Level	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
			Worst	Median	Best
High	Non-Annuity	42%	-167,867	18,682	348,781
	Annuity	4%	-121,776	98,179	563,188
Low	Non-Annuity	38%	-155,860	44,091	397,819
	Annuity	4%	-114,612	118,879	614,206
None	Non-Annuity	35%	-145,790	64,068	437,111
	Annuity	4%	-105,871	138,170	662,611

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; Initial Balance \$500,000; Target income \$37,621 pa; Adequate income \$19,450 pa

- 4.29 The above figures demonstrate the obvious result that lowering the account based pension fees results in an increase in the remaining account balance at age 90. The improvement in remaining account balance at age 90 due to the purchase of an annuity is reasonably consistent across all fee scenarios.
- 4.30 Under the non-annuity strategy, Table 4 shows that the probability of inadequacy reduces as the fees on the account based pension are lowered. A similar result arises under the annuity strategy due to lower fees on the account based pension element. However, the probability of inadequacy is already small so the effect is not easily observed.

Adverse Event Outcomes

- 4.31 A key driver of outcomes for retirees who hold an account based pension is the return on growth assets during the retirement period. In particular, early in the retirement period (where the dollar amount of the retiree's account balance is at its largest), the retiree is vulnerable to poor growth asset returns significantly eroding the size of their account balance and potentially reducing the likelihood of the retiree being able to draw enough to maintain target income throughout retirement.
- 4.32 The results presented in this report to this point capture the likelihood and impact of poor returns early in retirement in the stochastic scenarios modelled. That is, all of the outcomes generated include such poor return events, with the frequency and extent of such events in line with the underlying model assumptions.
- 4.33 Nonetheless it is instructive to explicitly identify the impact on retiree outcomes if poor returns occur early in the retirement period. This is equivalent to "stress testing" the chosen retirement strategy to see the effect of an adverse investment environment occurring shortly after a retiree's retirement date.

- 4.34 We have investigated this by defining the following as an "adverse event":

"an average real (i.e. in excess of CPI) return on growth assets of –5% pa or less over any five year period during the first ten years following retirement".

It should be noted that in any adverse event scenario, a recovery in growth asset returns after the first ten years is not precluded.

- 4.35 Using this definition, we have then isolated those stochastic outcomes where an adverse event occurs, generated the same metrics as previously (based on these outcomes), and compared results.
- 4.36 Table 5 below compares the core scenario results based on all outcomes, and alternatively adverse outcomes only.

Table 5: Core scenario results – Adverse event outcomes

Outcomes	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
			Worst	Median	Best
All	Non-Annuity	42%	-167,867	18,682	348,781
	Annuity	4%	-121,776	98,179	563,188
Adverse	Non-Annuity	71%	-252,260	-150,650	738
	Annuity	5%	-205,358	-98,312	91,900

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; Initial Balance \$500,000; Target income \$37,621 pa; Adequate income \$19,450 pa



- 4.37 The results show that an adverse event is expected to lead to significantly worse outcomes for retirees (as measured by remaining account balance at age 90) under both non-annuity and annuity strategies. In particular, under each strategy the median outcome moves from a positive to a significant negative position.
- 4.38 When the probability of inadequacy metric is considered, however, the impact of an adverse event is minimal under an annuity strategy but material under a non-annuity strategy. The minimal impact under an annuity strategy reflects that the (less onerous) “adequate” income level can generally be met over time by the annuity income plus age pension even where growth returns early in the retirement period are adverse.

Drivers of Results

- 4.39 On the metrics used, the results indicate a reduction in risk arising from a re-allocation of the defensive portion of the retiree’s assets to an annuity at the date of retirement. The risk reduction is not uniform; however the reduction is robust to a range of different initial balances, target incomes and portfolio asset allocations.
- 4.40 We have undertaken some analyses to understand the key underlying drivers of these results. In our view the results are dependent on the following two important drivers

Annuity Pricing Basis vs Bond Portfolio Return

- 4.41 The defensive portfolio used in the non-annuity strategies assumes a mix of government and corporate bonds and cash, with an overall expected return similar to that of Australian government bonds. The annuity pricing basis we have used as provided by Challenger is based on swap rates, and we have used an expected margin of swap rates over government bonds of approximately 100 bps (1%) pa. Further details of the annuity rates can be found in Appendix 1.
- 4.42 Hence by substituting a lifetime annuity for defensive assets, in return terms the retiree is effectively generating an additional 1% pa on those assets. However, there is no accompanying increase in risk – indeed, as the annuity payments are certain (no probability of life office default is modelled), on the risk metrics used a reduction in risk occurs. Effectively the retiree is relying on the life office and/or the surrounding regulatory environment to “absorb” the additional credit risk inherent in the assets underlying the annuity.

Effective Increase in Growth Exposure over time under Annuity Strategy

- 4.43 Under the non-annuity strategies, assets are assumed to be rebalanced annually to the starting growth and defensive allocations (e.g. 70% / 30% under the core scenario). The retiree’s proportional allocation to growth and defensive assets is therefore constant over time.
- 4.44 Given the higher assumed median return on growth assets compared to defensive assets, maintaining this constant growth/defensive proportion in fact requires (more often than not) a reallocation of assets from growth to defensive at the start of each year. (After a year where defensive assets outperformed growth, the reverse would be true). This process would be hidden from a retiree who invests via a managed portfolio which would maintain the proportion on the retiree’s behalf.
- 4.45 Under the annuity strategy, the defensive assets are used to purchase an annuity at the start date, the remaining account balance (after the annuity purchase) is held in growth assets, and thereafter no reallocation between asset classes occurs.

- 4.46 By analogy with the non-annuity strategy, it can be seen that the higher median return on growth assets results in the overall growth exposure of the retiree's portfolio under the annuity strategy increasing over time. To maintain a constant growth allocation, it would be necessary to rebalance growth assets portfolios annually (e.g. by "selling" growth assets in good return years, and allocate assets to a defensive portfolio – either by purchasing further annuities or allocation the assets to a cash/bonds portfolio). This approach would cause the investment returns underlying the annuity and non-annuity strategies to be comparable, meaning the results would be driven instead by the "repackaging" effect of the retiree selecting annuities instead of bonds.
- 4.47 This possible alternative approach is outside the scope of this report.



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Section 5: Reliances and Limitations

Reliances

- 5.1 In carrying out our analysis and producing this Report we have relied without independent verification upon the accuracy and completeness of the data and information provided to us, both in written and oral form, by Challenger which produced the sources of information discussed in the Report.
- 5.2 Reliance has been placed upon, but not limited to, the lifetime annuity rates provided by Challenger found in Table 6 in Appendix 1.

Limitations

- 5.3 The Report has been prepared by Watson Wyatt Limited on an agreed basis to meet the specific purposes of the Challenger Group Services Pty. Ltd. and must not be relied upon for any other purpose. The Report has been prepared for use by persons technically competent in the areas covered. Except with the written consent of Watson Wyatt Limited, the Report and any written or oral information or advice provided by Watson Wyatt Limited must not be reproduced, distributed or communicated in whole or in part to any other person, or be relied upon by any other person. Any reference to Watson Wyatt Limited in any report, accounts or other published documents is not authorised without our prior written consent.
- 5.4 The Report must be considered in its entirety since individual sections, if considered in isolation, may be misleading. Draft versions of the Report must not be relied upon by any person for any purpose. No reliance should be placed on any advice not given in writing. If reliance is placed contrary to the guidelines set out above, Watson Wyatt Limited disclaim any and all liability which may arise.
- 5.5 Assumptions are made about future experience, including mortality and morbidity. These assumptions have been made on the basis of reasonable estimates. However, actual future experience is likely to differ from these assumptions, due to random fluctuations, changes in the operating environment, and other factors. Such variations in experience could have a significant effect on the results and conclusions of this Report. No warranty is given by Watson Wyatt that the assumptions made in this Report will be reflected in actual future experience.
- 5.6 This Report was based on data available to Watson Wyatt Limited at, or prior to, 2 September 2009, and takes no account of developments after that date.
- 5.7 This Report is subject to the terms and limitations, including limitation of liability, set out in our engagement letter of 21 July 2009.



Nick Callil
Consulting Actuary

Review:



John Burnett
Consulting Actuary

Date: 2 September 2009

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Appendix 1: Modelling Assumptions

1.1 Investment Model

All results and analysis contained in this report are based on stochastic projections of a wide range of future market conditions, including investment returns for major asset classes and future levels of CPI and interest rates. Details of the methods and assumptions for the underlying Investment Model are set out separately in Appendix 2.

1.2 Model Retiree

Our investigations have been based on the assumption that the model retiree is a single female who retires at age 65. The retiree is assumed to be a homeowner (for Age Pension means test purposes).

Previous research was based on a retired couple. However, incorporating a spouse into the research adds a significant degree of complexity into the modelling parameters and adds to the challenge of presenting and analysing results. We believe that the key insights into the project objectives can be obtained without incorporating a spouse.

1.3 Mortality

In order to make a direct comparison of the impact of incorporating an annuity into a retiree's asset allocation in isolation, much of the analysis has been performed without regard to underlying mortality rates. This is necessary since incorporating mortality would dilute the average outcomes through members dying before running out of account based pension either with or without an annuity.

Where a mortality assumption has been adopted, the base table adopted is the Australian Life Tables 2005-07.

We have adjusted these tables to reflect the general principle that socio-economic status is a key driver behind differences in health and therefore mortality. On this basis we have assumed that retirees with larger superannuation savings exhibit lighter mortality than the general population due to access to better healthcare and a better general standard of living.

In addition, we have also made a further adjustment to the mortality tables to make a specific allowance for mortality improvements in the future.

The actual adjustments made are:

- Socio-economic status (SES) allowance: 75% of base rates at age 60 rising to 95% of table at age 100 and over; and
- Mortality Improvement: 25-year improvement factors in Australian Life Tables 2000-02 (Australian Government Actuary).

Based on the adjusted mortality, the expected future lifetime of a female aged 65 is 25 years. An equivalent male future lifetime is 22 years.

The mortality tables which underpin the lifetime annuity rates used in the research may differ to those referenced here. The annuity rates used have been provided by Challenger.



1.4 Initial Retirement Account Balance

In order to examine the impact of the magnitude of a retiree's amount of savings at retirement, we have modelled four initial account balances:

- \$1,000,000;
- \$500,000;
- \$250,000; and
- \$100,000.

The retiree is assumed to have no assets other than the initial account balance.

1.5 Target Retirement Income

In each modelled scenario, we have made an assumption about the level of target retirement income which the individual will receive. This target income is the combination of income from three sources: Age Pension income, lifetime annuity income (if any) and account based pension income. The annual amount of income drawn from the account based pension is calculated as the balancing item required in order to achieve the target income in each year. This is an iterative process due to the social security means tests.

For the purpose of modelling, our core assumption is to assume that the initial target income is the December 2008 ASFA-Westpac Comfortable income level of \$37,621 pa ("Comfortable"). We have then extended our investigation to two additional scenarios set out below:

- \$1,000,000 with a target income of \$75,242 pa ($2 \times$ Comfortable)
- \$100,000 with a target income of \$19,450 pa (Modest)

These additional scenarios have been modelled to reflect a target income which is more sustainable given the level of initial account balance.

1.6 Adequate Retirement Income

In each modelled scenario, we have made an assumption about the level of "adequate" retirement income. We assume that falling below this income level is an unacceptable outcome for the retiree.

For the purpose of modelling, our core assumption is to assume that the initial adequate income is the December 2008 ASFA-Westpac Modest income level of \$19,450 pa ("Modest"). The assumed adequate income level for the two additional scenarios is set out below:

- \$1,000,000 with an adequate income of \$38,900 pa ($2 \times$ Modest)
- \$100,000 with an adequate income of \$14,971 pa (Maximum Age Pension)

As with the target income for these additional scenarios, the adequate income level adopted is designed to reflect an income which may be more appropriate to the level of initial account balance.

1.7 Indexation of Retirement Income

We have assumed that both the target income and the adequate income are indexed in line with Average Weekly Ordinary Time Earnings (AWE) in the future. The choice of index used is significant and materially affects the results. Using AWE rather than the Consumer Price Index (CPI) is justified by the following:

- Using AWE reflects an aspiration that living standards of retirees keep pace with those of the working community; and
- The Government Age Pension is indexed annually at AWE. With the Age Pension indexed at AWE, indexing the total target income at CPI (generally assumed to be 1-2% lower than AWE) results in a “crowding out” of the account based pension components of the retiree’s income at later ages, so that the longevity and investment risk for such a retiree is limited because the Age Pension quickly becomes a greater proportion of target income.

1.8 Lifetime Annuity Rates

Challenger has provided us with a table of Lifetime Annuity Rates for use in this research. We understand that the rates provided are appropriate for a female retiree and have been provided on a number of different interest rates to enable their use in the stochastic model. We have assumed that the rates provided by Challenger are appropriate for the purpose of this research and have not performed any reasonableness or consistency checks.

A summary of the annuity rates used in this investigation is set out below.

Table 6: Annuity Rates for a 65 year old female - CPI indexed Lifetime annuity

Swap Rate (Real)	Annuity Rate (\$ pa per \$100,000)
1%	4,266
2%	5,116
3%	6,017
4%	6,950
5%	7,893
6%	8,828
7%	9,737
8%	10,608
9%	11,429
10%	12,195



The Watson Wyatt Global Asset Model does not generate swap rates. We have therefore agreed with Challenger that real swap rates used to determine the CPI indexed annuities should be derived from the model at the start of the projection period as follows:

- the yield on 10 year Commonwealth Government Bonds; plus
- two thirds of the AA corporate bond spread; less
- expected long term price inflation.

The average real swap rate generated is 4.1% pa, which implies an average annuity rate of \$7,044 pa per \$100,000.

1.9 Asset Allocation

The fundamental objective of this project is to compare modelled outcomes for various growth/defensive asset allocations where the defensive element of the portfolio is invested either in a lifetime annuity product or in the usual defensive asset classes.

We have modelled a number of different investment allocations with a varying exposure to defensive asset classes. In the scenarios where a lifetime annuity is purchased as the defensive portion of the allocation, it is assumed that the remaining assets are fully invested in growth type asset classes.

We note that this assumption takes no account of the risk appetite of retirees. For example, it is possible that, even with the safety net of a lifetime annuity, a retiree may still be cautious about investing their account based pension assets fully in growth type assets and so may choose to still hold a further portion of defensive assets to back their account based pension. We have considered this point further in the results set out in Table 3.1 of Appendix 3.

The account based pension account is rebalanced annually to maintain the desired asset allocations over time.

1.10 Account based Pension Fees

As part of the project objectives, Challenger has requested that the model is extended to incorporate projections both with and without the inclusion of platform, administration and investment management fees. No additional fees are to be incorporated into the lifetime annuity element of the calculations as we understand that the annuity rates already include a margin for expenses.

We have not included an explicit assumption for investment management fees. Returns from the Global Asset Model are assumed to be net of these fees.

As agreed with Challenger, we have assumed the fees to be those set out in the Superannuation Fees Report 2008 prepared for IFSA by Rice Warner Actuaries. The table below sets out an extract from that report detailing the average fees for Retail Retirement Income Products which we have incorporated into our model.

We have also created a second set of fee assumptions which has been based on a survey of 12 industry fund super pension divisions. These entities tend to charge lower fees than public offer retail funds and we have therefore identified this as our low fee assumption. Details of the fees assumed are set out below.

Table 7: Account Based Pension Fees

Account Balance	High Fee Assumption*		Low Fee Assumption#	
	Administration (%)	Platform (%)	Administration %	Platform %
>\$1 million	0.01	0.33	0.16	0
\$500,000 - \$1 million	0.01	0.38	0.18	0
\$250,000 - \$500,000	0.02	0.44	0.23	0
\$100,000 - \$250,000	0.05	0.51	0.27	0
\$50,000 - \$100,000	0.10	0.58	0.32	0
\$25,000 - \$50,000	0.22	0.67	0.46	0
<\$25,000	0.99	0.77	0.75	0

* - Allocated pension Open Products Expense Rate (%) – Retail Retirement Income Products, Superannuation Fees Report 2008, Rice Warner Actuaries

- Based on research across 12 industry super pension divisions.

1.11 Age Pension

In all scenarios modelled, we have integrated the income provided by the Age Pension. When calculating the Age Pension income in each future projection year, the model allows appropriately for the remaining account based pension balance and any annuity purchased at retirement in the means test calculation for that projection year.



Table 8: Age Pension rules

Age Pension (effective from 20 March 2009) available from age 65	Singles	Couples	
Full Age Pension Rate (per fortnight)	\$569.80	\$475.90	(each)
Income Test			
Threshold (per fortnight)	\$138.00	\$240.00	(combined)
Rate of Reduction (per dollar over threshold)	\$0.40	\$0.20	(each)
Assets Test			
Threshold: Homeowners	\$171,750	\$243,500	(combined)
Threshold: Non-homeowners	\$296,250	\$368,000	(combined)
Rate of Reduction (per fortnight per \$1,000 over threshold)	\$1.50	\$1.50	(combined)
Pharmaceutical Allowance (per fortnight)	\$6.00	\$3.00	(each)

Appendix 2: A summary of the Watson Wyatt asset modelling assumptions as at 31 March 2009

The tables and charts in this Appendix show the summary statistics for the major asset classes included in the Watson Wyatt Global Asset Model as at 31 March 2009 from the perspective of an Australian investor who is valuing his or her investments in Australian dollars.

We believe that we are currently in an abnormal economic environment and in a number of areas our short term expectations differ from our views of longer term central outcomes. However, this investigation is looking at the long term impact of incorporating annuities into retirement incomes and we have therefore removed the short term assumptions from our standard asset model in order to reflect a long term view.

The tables below show the arithmetic average, median and standard deviation of return in the first year of projection. We also show the median and standard deviation of annualized returns over a 10-year period and in the long-term – median returns behave similarly to longer-term geometric average returns, and are therefore a more natural basis for comparison with past history. These assumptions are *before* allowing for the effects of tax and investment management expenses.

The return assumptions given for each mainstream asset class (i.e. equities, property, bonds, credit and cash) and certain alternatives (i.e. commodity futures, local currency emerging market debt) represent the expected market average (index) returns that an institutional investor could expect to achieve through a passive investment management approach. As such, they do not include expected premia for active investment management, or any offsets for the risks and costs of managing active strategies.

The return assumptions for private equity, infrastructure and fund of hedge funds are based on the return net of fees that could be expected from a low (active) risk, well diversified exposure such as through a fund of funds.



Table 9: Watson Wyatt Assumptions as at 31 March 2009
Denominated in AUD, nominal, gross of tax

Asset class	Actual			10-year annualized	
	Arithmetic average	Median	Standard deviation	Median	Standard deviation
Price Inflation (CPI)	2.5	2.5	1.6	2.5	0.4
Wage Inflation (AWE)	4.1	4.0	2.6	4.1	0.8
Cash & Bonds					
Cash	5.1	5.1	1.2	5.1	0.4
Australian 10yr Govt Bonds Return	5.9	5.4	7.9	5.6	0.5
Australian 10yr Govt Bonds Yield	5.6	5.5	1.3	5.6	0.5
Australian Fixed Interest	5.9	5.7	4.0	5.9	0.5
Australian Inflation-Linked Bonds	4.9	4.8	4.2	4.8	0.4
Global Bonds (Govt, hedged)	5.5	5.3	3.8	5.4	0.5
Global Bonds (Aggregate, hedged)	6.1	5.9	4.0	6.0	0.5
Global Inflation-Linked Bonds (hedged)	5.5	5.3	4.4	5.4	0.4
Australian All Corp Bond Spread	1.5	1.5	0.6	1.5	0.1
Equities					
Australian Equities	9.7	8.3	18.4	8.2	2.5
Australian Small Cap Equities	10.6	8.2	23.3	8.3	3.2
Global Equities (ex Aus, unhedged)	9.8	8.7	15.6	8.8	2.1
Global Equities (ex Aus, hedged)	10.5	9.5	15.4	9.5	2.1
Emerging Market Equities (unhedged)	13.3	9.0	32.6	8.9	4.0
Property					
Australian Unlisted Property	7.6	7.1	10.0	7.1	1.4
Australian Listed Property	8.1	6.5	18.7	6.5	2.6
Global Listed Property (hedged)	8.2	7.1	15.2	7.1	2.1
Credit					
Emerging Market Debt (hedged)	7.6	7.6	15.9	6.4	2.3
High Yield Debt (hedged)	8.8	8.4	10.2	8.4	1.5
Australian Investment Grade Credit	6.6	6.4	4.7	6.5	0.5
Global Investment Grade Credit (hedged)	6.8	6.6	4.7	6.7	0.5
Alternative assets					
Fund of Hedge Funds (hedged)	7.7	7.5	6.7	7.5	1.0
Private Equity (global, unhedged)	9.8	7.5	23.4	7.4	3.0
Global Infrastructure (hedged)	9.6	9.1	13.7	8.8	1.8
Commodity Futures (hedged)	7.5	5.6	20.3	5.6	2.8
Timber (unhedged)	9.3	7.1	22.1	7.1	3.9
Emerging Market Cash (unhedged)	7.1	6.9	7.3	6.9	2.3
Local Currency EMD (unhedged)	8.2	6.8	17.2	6.9	5.3
Equity Risk Premium					
Aus equities – Aus govt bonds	3.8				
Aus equities – Aus ILBs	4.8				

Table 10: Assumptions underlying the Account based pension at 31 March 2009
Denominated in AUD, nominal, gross of tax

Portfolio	Actual			10-year annualized	
	Arithmetic average	Median	Standard deviation	Median	Standard deviation
0% Growth	5.8	5.6	2.7	5.7	0.4
30% Growth	6.9	6.6	4.4	6.8	0.6
50% Growth	7.6	7.2	6.5	7.4	0.9
70% Growth	8.4	7.8	8.7	8.0	1.2
90% Growth	9.1	8.4	11.1	8.5	1.6
100% Growth	9.5	8.7	12.3	8.8	1.7

Please note that our assumptions are intended to be long-term assumptions, and as such they are intended to be used in setting long term or strategic asset allocations. They are not intended to be representative of short term experiences (for example over the next year), but rather they could be considered to represent the experience of an “average” year over the next ten years.

Correlation assumptions

Correlation is a statistical measure that describes the extent to which the returns from two asset classes are linked. The correlations of returns between the different asset classes describe important characteristics of the Global Asset Model in addition to the expected annual return and the standard deviation of annual returns.

Table 11 shows the key correlations of nominal 1-year returns between assets used in the Global Asset Model. To help in interpreting these numbers, a figure below 0.3 (positive or negative) is indicative of low correlation, a figure between 0.3 and 0.5 indicates moderate correlation and a figure of above 0.5 indicates a high degree of correlation.

Table 11: Watson Wyatt Correlation matrix as at 31 March 2009

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Watson Wyatt global asset model: Confidentiality and Disclaimer

The assumptions shown in this Appendix and used for this report have been derived by Watson Wyatt through a blend of economic theory, historical analysis and the views of investment managers. They inevitably contain an element of subjective judgment.

These assumptions are intended to be used in conjunction with Watson Wyatt's global asset model, for the purpose of setting long term or strategic asset allocations.

The key component of an asset allocation study is the way in which the assets are modelled. The structure of the Watson Wyatt global asset model is based on historical analysis of investment returns, although Watson Wyatt has incorporated its subjective judgement to complement the information provided by historical returns. The model is designed to illustrate the future range of returns stemming from different asset classes and their inter-relationship. It should be noted that no economic model could be expected to perfectly capture future uncertainty, particularly the risk of extreme events.

In particular it should be noted that our timeframe in establishing our asset model and the assumptions used in the model is long-term, and as such it is not meant to be precisely reflective of the likely course of the investment markets in the short-term. Furthermore, our opinions and return forecasts are not intended to imply, nor should be interpreted as conveying, any form of guarantee or assurance by Watson Wyatt, of the future performance of the asset classes in question, either favourable or unfavourable. Past performance should not be taken as representing any particular guide to future performance.



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Appendix 3: Supporting Tables

Table 1: Core scenario results – impact of purchasing an annuity

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
500,000	37,621	19,450	Non-Annuity	42%	-167,867	18,682	348,781
500,000	37,621	19,450	Annuity	4%	-121,776	98,179	563,188

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; High Fees.

Table 2: Sensitivities to variation in initial account balance

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
1,000,000	37,621	19,450	Non-Annuity	6%	179,815	721,061	1,982,340
			Annuity	1%	266,579	851,057	2,407,016
500,000	37,621	19,450	Non-Annuity	42%	-167,867	18,682	348,781
			Annuity	4%	-121,776	98,179	563,188
250,000	37,621	19,450	Non-Annuity	90%	-447,941	-344,376	-221,845
			Annuity	75%	-409,464	-314,140	-194,829
100,000	37,621	19,450	Non-Annuity	98%	-688,130	-546,661	-443,139
			Annuity	98%	-658,802	-525,762	-427,193
1,000,000	75,242	38,900	Non-Annuity	70%	-788,096	-422,117	417,291
			Annuity	66%	-712,485	-351,164	825,758
100,000	19,450	14,971	Non-Annuity	24%	-20,729	40,507	158,197
			Annuity	0%	-10,422	56,099	189,047

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; High Fees.



Table 3: Sensitivities to variation in asset allocation

Asset Allocation				Remaining account balance at age 90 (\$)		
Growth	Defensive	Strategy	Pr (Inadequacy)	Worst	Median	Best
0%	100%	Non-Annuity	67%	-180,359	-103,035	-2,698
		Annuity	0%	-115,676	28,296	254,911
30%	70%	Non-Annuity	57%	-157,853	-51,762	96,277
		Annuity	0%	-98,456	78,148	362,986
50%	50%	Non-Annuity	50%	-160,139	-18,006	204,226
		Annuity	0%	-102,315	96,905	462,624
70%	30%	Non-Annuity	42%	-167,867	18,682	348,781
		Annuity	4%	-121,776	98,179	563,188
90%	10%	Non-Annuity	36%	-183,093	55,496	594,990
		Annuity	32%	-163,898	84,891	691,012

Assumptions: Initial Balance \$500,000; Target income \$37,621 pa; Adequate income \$19,450 pa; High Fees.

Table 3.1: Sensitivities to variation in asset allocation - Annuity allocation capped at 30%

Asset Allocation				Remaining account balance at age 90 (\$)		
Growth	Bonds	Annuities	Pr (Inadequacy)	Worst	Median	Best
30%	70%	0%	57%	-157,853	-51,762	96,277
30%	40%	30%	5%	-113,598	9,926	193,737
50%	50%	0%	50%	-160,139	-18,006	204,226
50%	20%	30%	4%	-113,798	51,869	329,143
70%	30%	0%	42%	-167,867	18,682	348,781
70%	0%	30%	4%	-121,776	98,179	563,188

Assumptions: Initial Balance \$500,000; Target income \$37,621 pa; Adequate income \$19,450 pa; High Fees.



Table 4: Sensitivities to variation in account based pension fees

Fee Level	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
			Worst	Median	Best
High	Non-Annuity	42%	-167,867	18,682	348,781
	Annuity	4%	-121,776	98,179	563,188
Low	Non-Annuity	38%	-155,860	44,091	397,819
	Annuity	4%	-114,612	118,879	614,206
None	Non-Annuity	35%	-145,790	64,068	437,111
	Annuity	4%	-105,871	138,170	662,611

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; Initial Balance \$500,000; Target income \$37,621 pa; Adequate income \$19,450 pa

Table 4.1: Sensitivities to variation in initial account balance – High fees

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
1,000,000	37,621	19,450	Non-Annuity	6%	179,815	721,061	1,982,340
			Annuity	1%	266,579	851,057	2,407,016
500,000	37,621	19,450	Non-Annuity	42%	-167,867	18,682	348,781
			Annuity	4%	-121,776	98,179	563,188
250,000	37,621	19,450	Non-Annuity	90%	-447,941	-344,376	-221,845
			Annuity	75%	-409,464	-314,140	-194,829
100,000	37,621	19,450	Non-Annuity	98%	-688,130	-546,661	-443,139
			Annuity	98%	-658,802	-525,762	-427,193
1,000,000	75,242	38,900	Non-Annuity	70%	-788,096	-422,117	417,291
			Annuity	66%	-712,485	-351,164	825,758
100,000	19,450	14,971	Non-Annuity	24%	-20,729	40,507	158,197
			Annuity	0%	-10,422	56,099	189,047

Assumptions: Asset Allocation: 70% Growth / 30% Defensive; High Fees.



Table 4.2: Sensitivities to variation in initial account balance – Low fees

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
1,000,000	37,621	19,450	Non-Annuity	3%	206,911	794,661	2,118,643
			Annuity	1%	283,397	906,553	2,545,671
500,000	37,621	19,450	Non-Annuity	38%	-155,860	44,091	397,819
			Annuity	4%	-114,612	118,879	614,206
250,000	37,621	19,450	Non-Annuity	90%	-442,426	-338,200	-208,470
			Annuity	75%	-408,174	-312,075	-185,834
100,000	37,621	19,450	Non-Annuity	98%	-686,759	-545,685	-442,088
			Annuity	98%	-658,648	-525,652	-427,293
1,000,000	75,242	38,900	Non-Annuity	67%	-768,171	-383,603	534,918
			Annuity	64%	-705,188	-331,173	961,981
100,000	19,450	14,971	Non-Annuity	19%	-15,896	51,808	174,242
			Annuity	0%	-6,997	64,555	204,877

Assumptions: Asset Allocation: 70% Growth / 30% Defensive.



Table 4.3: Sensitivities to variation in initial account balance – No fees

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
1,000,000	37,621	19,450	Non-Annuity	2%	228,428	846,431	2,203,154
			Annuity	1%	297,834	950,612	2,638,033
500,000	37,621	19,450	Non-Annuity	35%	-145,790	64,068	437,111
			Annuity	4%	-105,871	138,170	662,611
250,000	37,621	19,450	Non-Annuity	89%	-437,650	-332,807	-197,612
			Annuity	75%	-405,178	-308,984	-178,350
100,000	37,621	19,450	Non-Annuity	98%	-685,838	-545,080	-441,641
			Annuity	98%	-658,169	-525,221	-426,975
1,000,000	75,242	38,900	Non-Annuity	65%	-753,776	-358,709	618,126
			Annuity	65%	-693,358	-310,026	1,044,261
100,000	19,450	14,971	Non-Annuity	15%	-9,978	62,227	186,762
			Annuity	0%	-2,138	73,949	217,088

Assumptions: Asset Allocation: 70% Growth / 30% Defensive.



Table 5: Core scenario results – Adverse event outcomes

Outcomes	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
			Worst	Median	Best
All	Non-Annuity	42%	-167,867	18,682	348,781
	Annuity	4%	-121,776	98,179	563,188
Adverse	Non-Annuity	71%	-252,260	-150,650	738
	Annuity	5%	-205,358	-98,312	91,900

Assumptions: Asset Allocation: 70% Growth / 30% Defensive.

Table 5.1: Sensitivities to variation in initial account balance - adverse event outcomes

Initial Balance (\$)	Target Income (\$)	Adequate Income (\$)	Strategy	Pr (Inadequacy)	Remaining account balance at age 90 (\$)		
					Worst	Median	Best
1,000,000	37,621	19,450	Non-Annuity	20%	18,529	262,233	812,071
			Annuity	0%	122,311	371,321	906,020
500,000	37,621	19,450	Non-Annuity	71%	-252,260	-150,650	738
			Annuity	5%	-205,358	-98,312	91,900
250,000	37,621	19,450	Non-Annuity	92%	-496,282	-396,106	-311,852
			Annuity	70%	-433,260	-355,697	-282,576
100,000	37,621	19,450	Non-Annuity	97%	-690,929	-542,715	-439,022
			Annuity	98%	-654,162	-523,215	-417,923
1,000,000	75,242	38,900	Non-Annuity	87%	-987,575	-741,400	-456,069
			Annuity	86%	-848,383	-649,263	-394,823
100,000	19,450	14,971	Non-Annuity	61%	-42,158	-14,650	41,190
			Annuity	0%	-31,603	-3,344	54,570

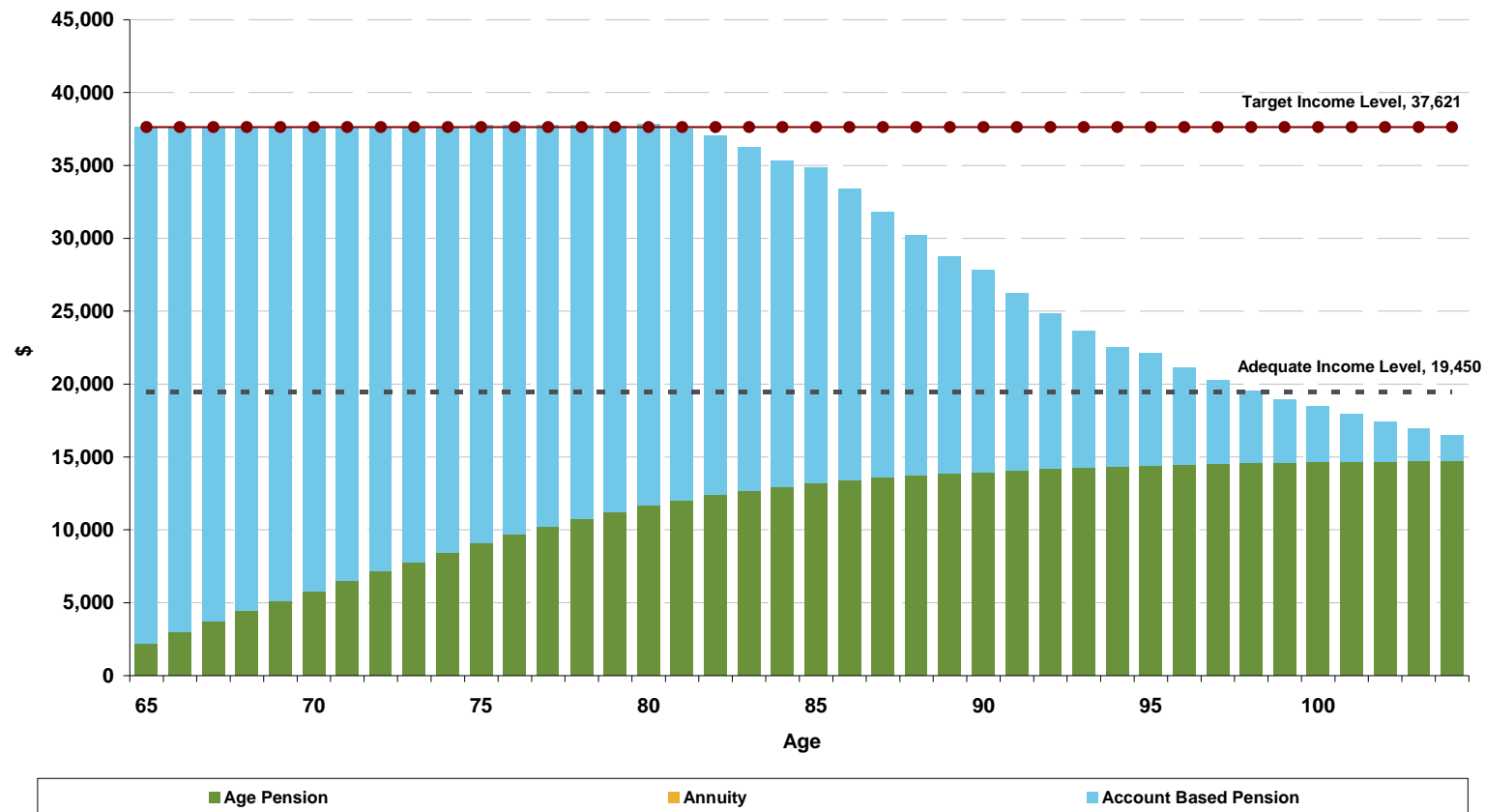
Assumptions: Asset Allocation: 70% Growth / 30% Defensive.



Appendix 4: Supporting Charts

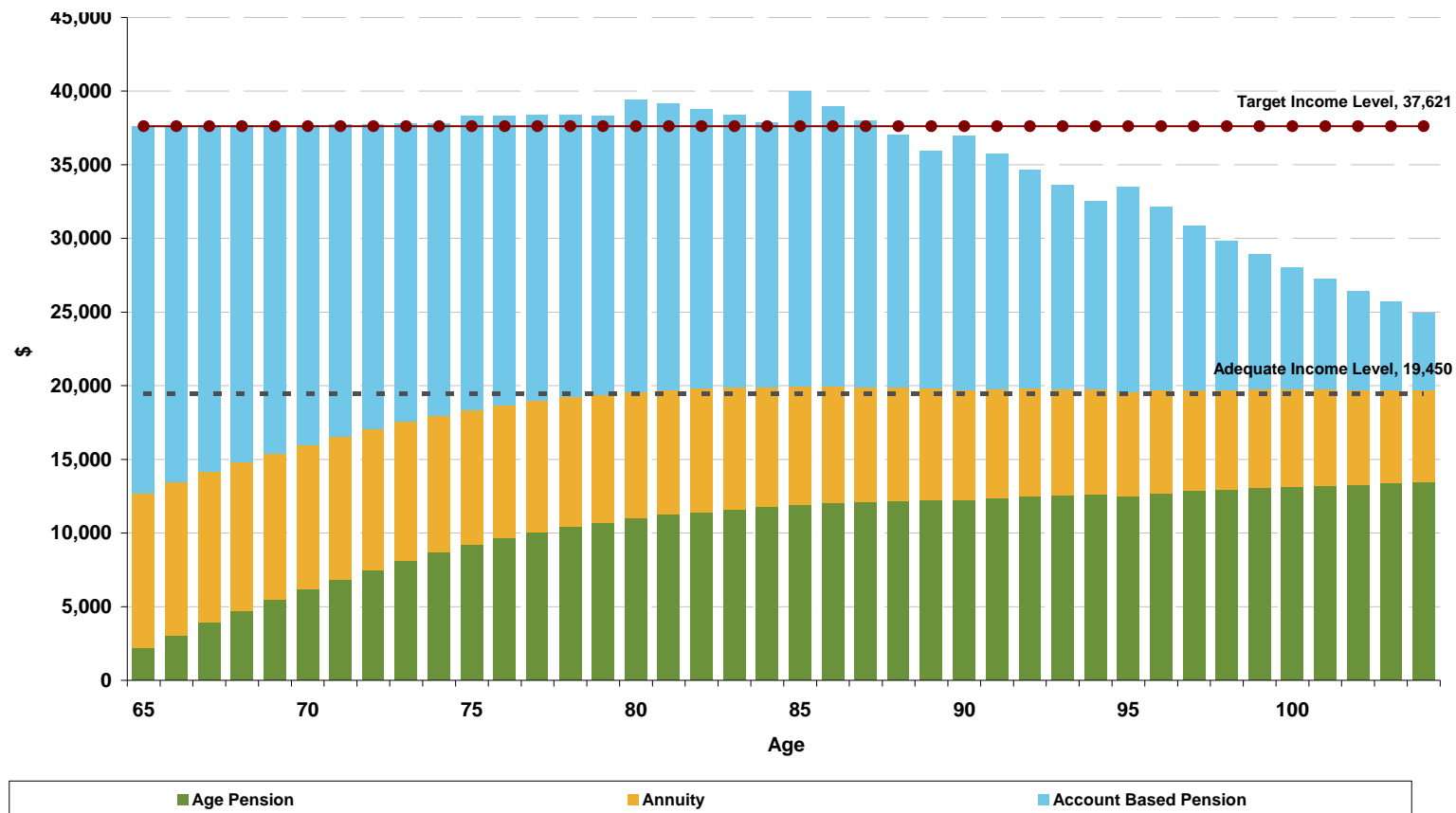


Figure 1.1: Average retirement income
- No lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; High Fees

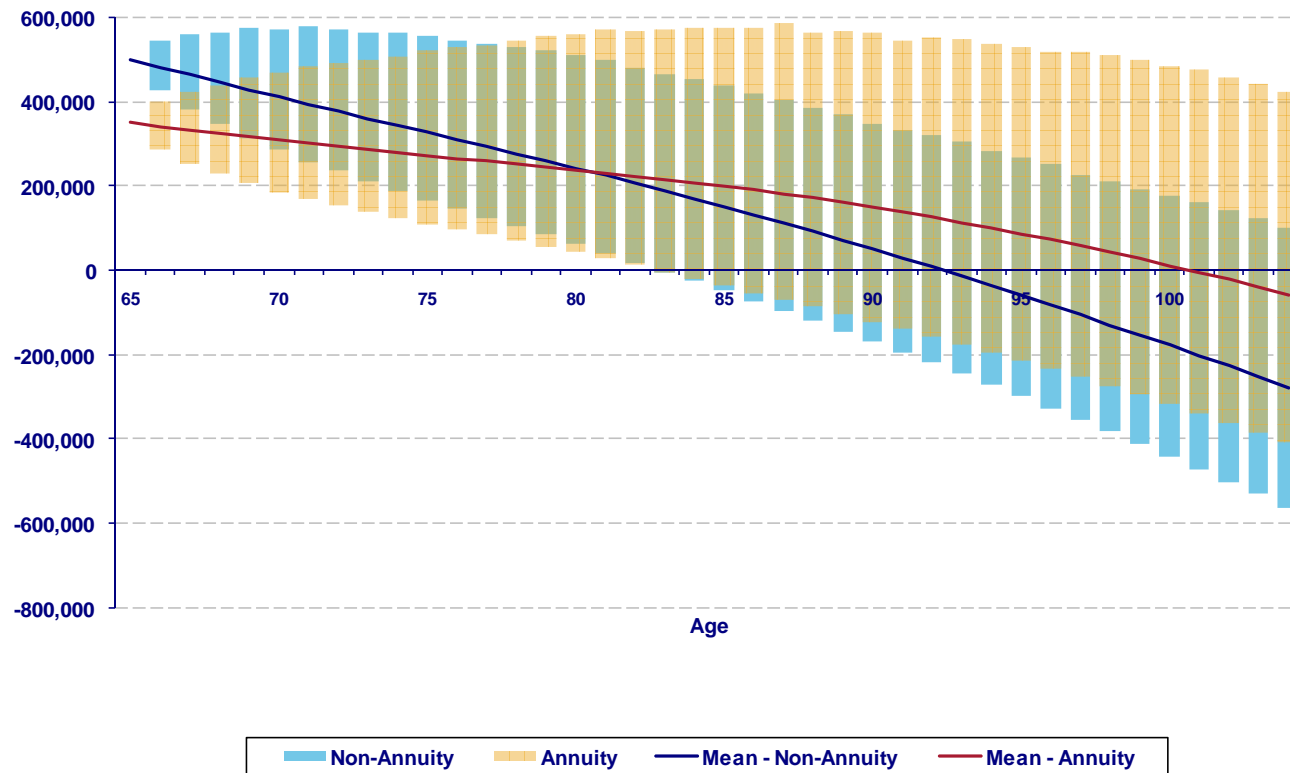
Figure 1.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; High Fees



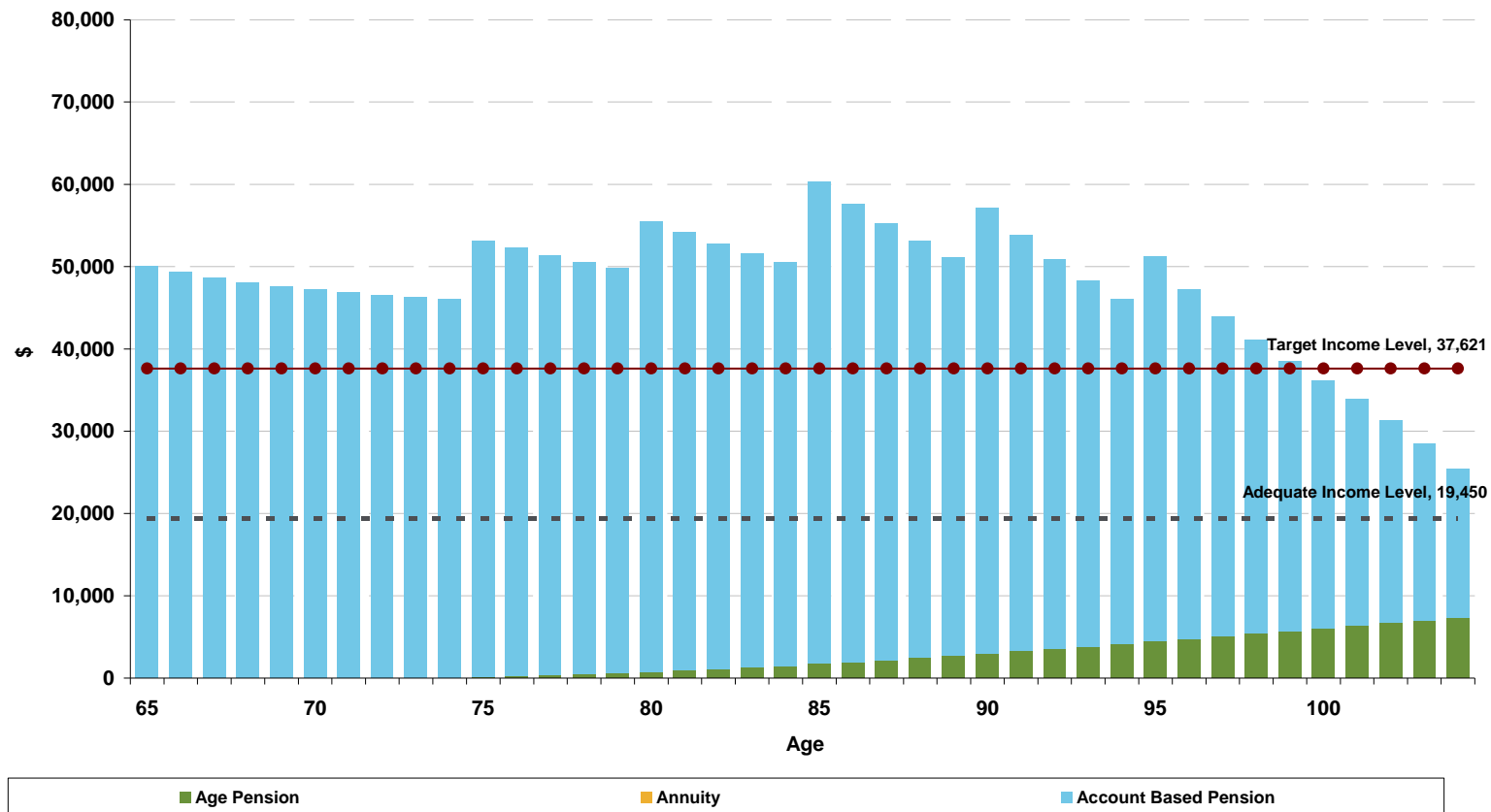
Figure 1.3: Remaining account balance
- 90% Confidence interval



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; High Fees



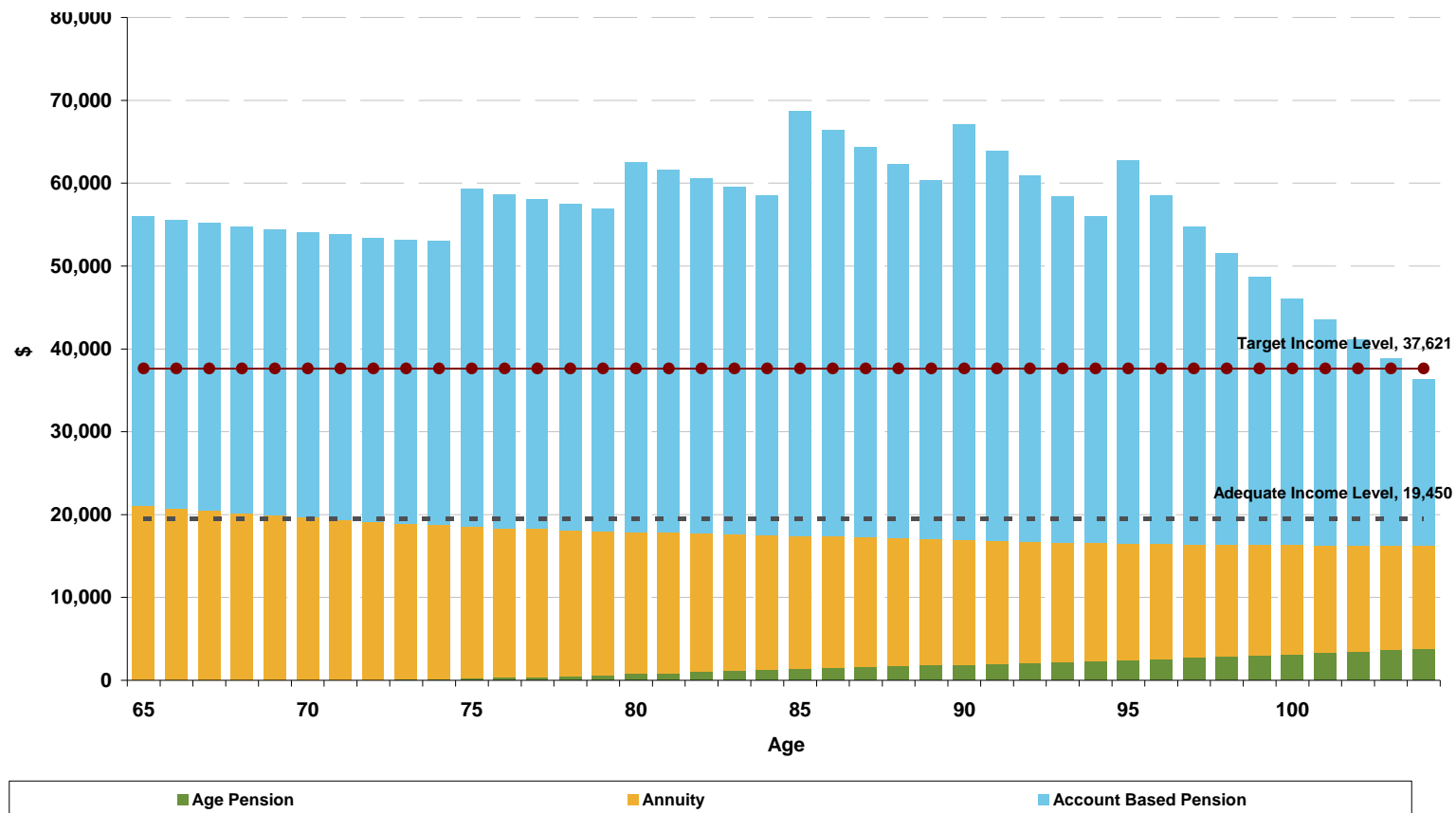
Figure 2.1: Average retirement income
- No lifetime annuity purchased at retirement



Assumptions: \$1,000,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; High Fees

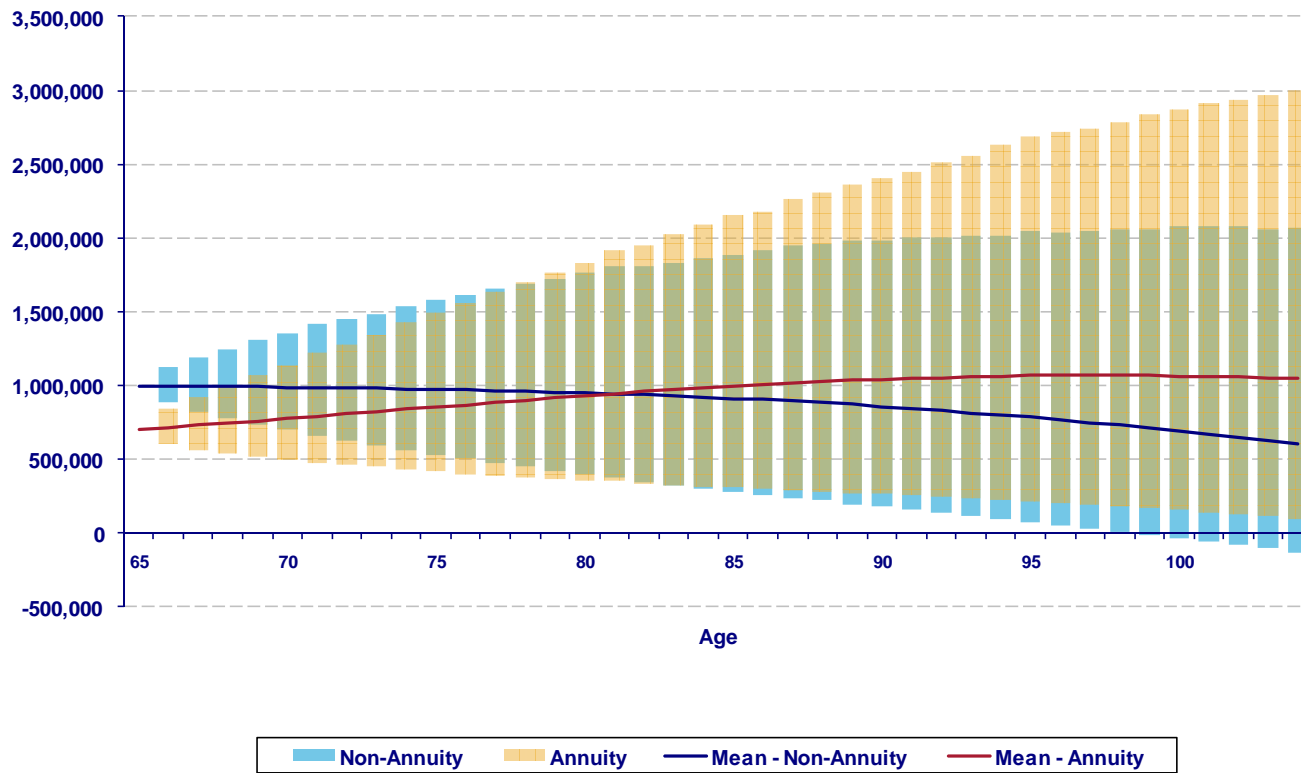


Figure 2.2: Average retirement income
- Lifetime annuity purchased at retirement



Assumptions: \$1,000,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Annuity; High Fees

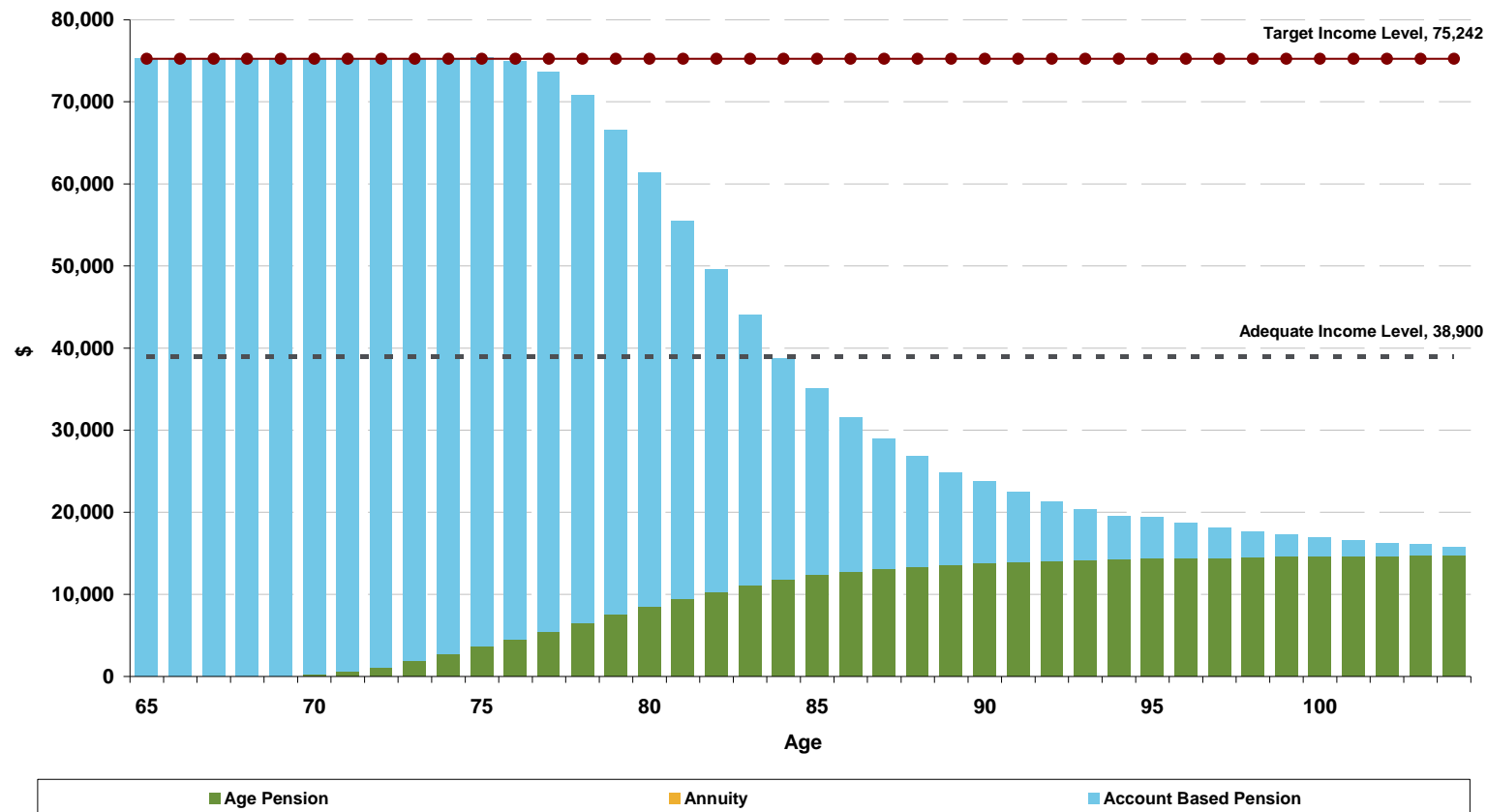
Figure 2.3: Remaining account balance
- 90% Confidence interval



Assumptions: \$1,000,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; High Fees

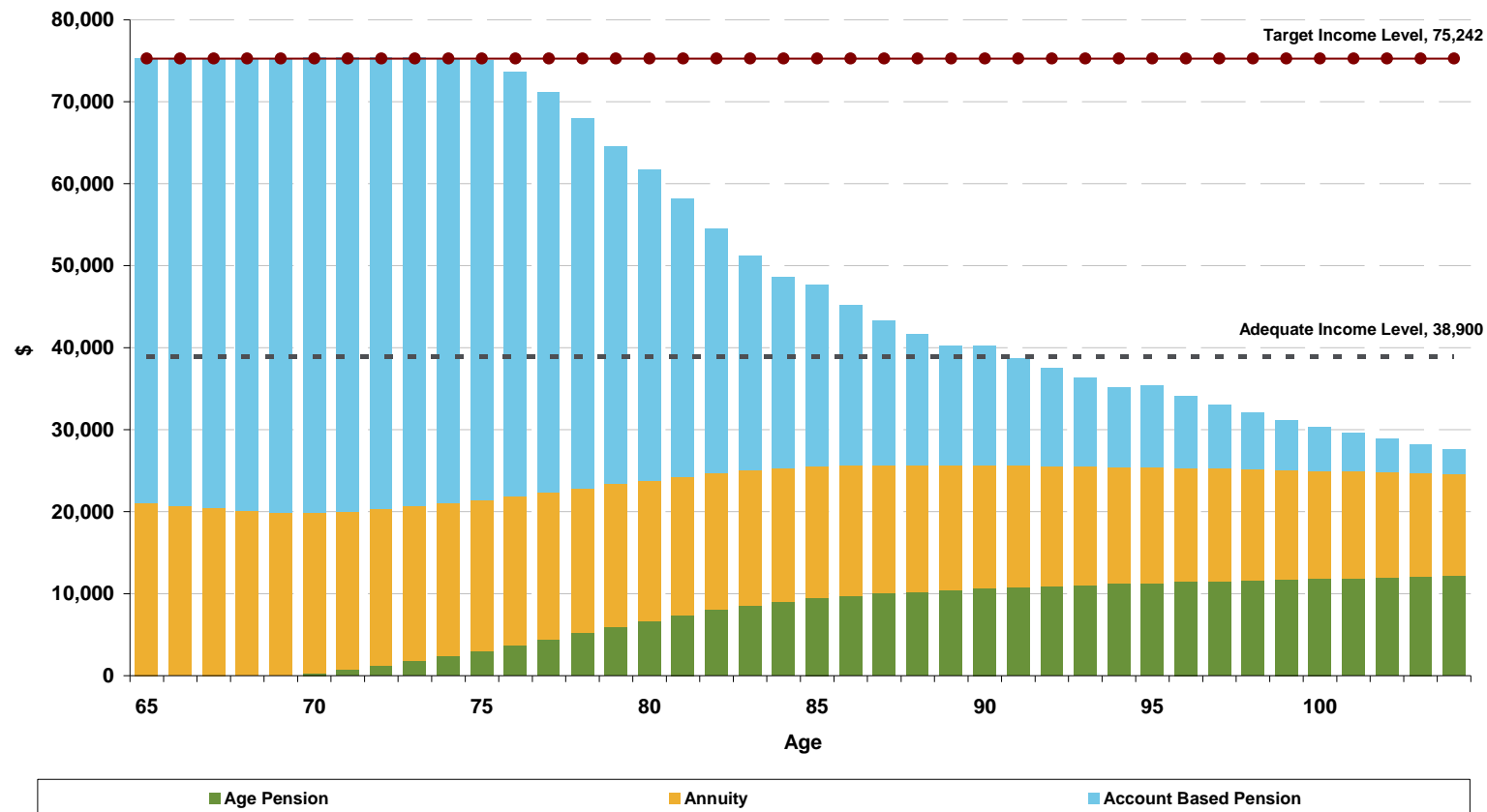


Figure 3.1: Average retirement income
- No lifetime annuity purchased at retirement



Assumptions: \$1,000,000 Initial account balance; \$75,242 pa Target income; \$38,900 pa Adequate income; 70% Growth, 30% Defensive; High Fees

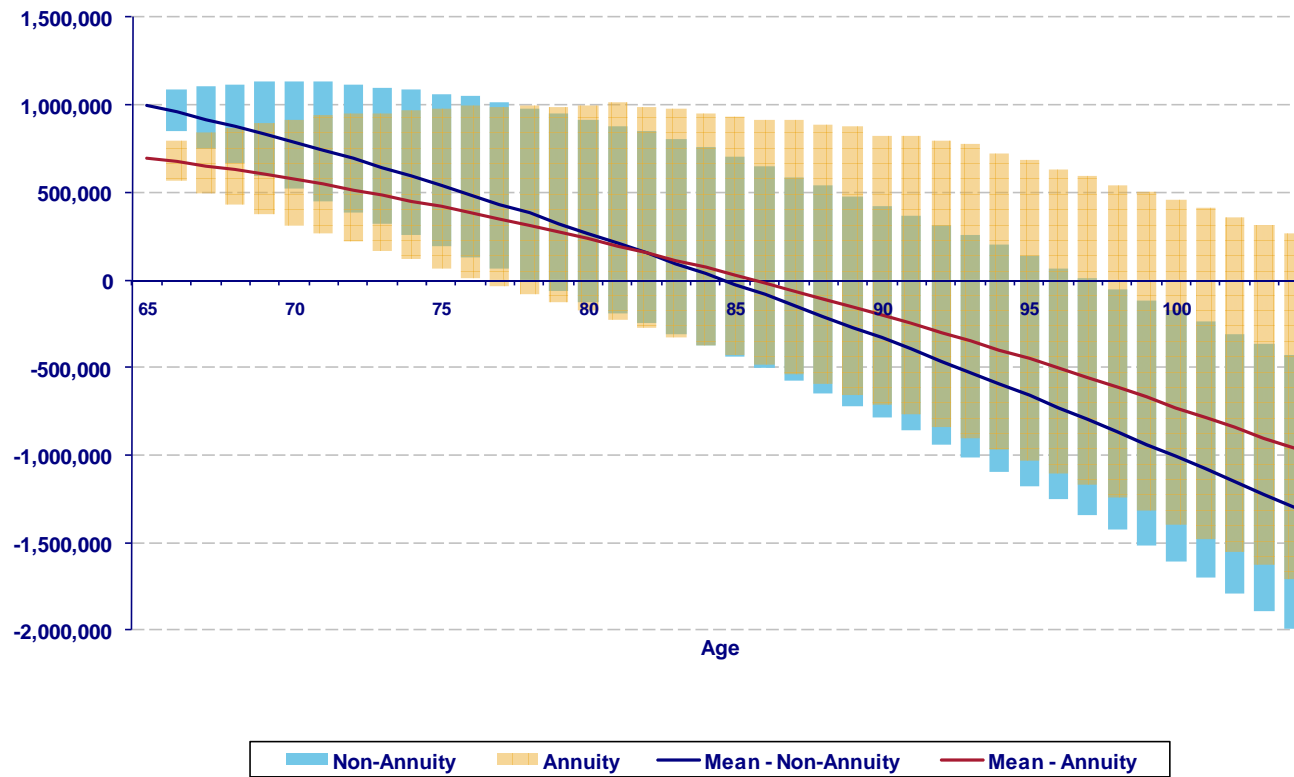
Figure 3.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$1,000,000 Initial account balance; \$75,242 pa Target income; \$38,900 pa Adequate income; 70% Growth, 30% Annuity; High Fees

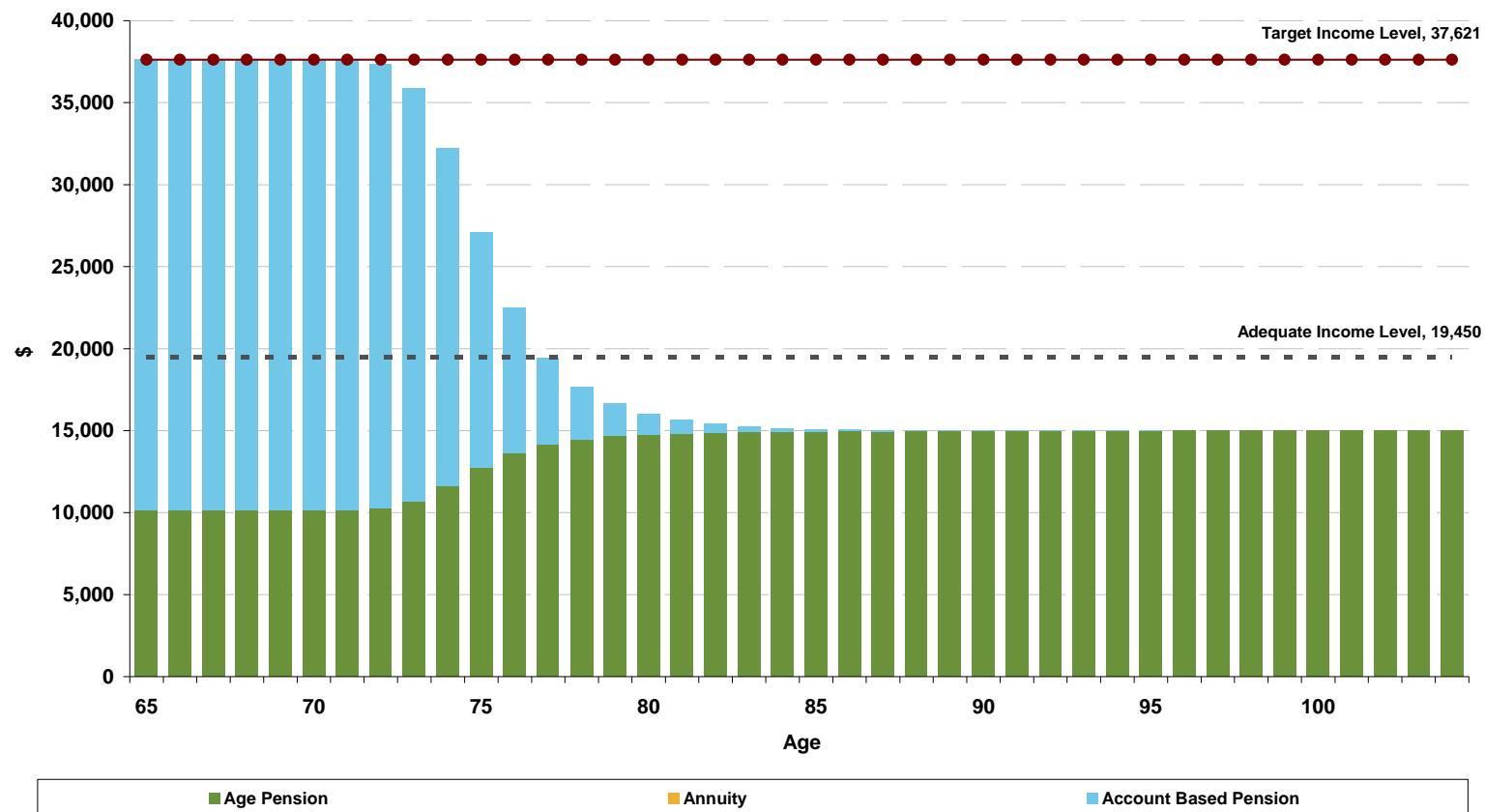


Figure 3.3: Remaining account balance
- 90% Confidence interval



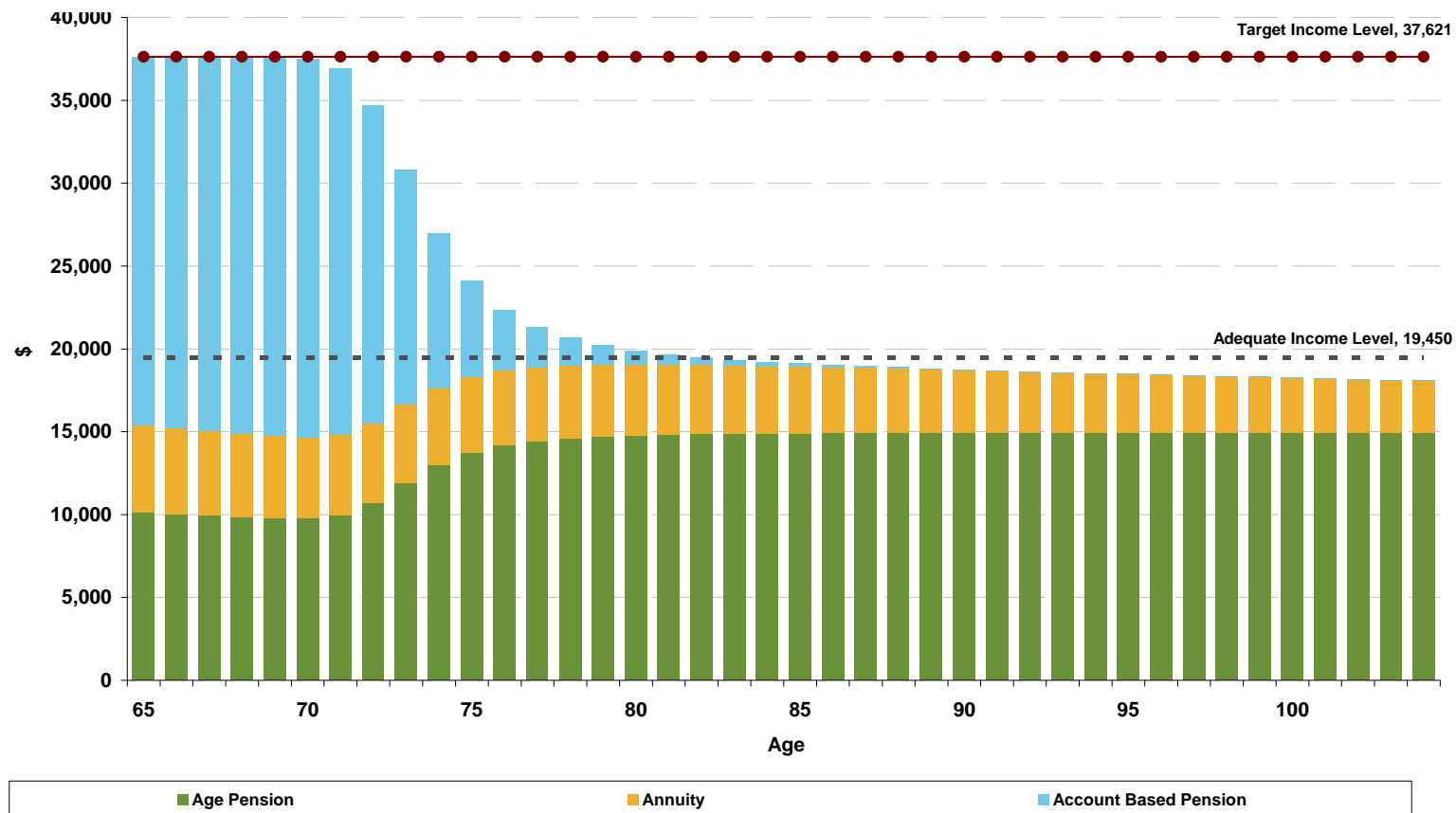
Assumptions: \$1,000,000 Initial account balance; \$75,242 pa Target income; \$38,900 pa Adequate income; 70% Growth; High Fees

Figure 4.1: Average retirement income
- No lifetime annuity purchased at retirement



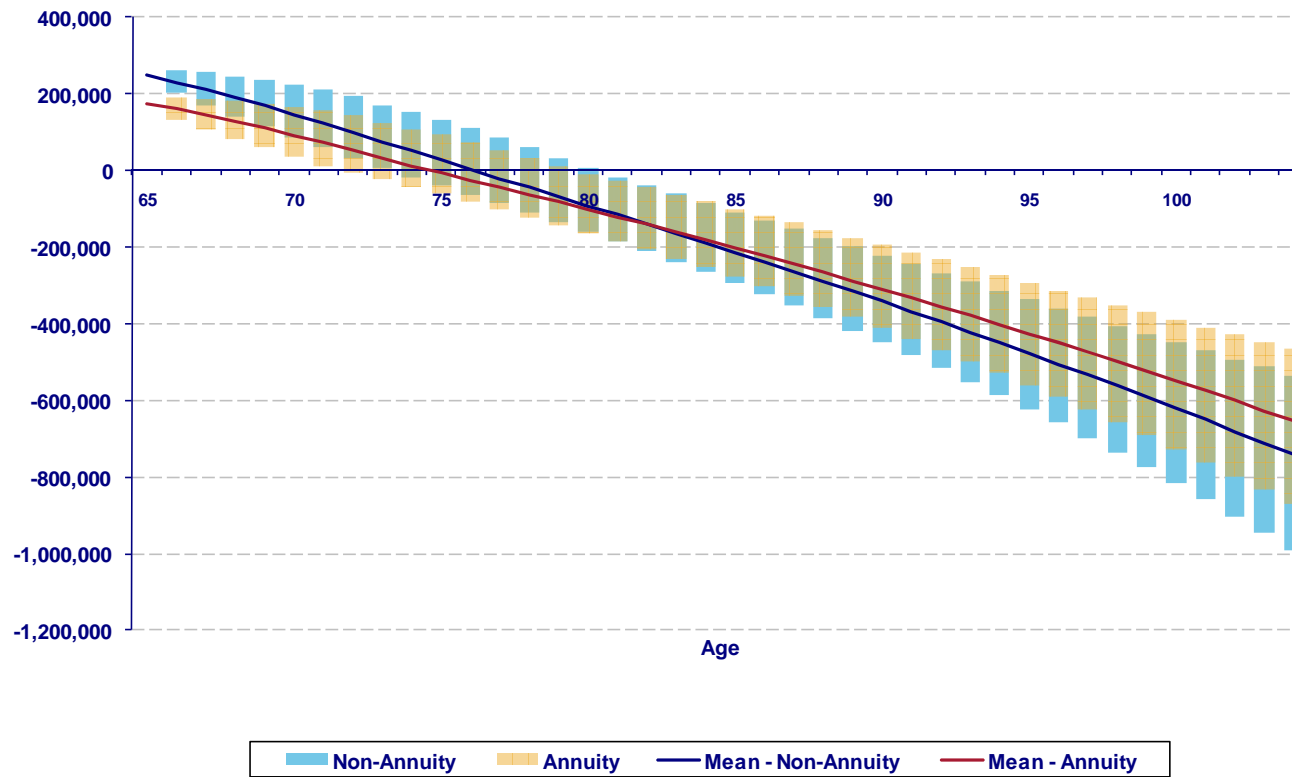
Assumptions: \$250,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; High Fees

Figure 4.2: Average retirement income
- Lifetime annuity purchased at retirement



Assumptions: \$250,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Annuity; High Fees

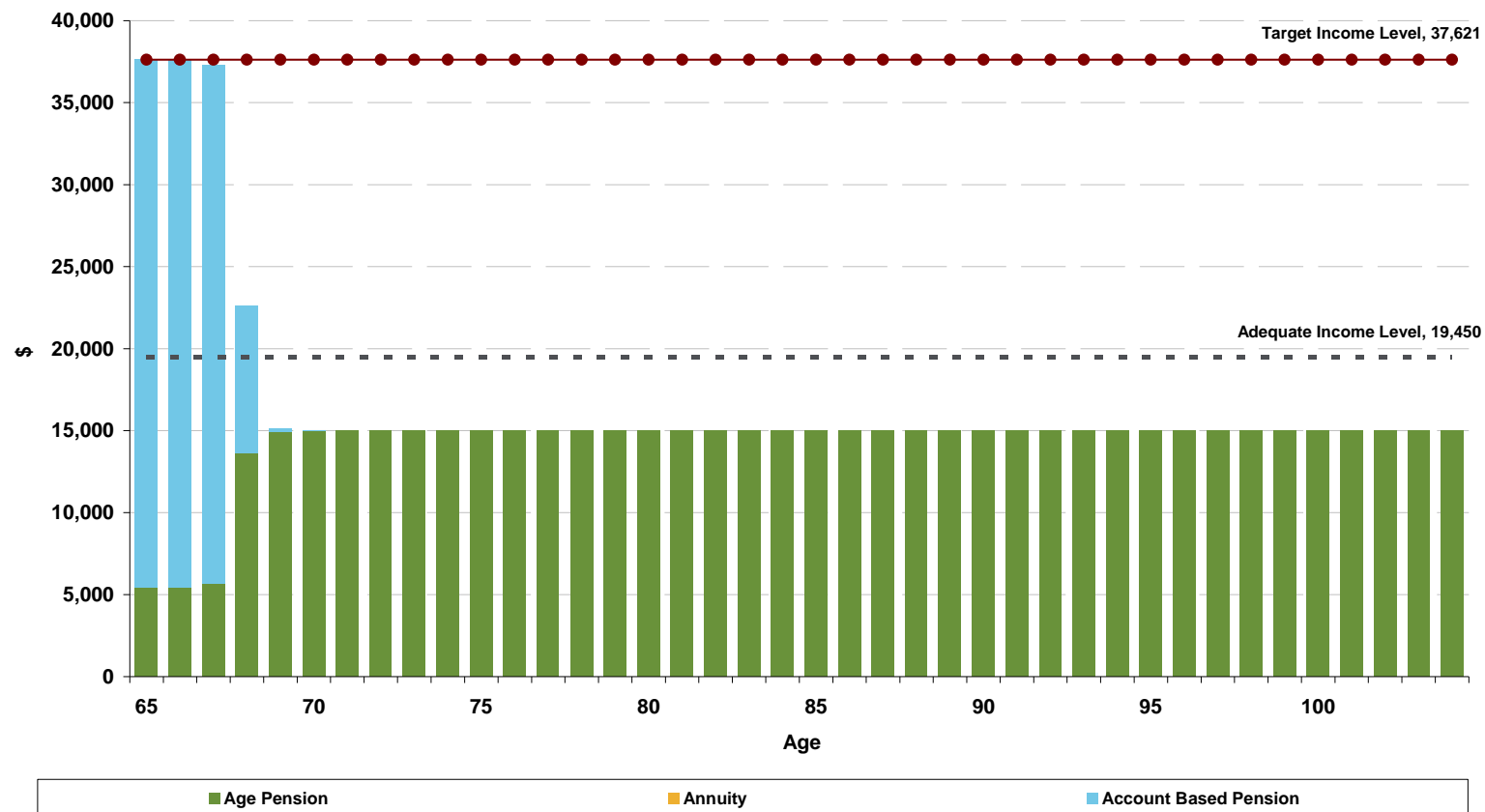
Figure 4.3: Remaining account balance
- 90% Confidence interval



Assumptions: \$250,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; High Fees

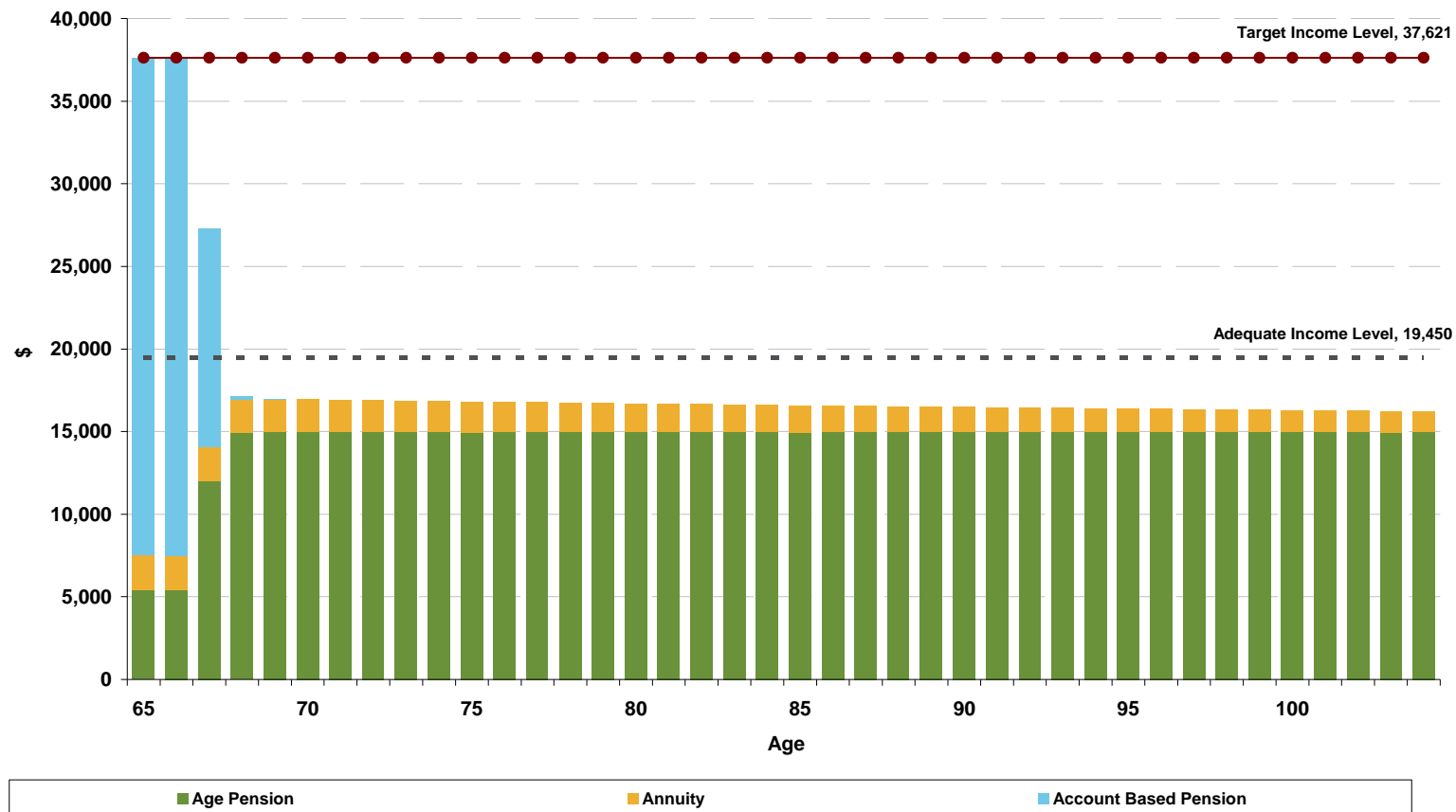


Figure 5.1: Average retirement income
- No lifetime annuity purchased at retirement



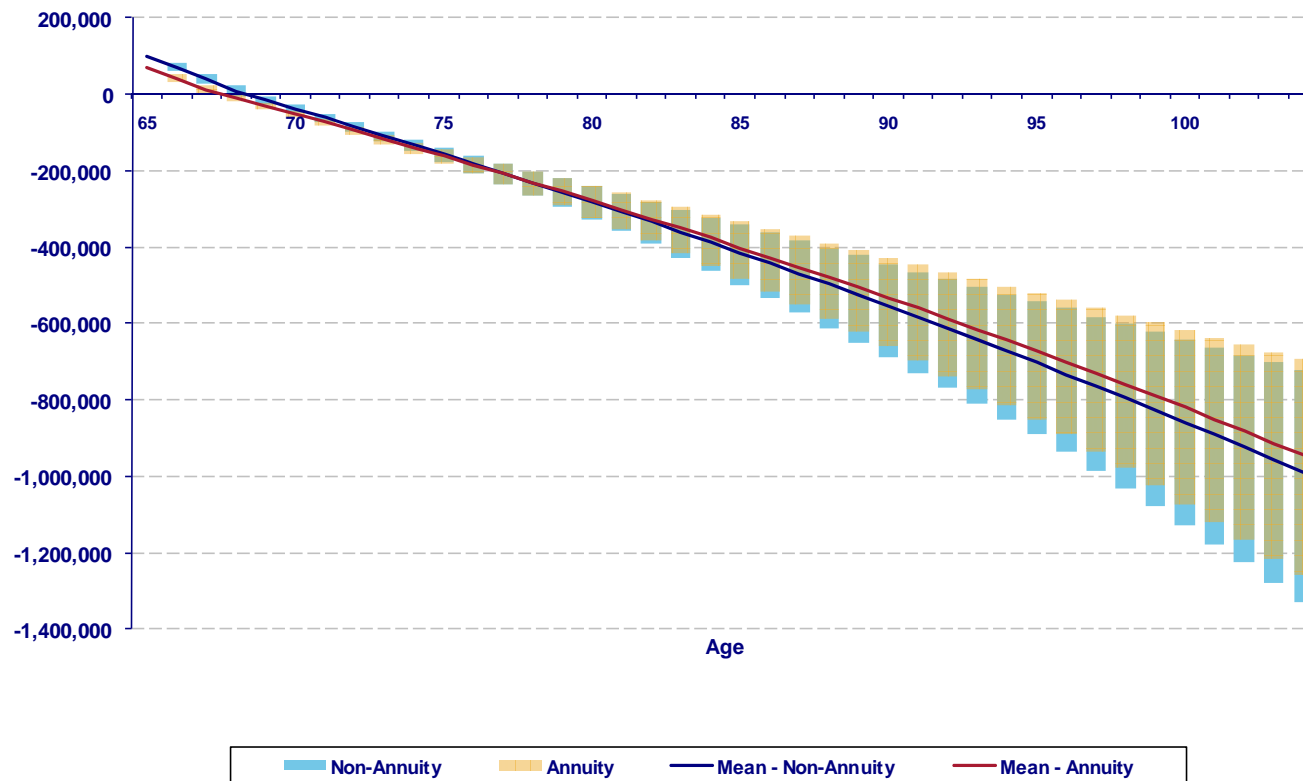
Assumptions: \$100,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; High Fees

Figure 5.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$100,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Annuity; High Fees

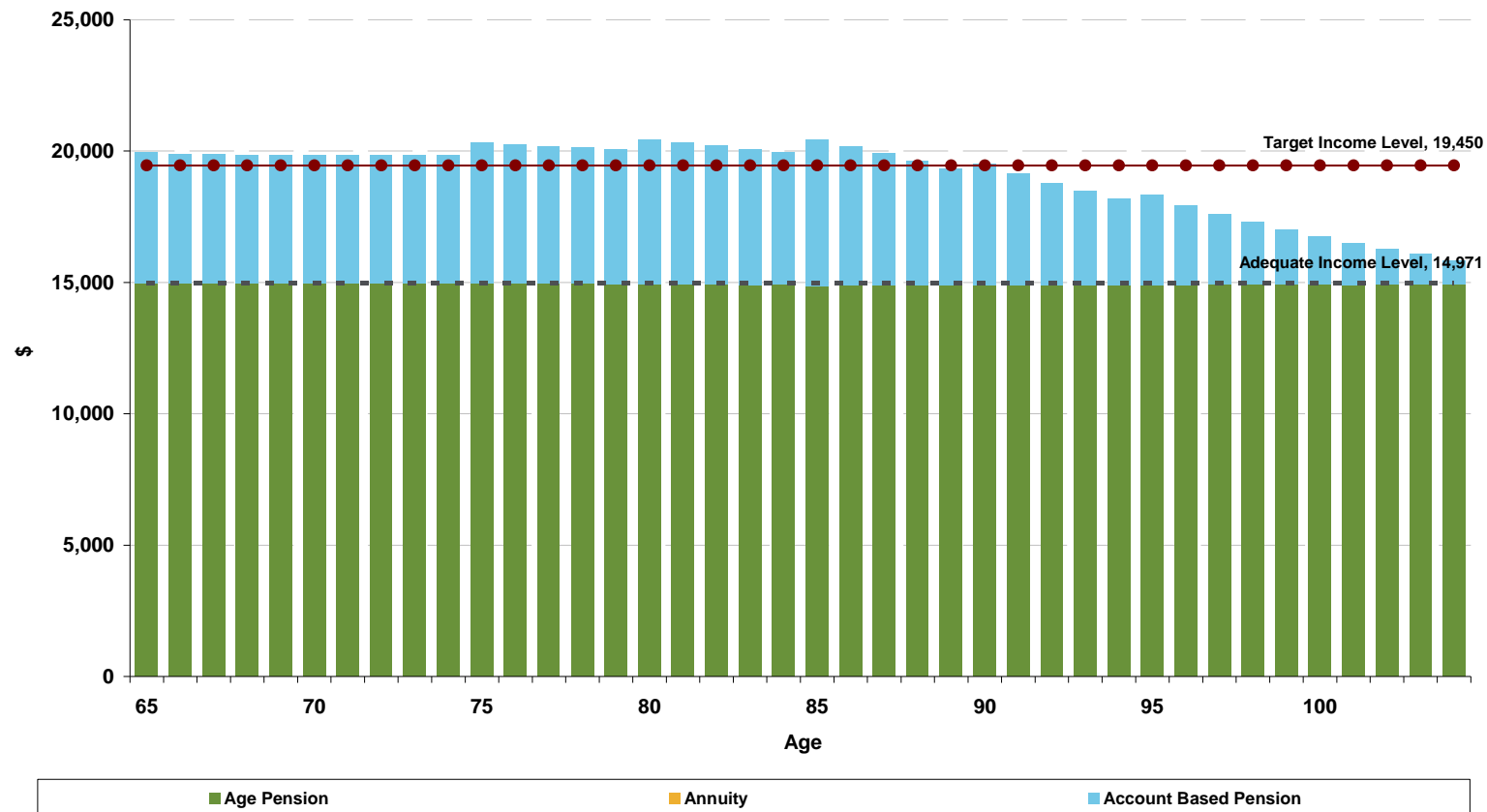
Figure 5.3: Remaining account balance
- 90% Confidence interval



Assumptions: \$100,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; High Fees



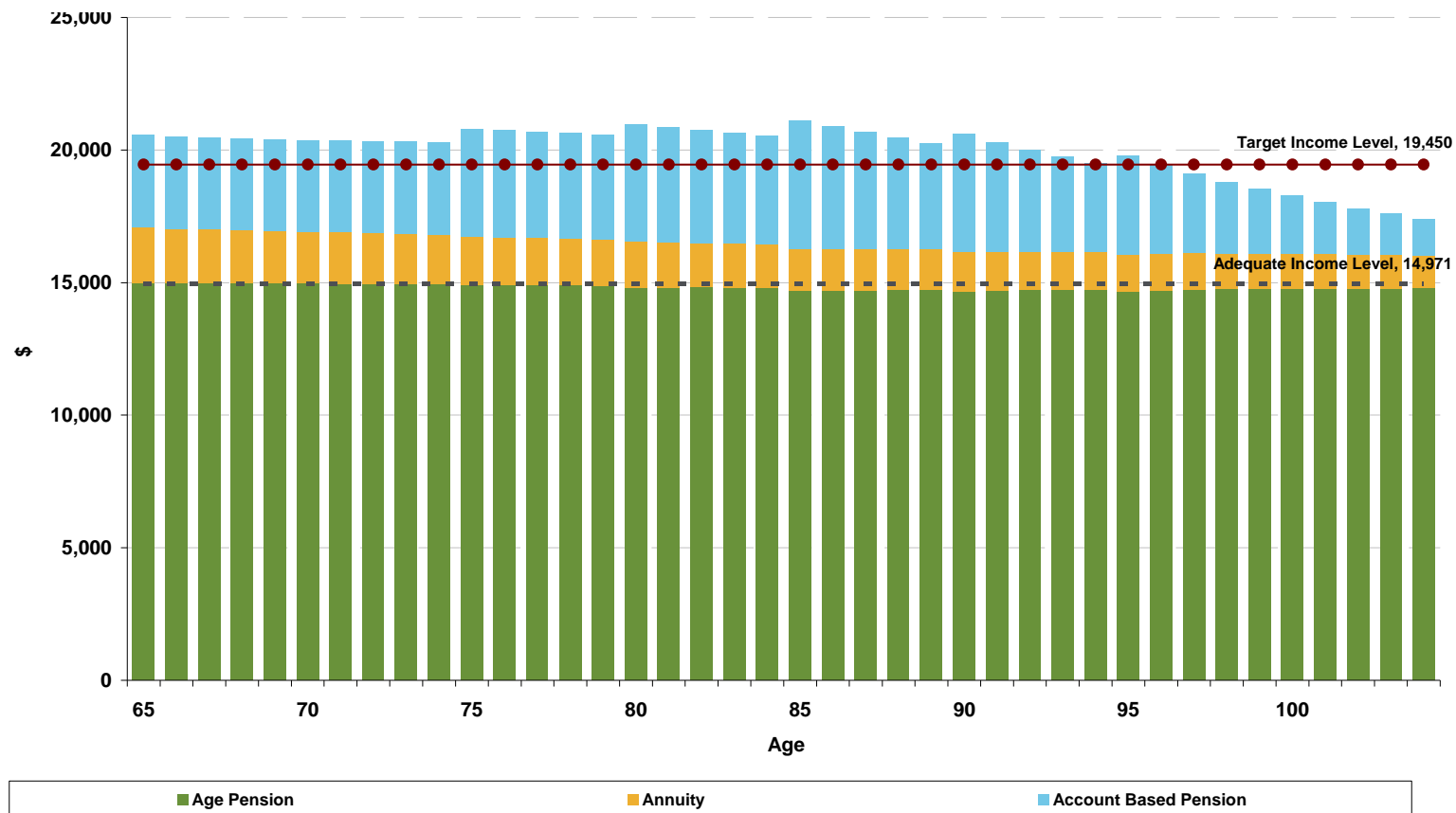
Figure 6.1: Average retirement income
- No lifetime annuity purchased at retirement



Assumptions: \$100,000 Initial account balance; \$19,450 pa Target income; \$14,971 pa Adequate income; 70% Growth, 30% Defensive; High Fees

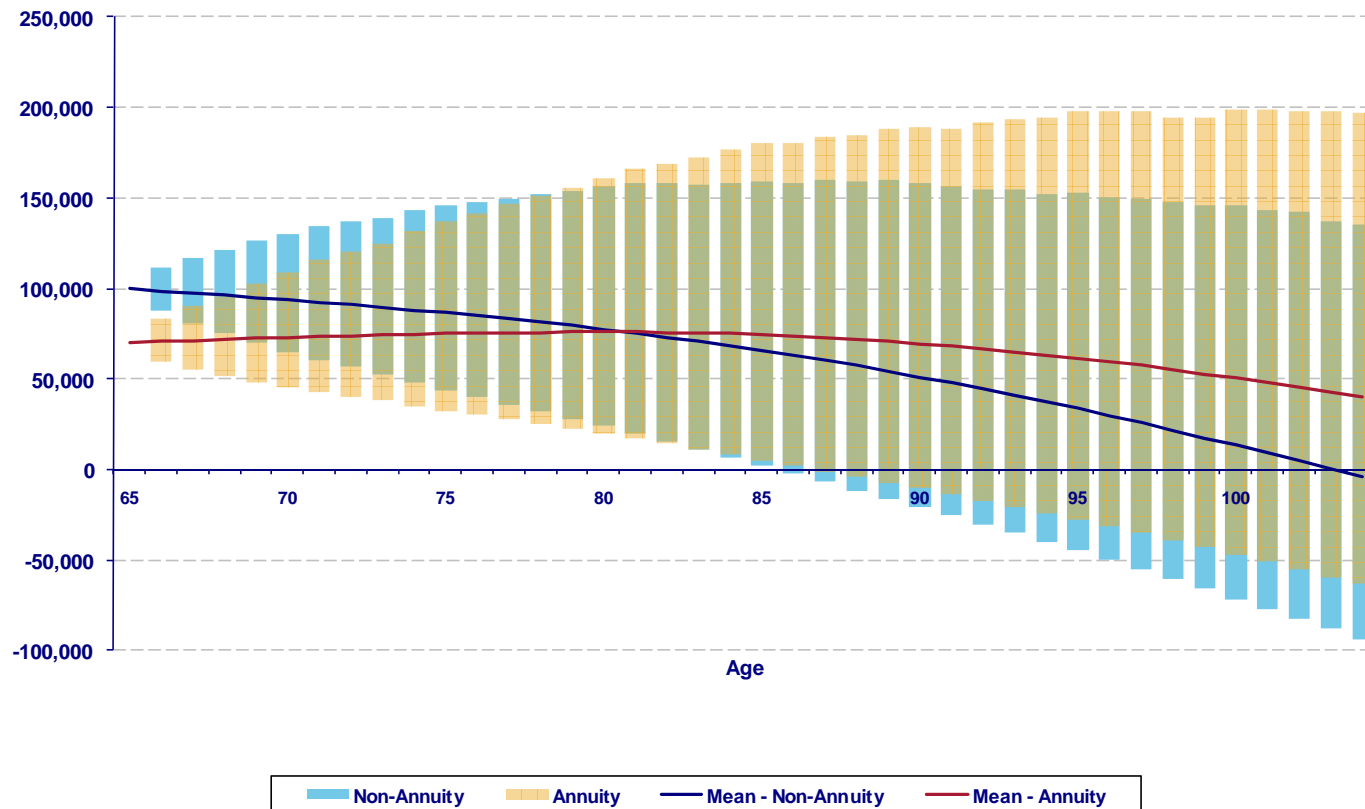


Figure 6.2: Average retirement income
- Lifetime annuity purchased at retirement



Assumptions: \$100,000 Initial account balance; \$19,450 pa Target income; \$14,971 pa Adequate income; 70% Growth, 30% Annuity; High Fees

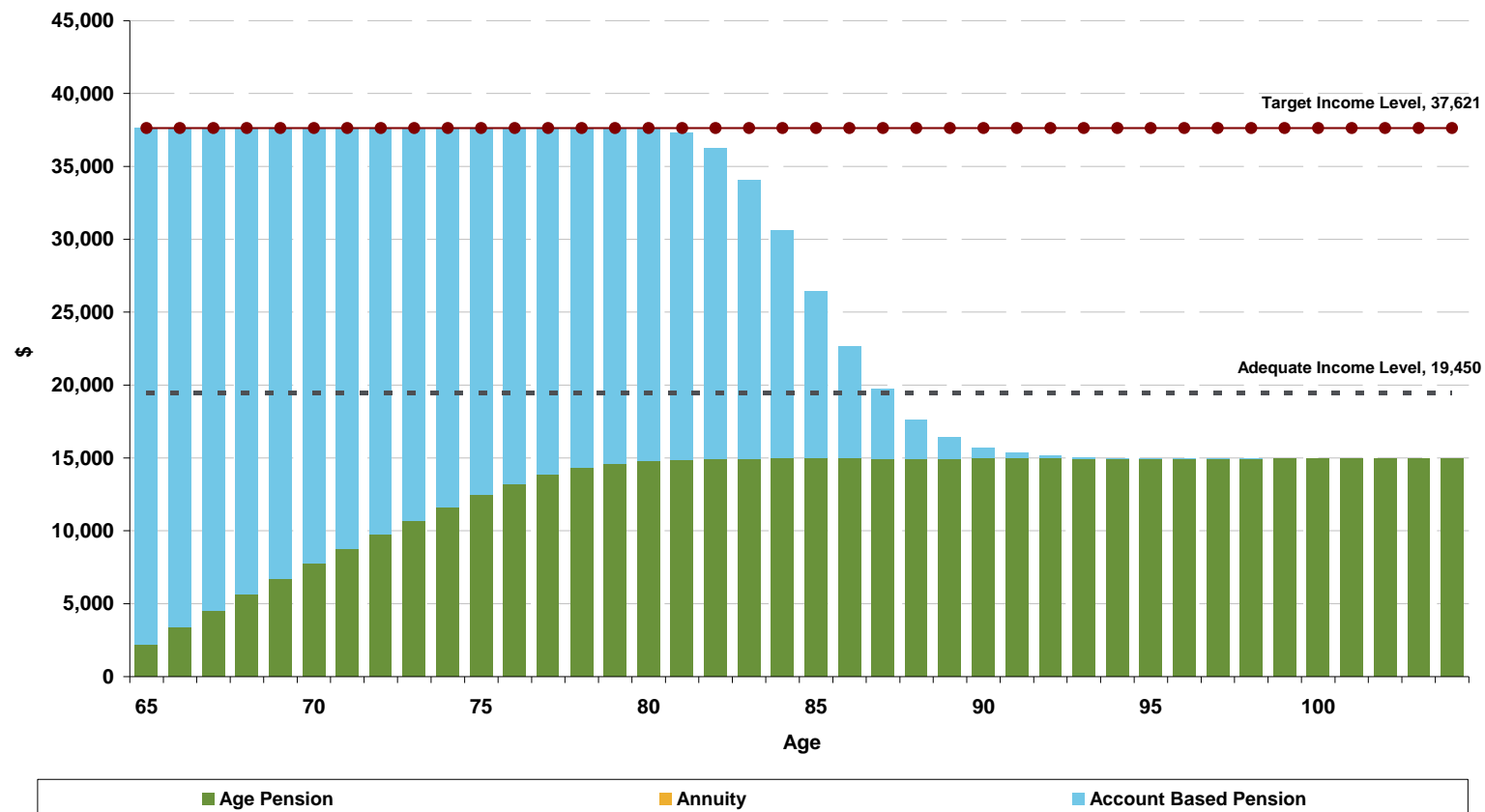
Figure 6.3: Remaining account balance
- 90% Confidence interval



Assumptions: \$100,000 Initial account balance; \$19,450 pa Target income; \$14,971 pa Adequate income; 70% Growth; High Fees



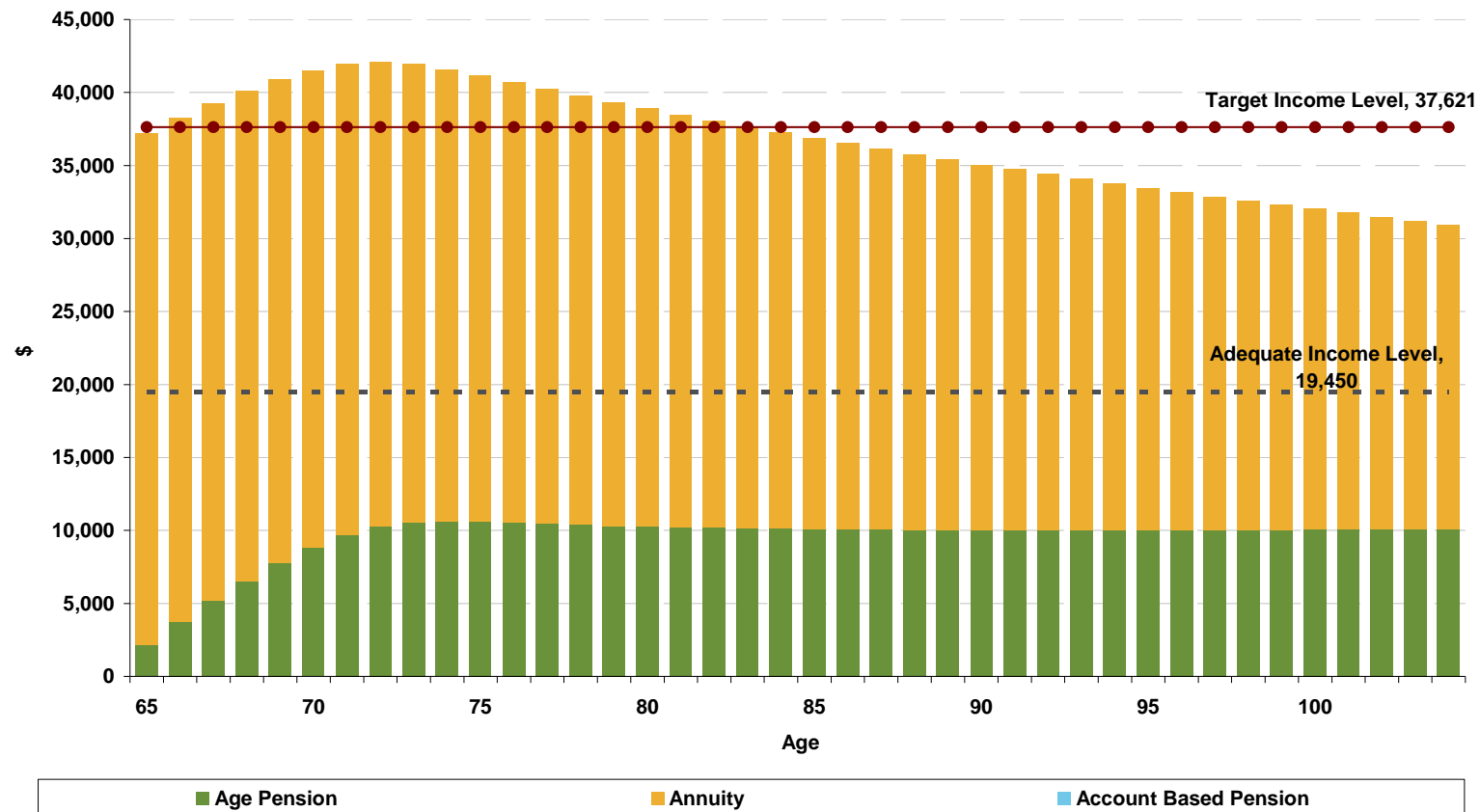
Figure 7.1: Average retirement income
- No lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 0% Growth, 100% Defensive; High Fees

Figure 7.2: Average retirement income

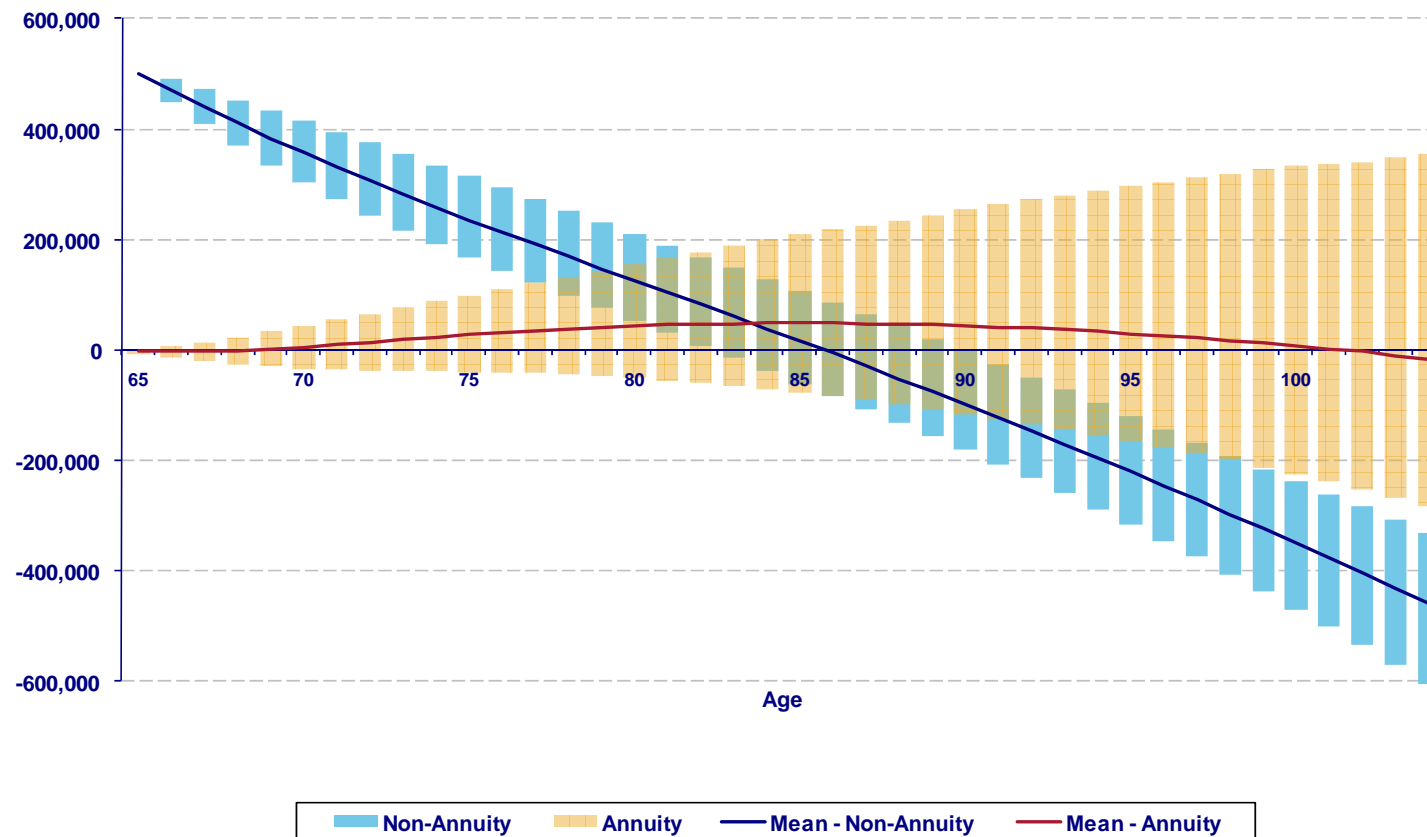
- Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 0% Growth, 100% Annuity; High Fees



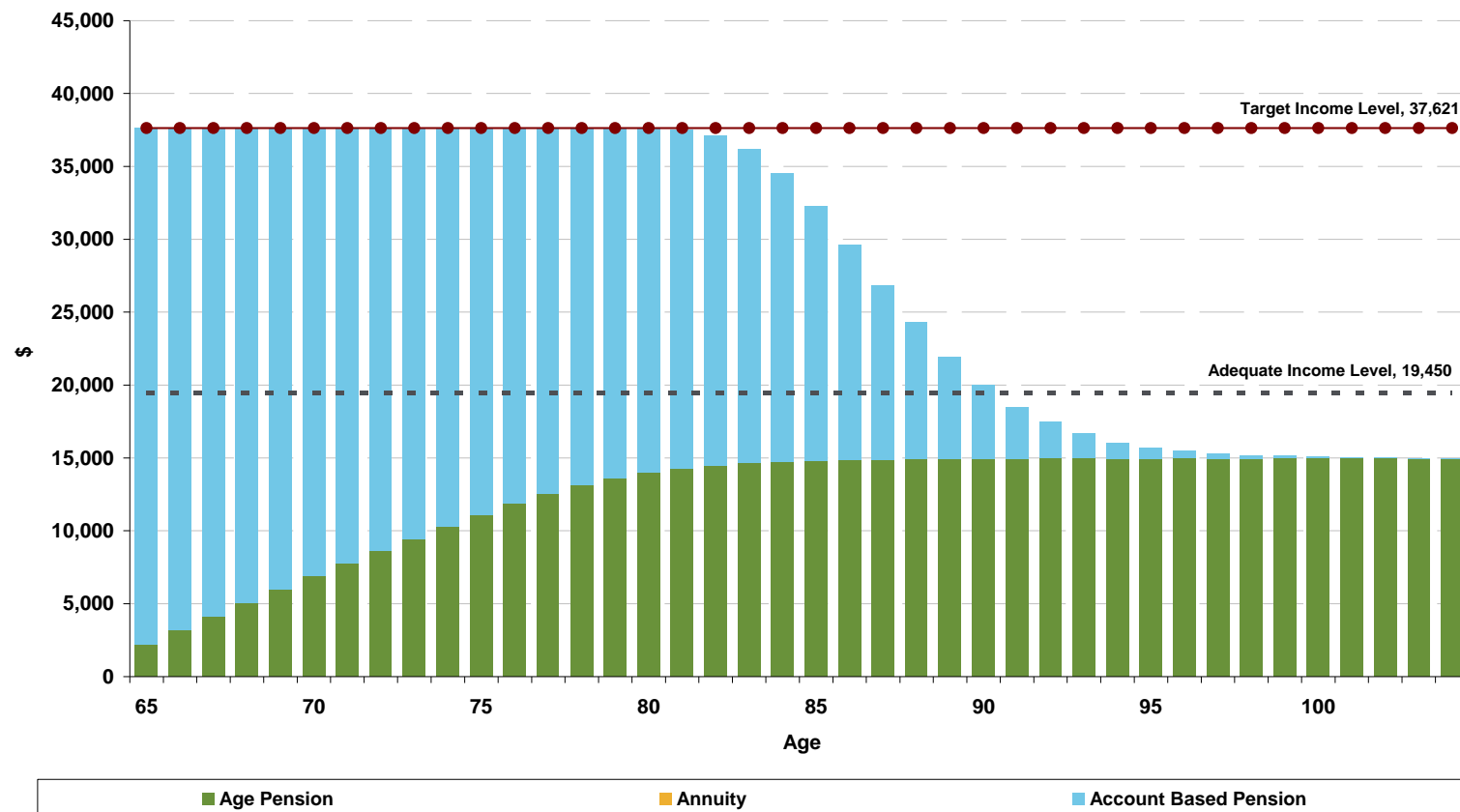
Figure 7.3: Remaining account balance
- 90% Confidence interval



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 0% Growth; High Fees



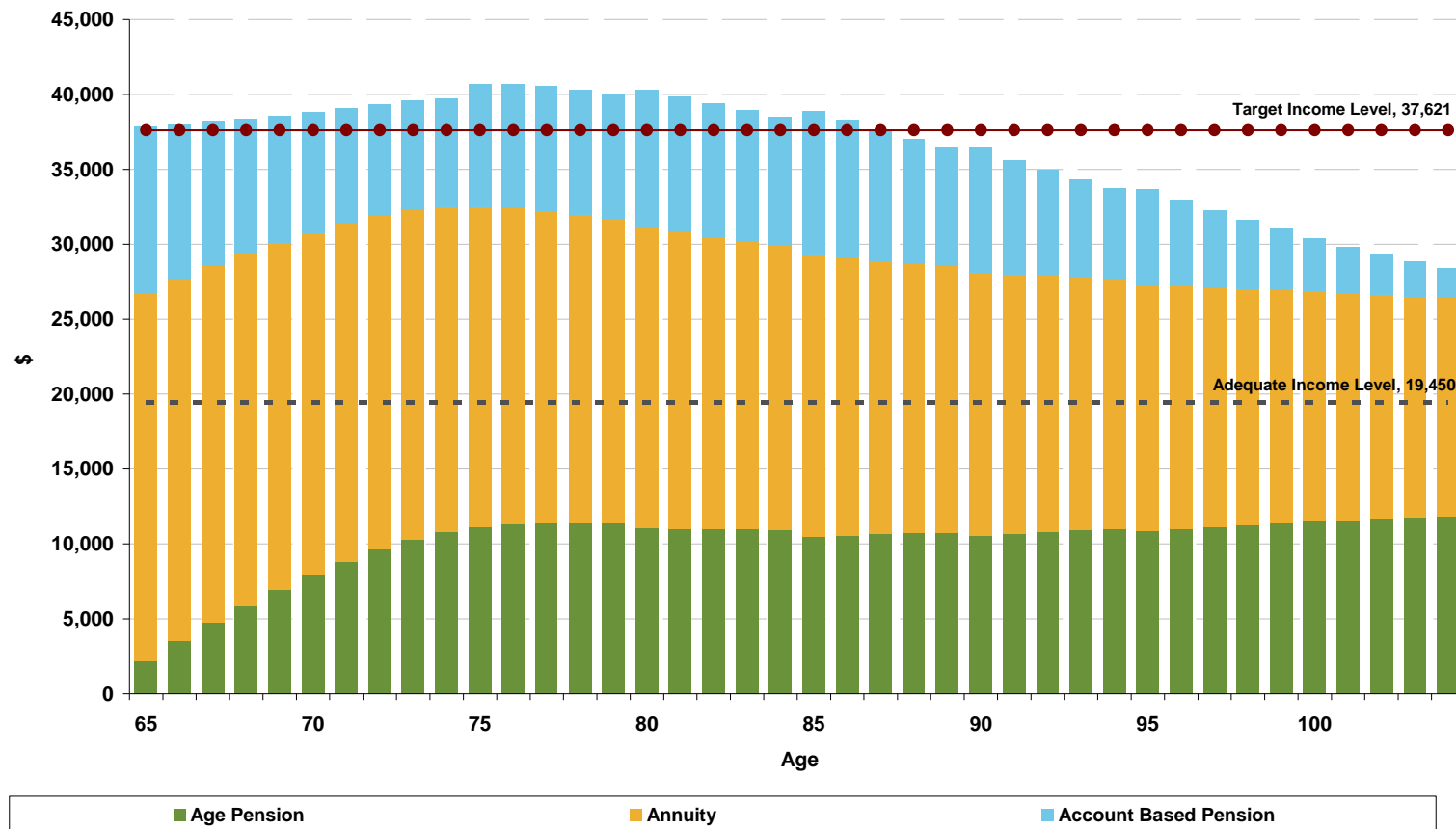
Figure 8.1: Average retirement income
- No lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 30% Growth, 70% Defensive; High Fees

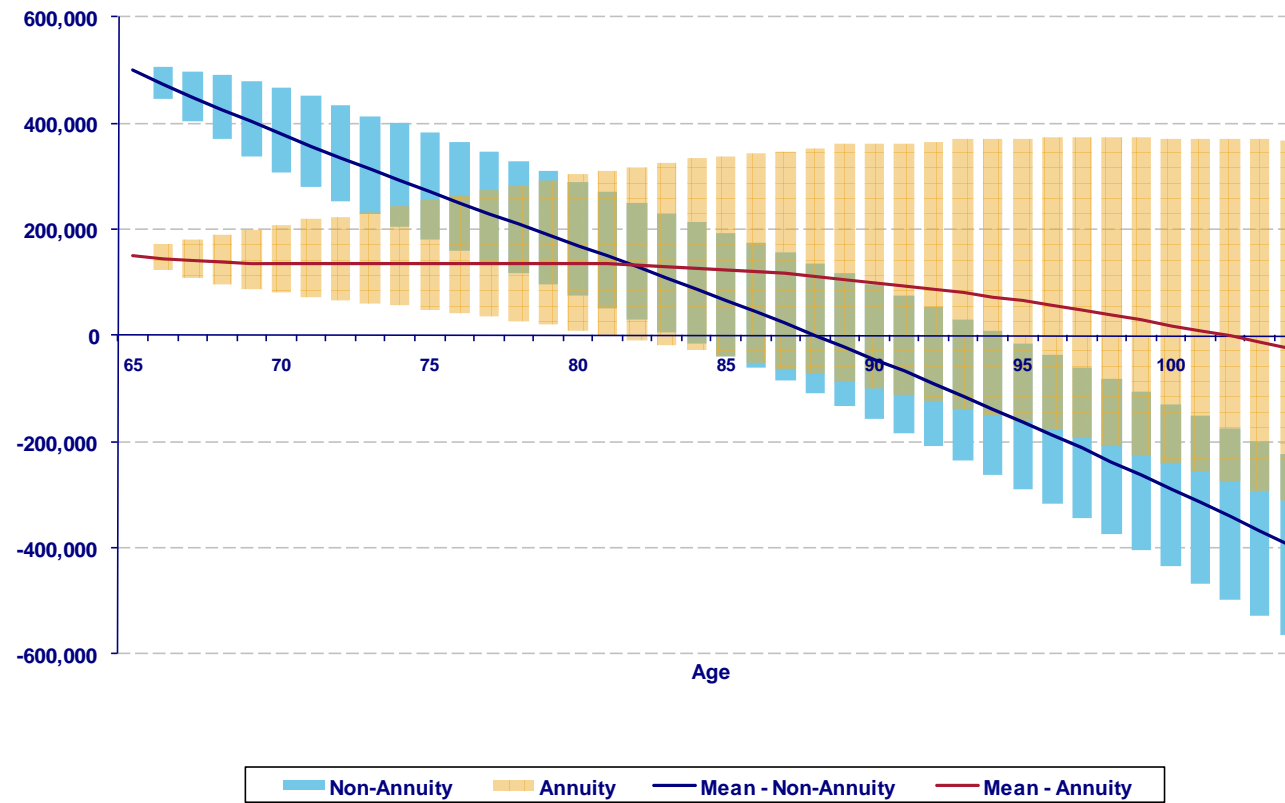


Figure 8.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 30% Growth, 70% Annuity; High Fees

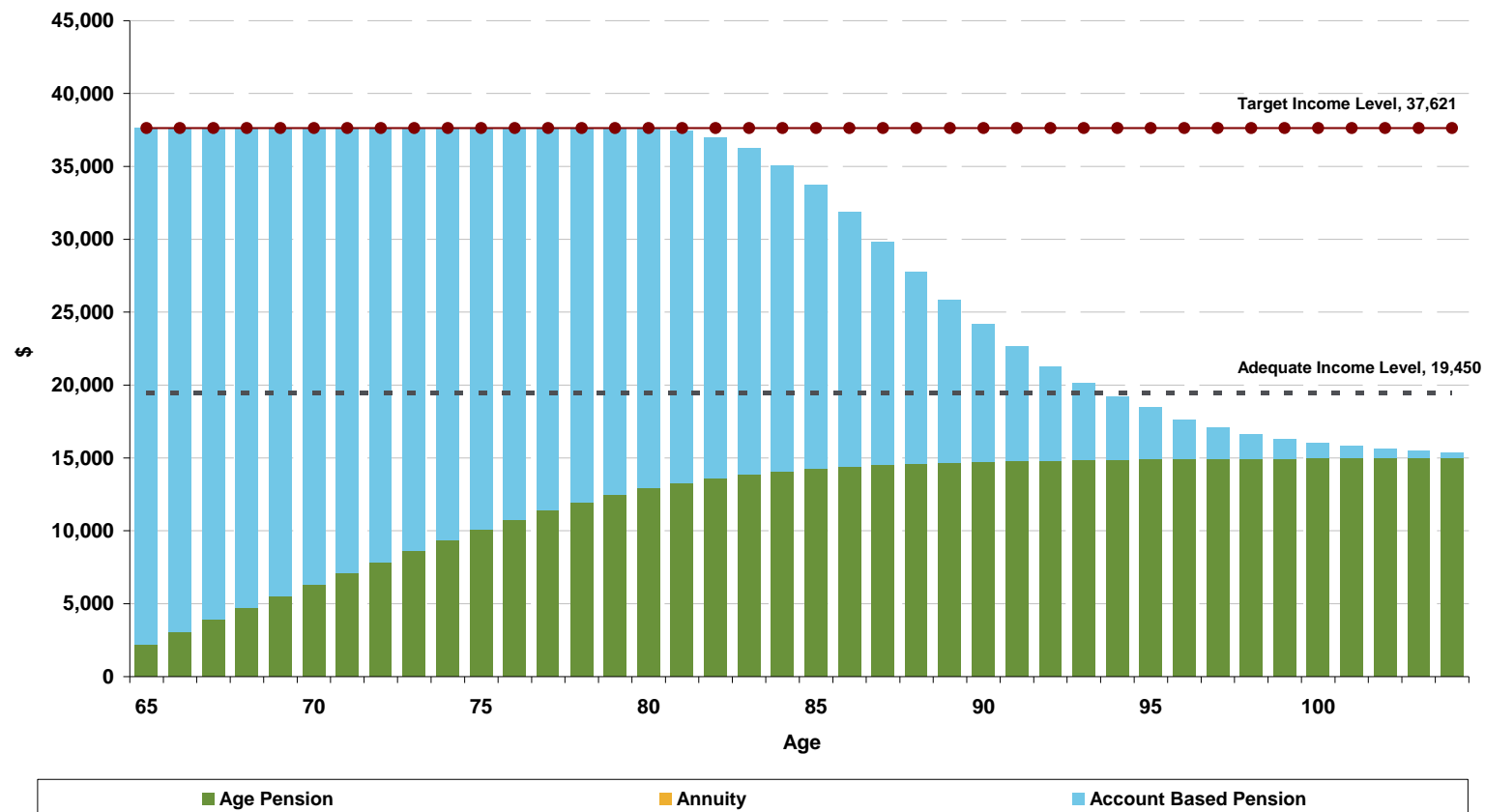
Figure 8.3: Remaining account balance
- 90% Confidence interval



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 30% Growth; High Fees

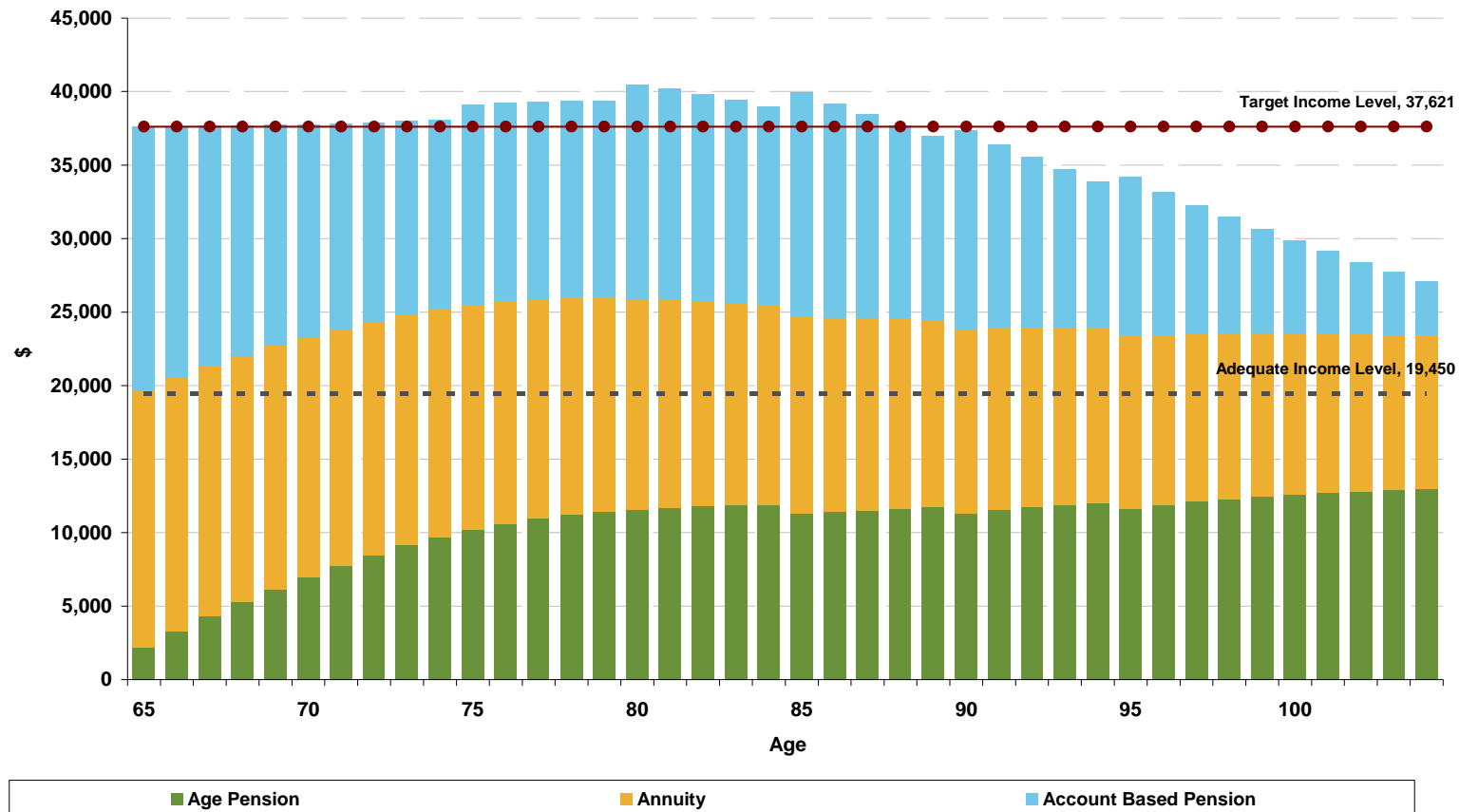


Figure 9.1: Average retirement income
- No lifetime annuity purchased at retirement



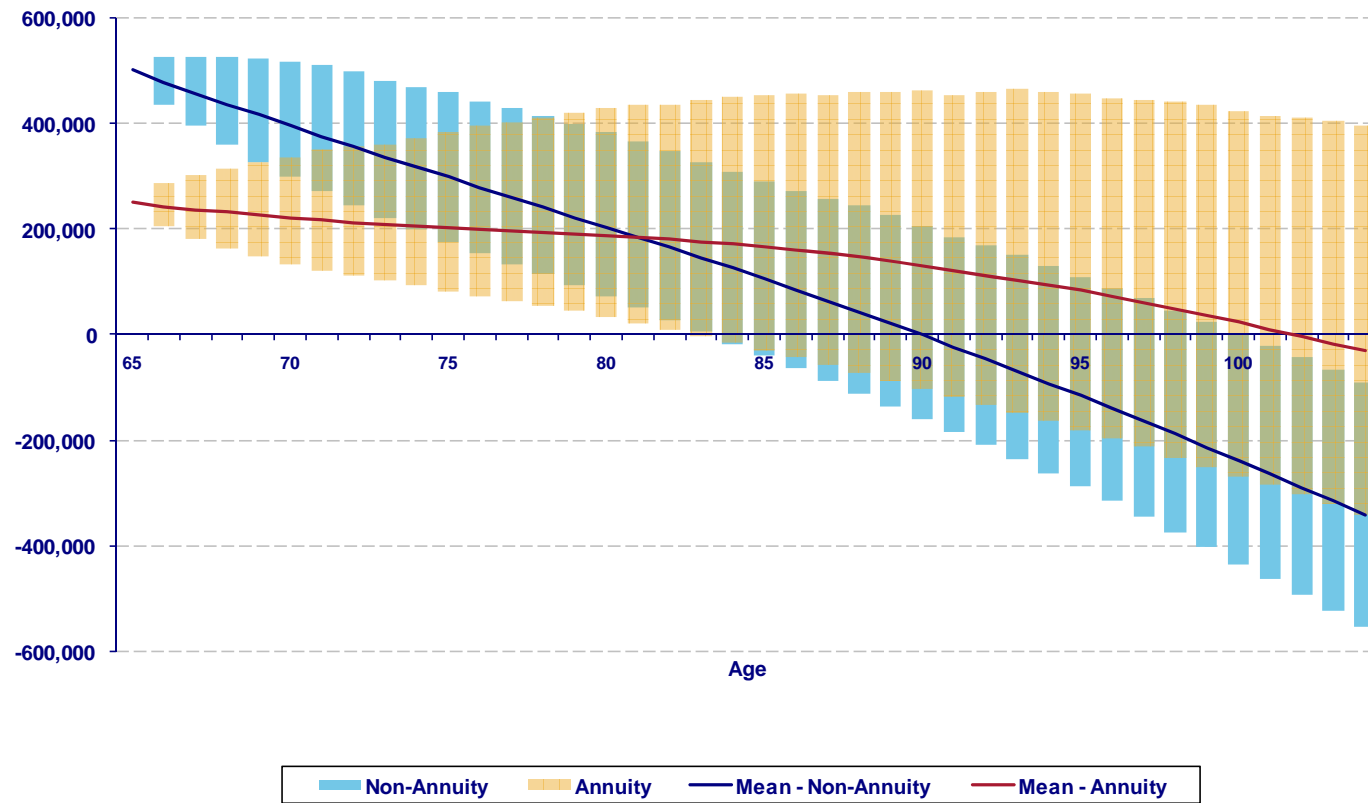
Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 50% Growth, 50% Defensive; High Fees

Figure 9.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 50% Growth, 50% Annuity; High Fees

Figure 9.3: Remaining account balance
- 90% Confidence interval

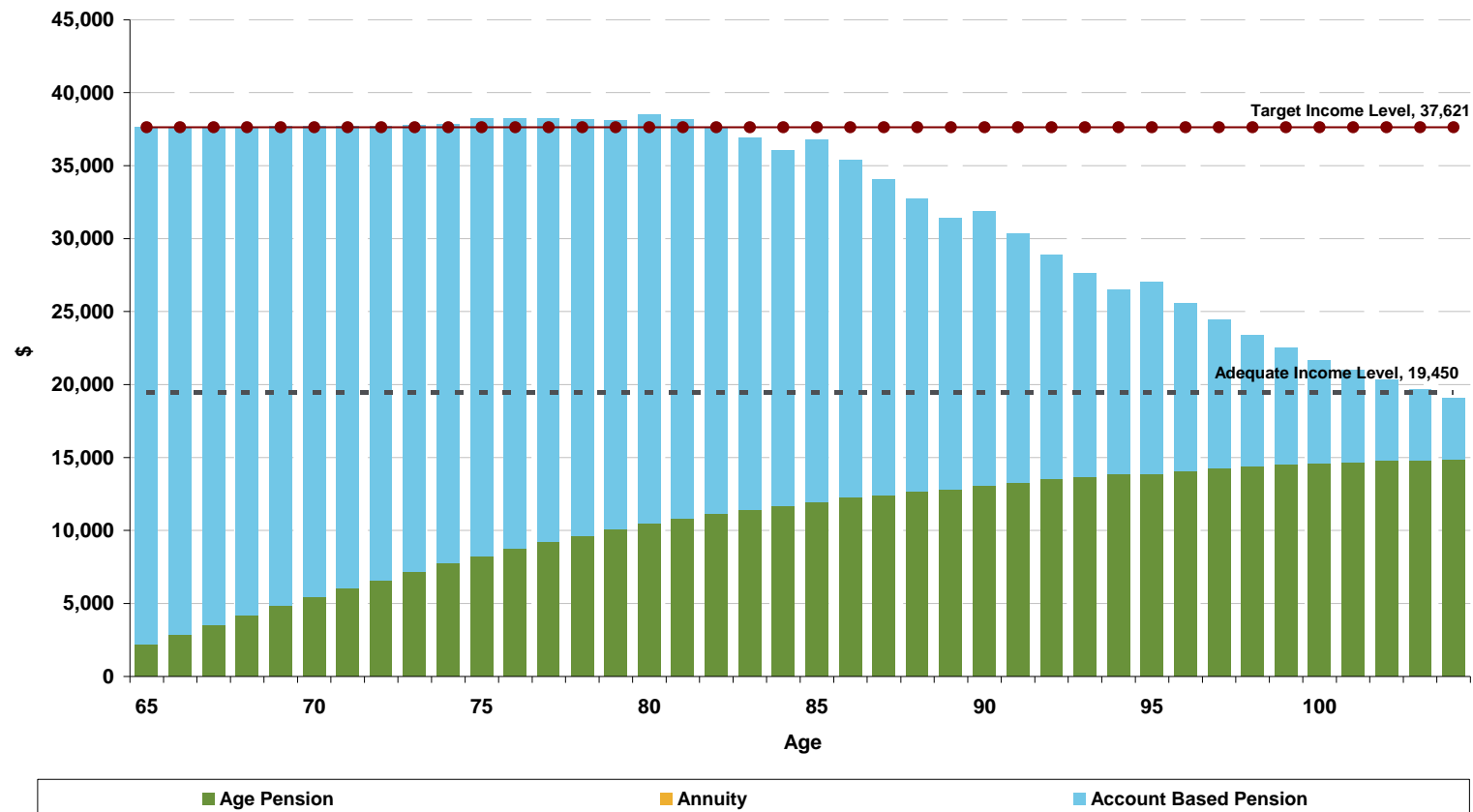


Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 50% Growth; High Fees



Figure 10.1: Average retirement income

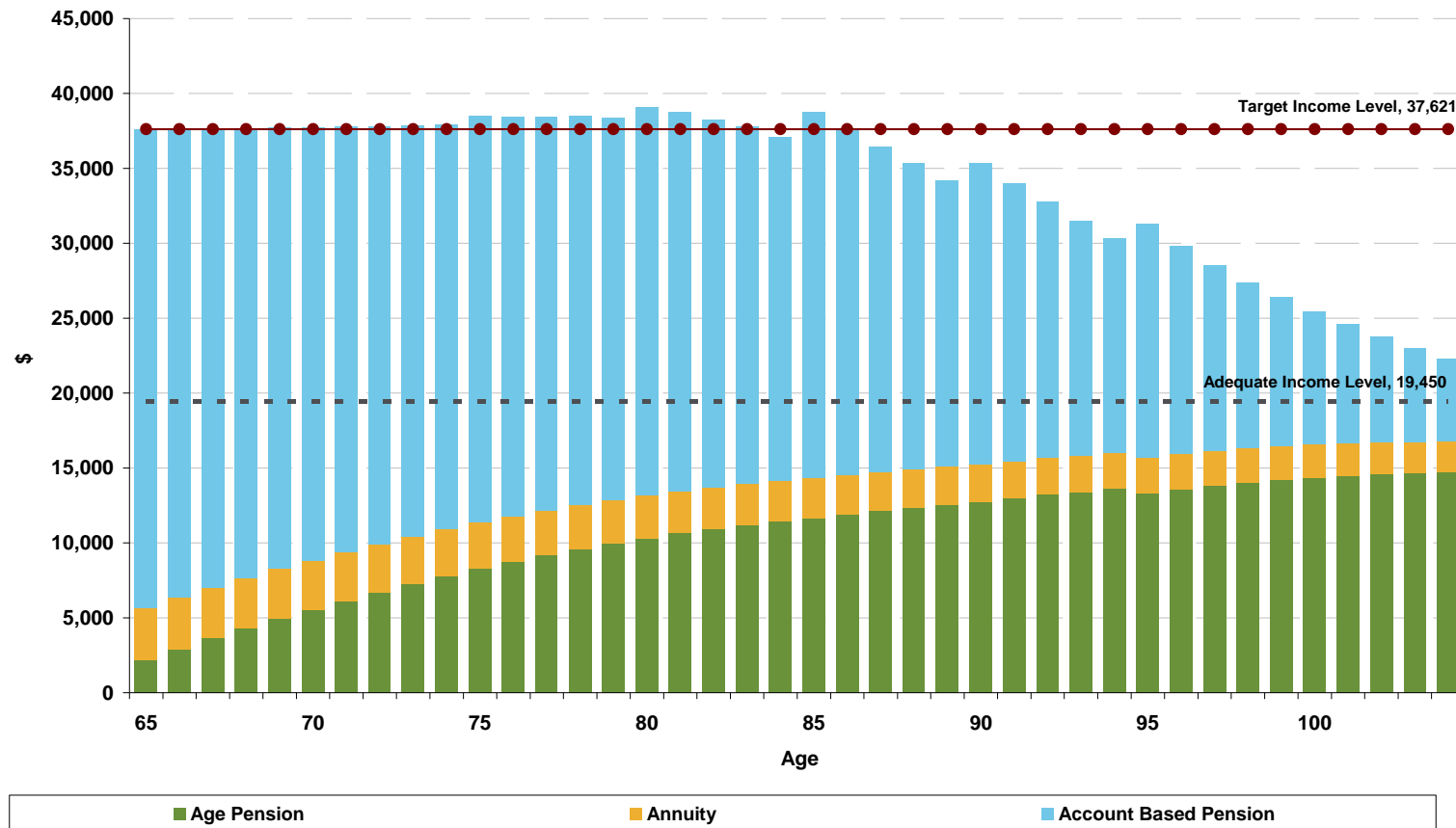
- No lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 90% Growth, 10% Defensive; High Fees

Figure 10.2: Average retirement income

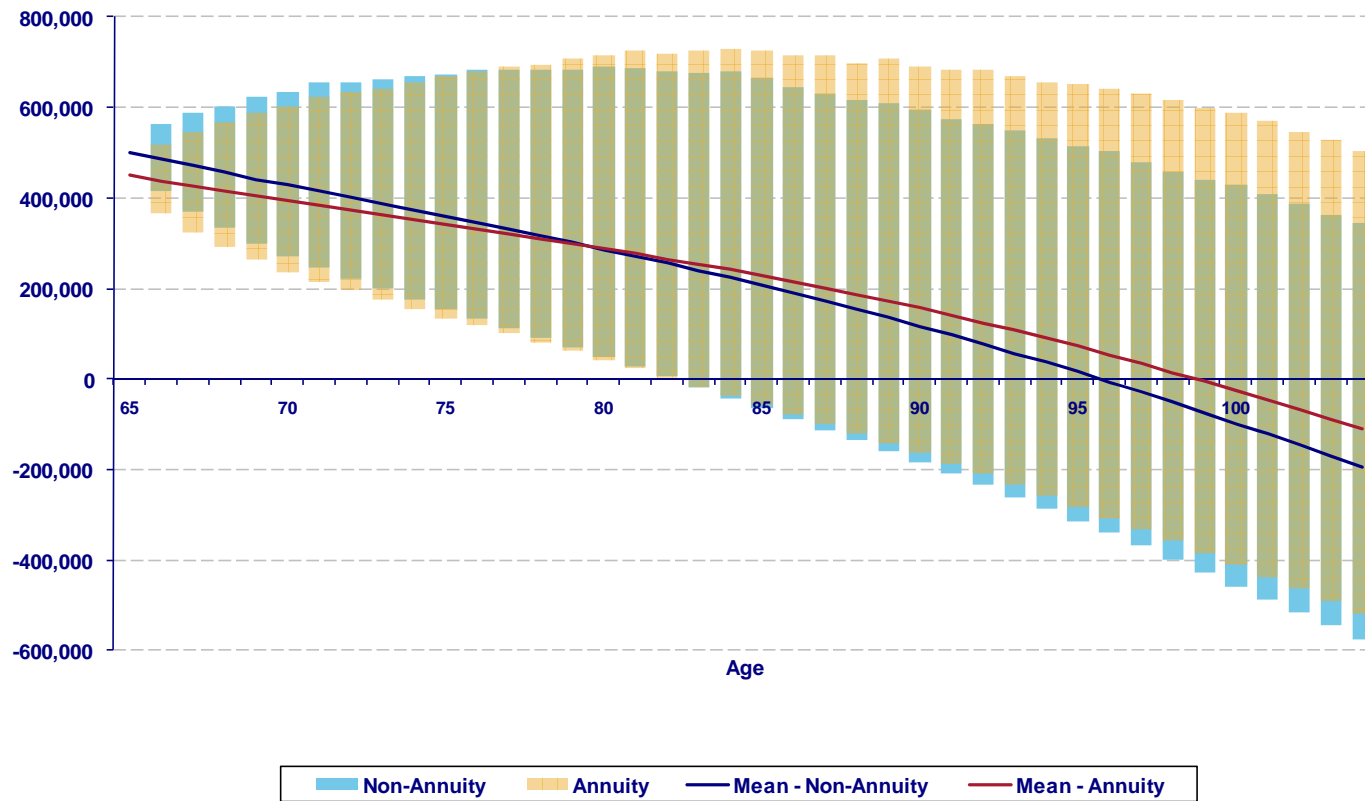
- Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 90% Growth, 10% Annuity; High Fees



Figure 10.3: Remaining account balance - 90% Confidence interval

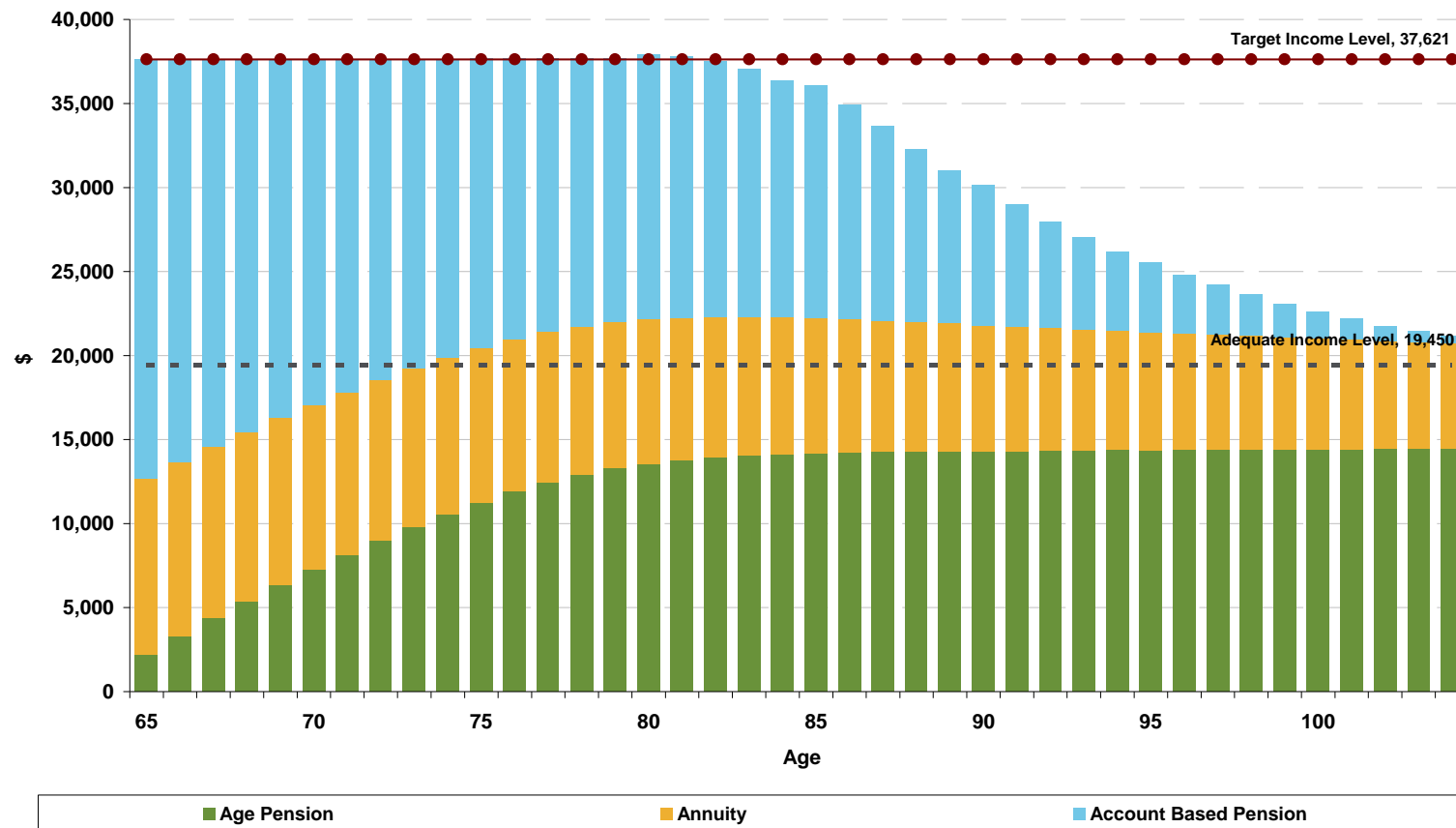


Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 90% Growth; High Fees



Figure 11.1: Average retirement income

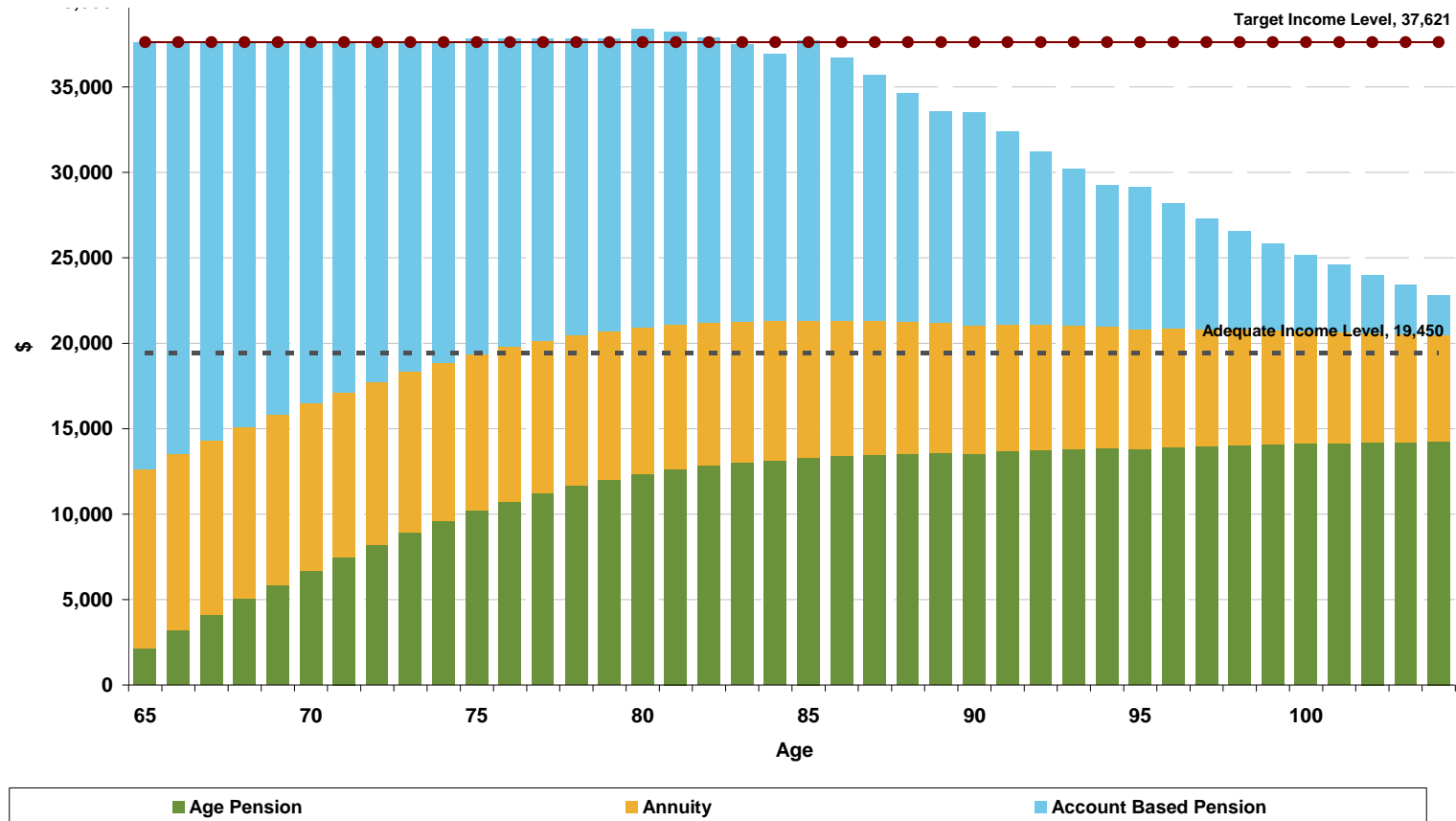
- Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 30% Growth, 40% Bonds, 30% Annuity; High Fees



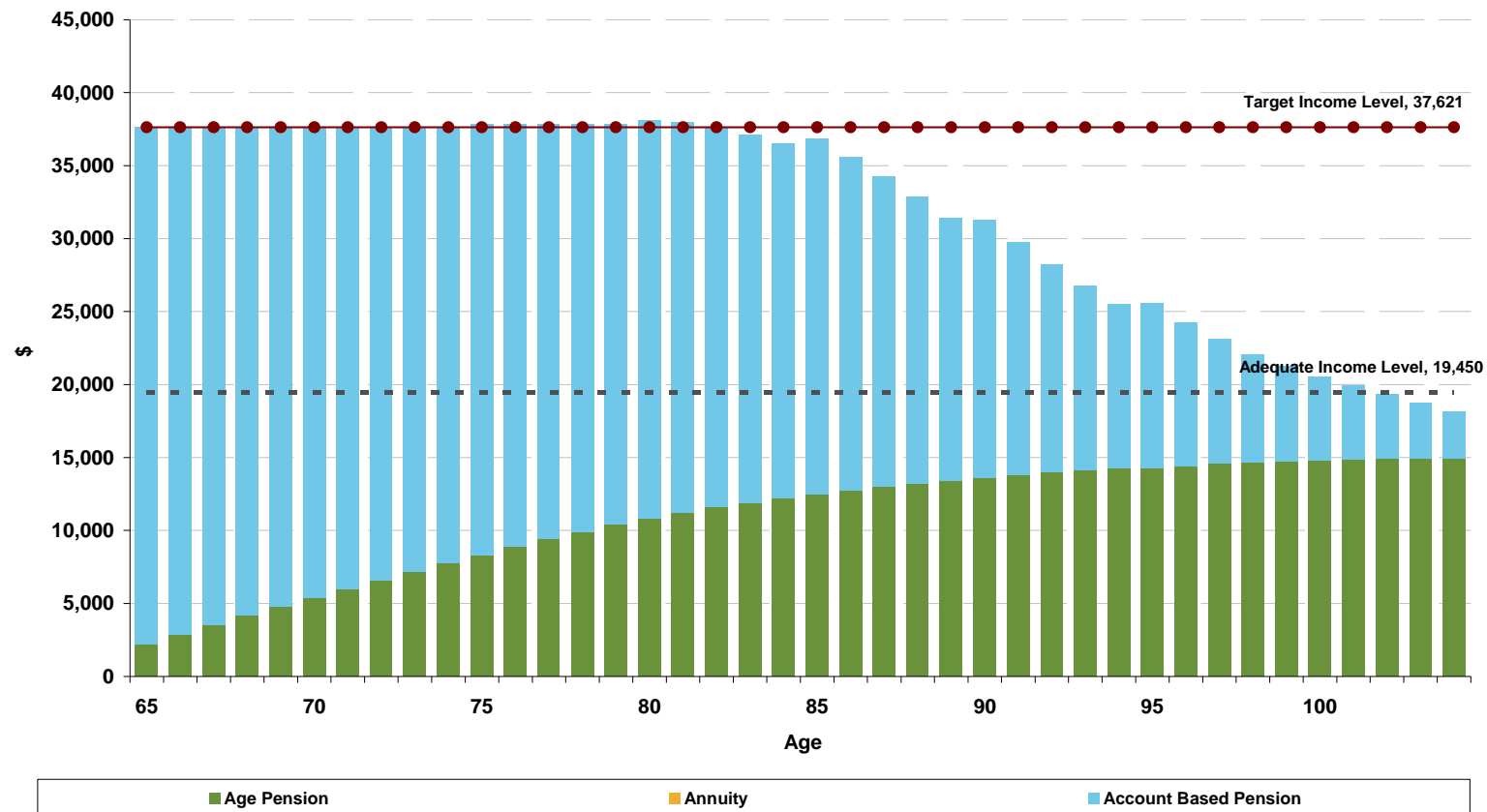
Figure 12.1: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 50% Growth, 20% Bonds, 30% Annuity; High Fees

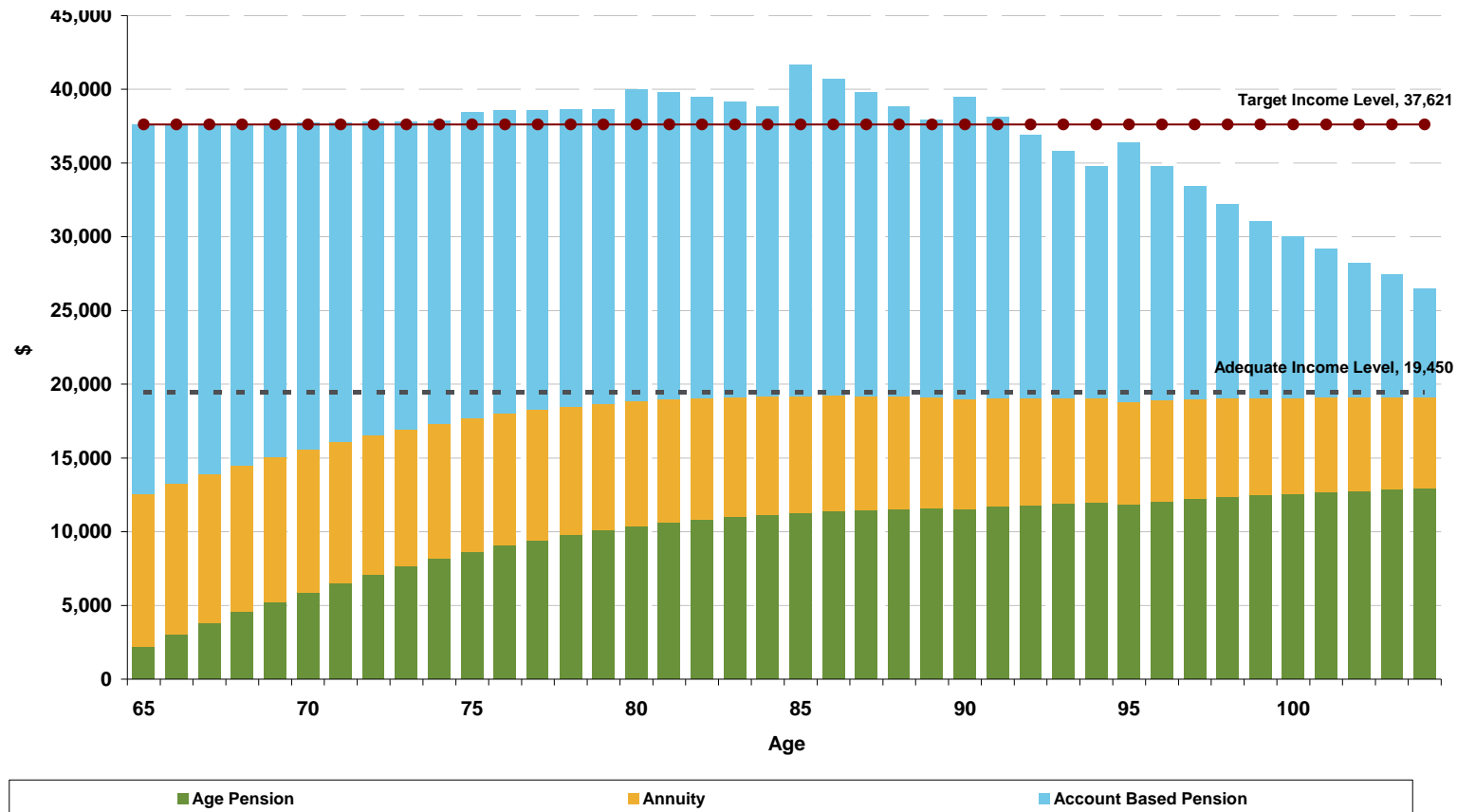
Figure 13.1: Average retirement income

- No lifetime annuity purchased at retirement



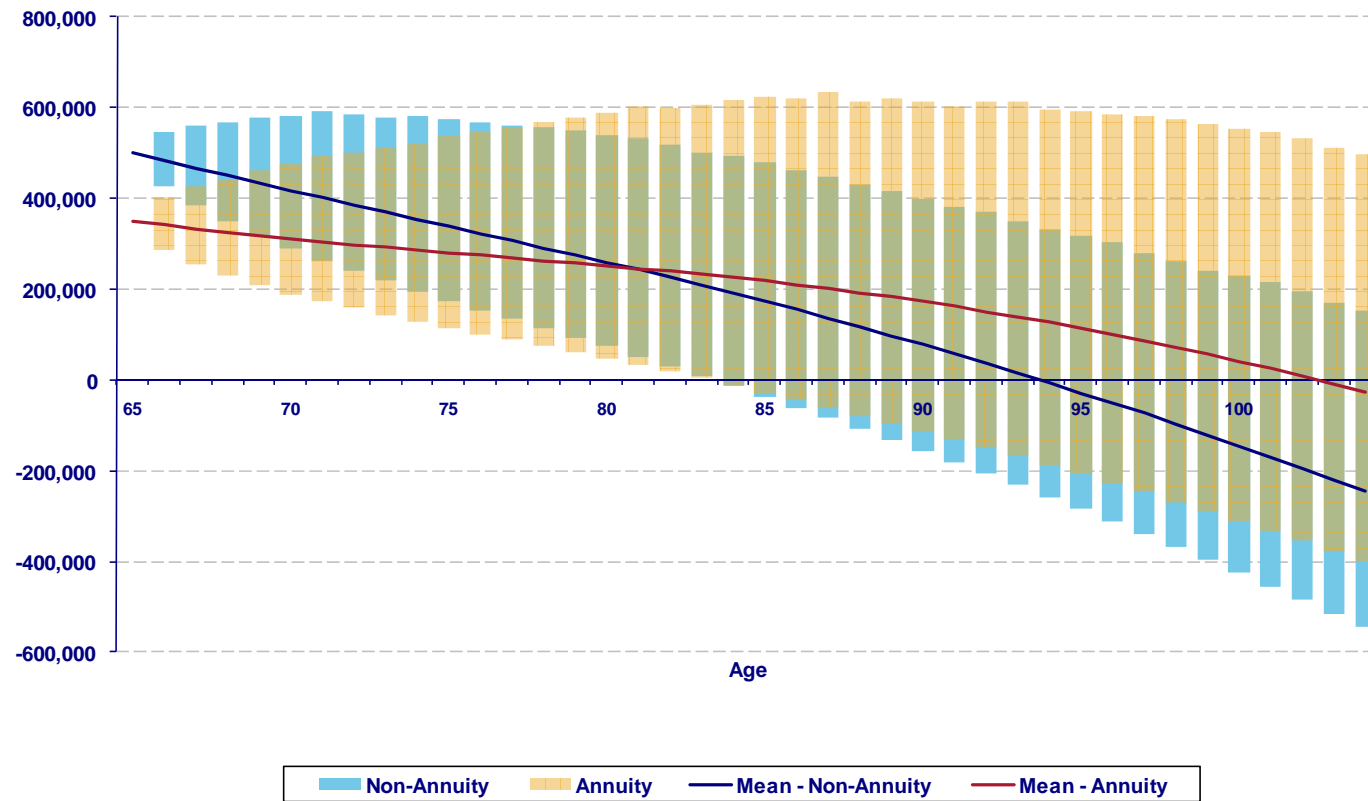
Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; Low Fees

Figure 13.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Annuity; Low Fees

Figure 13.3: Remaining account balance
- 90% Confidence interval

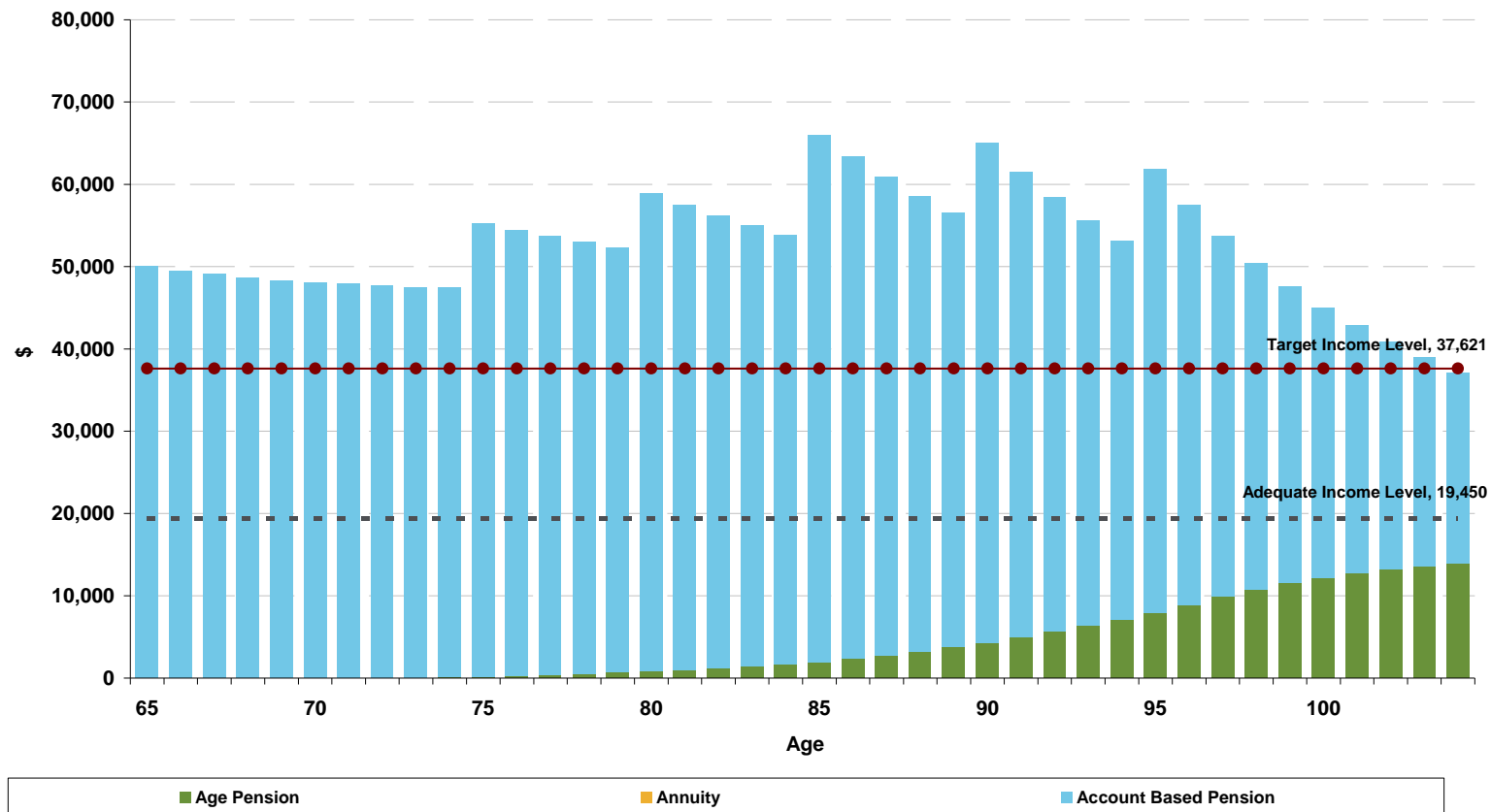


Assumptions: \$500,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; Low Fees



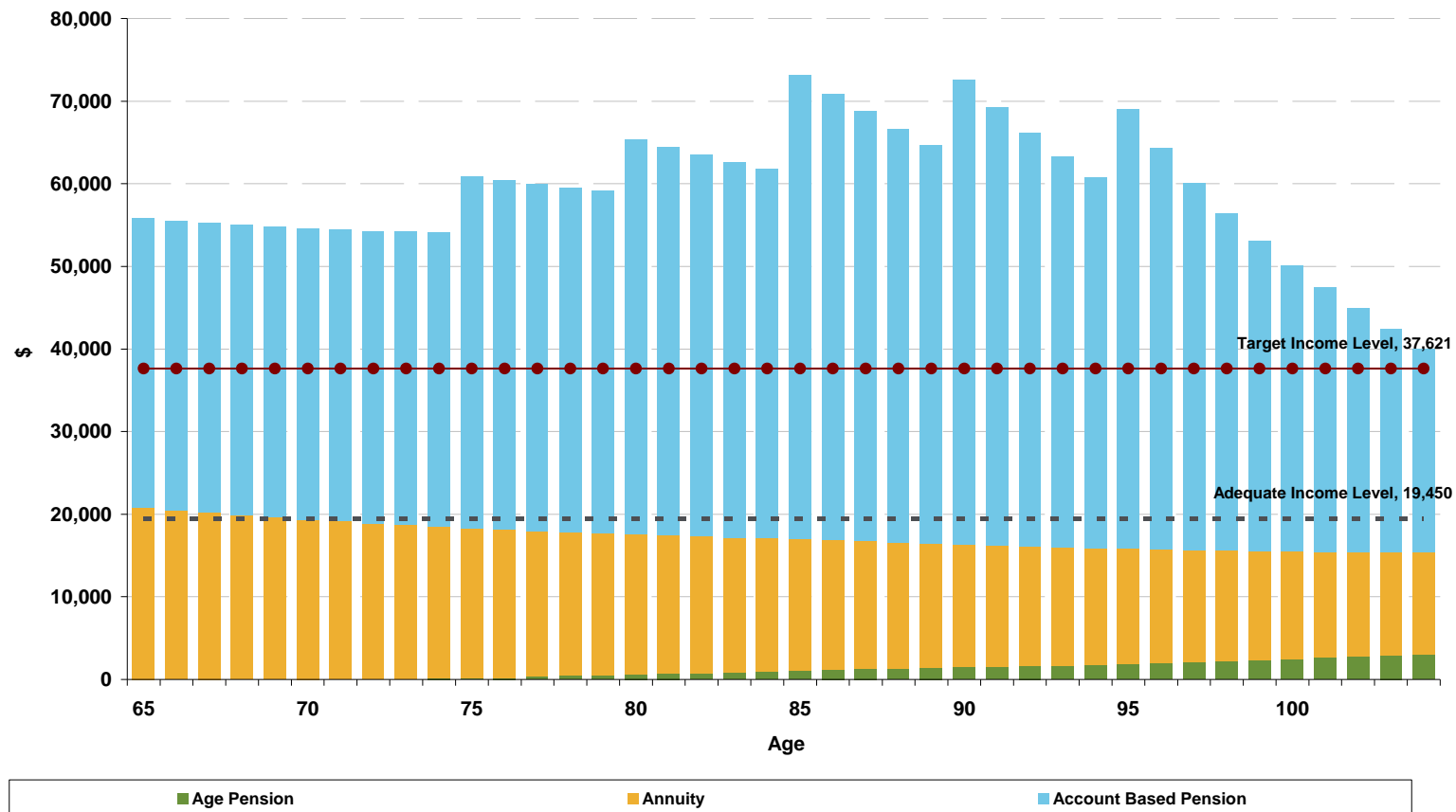
Figure 14.1: Average retirement income

- No lifetime annuity purchased at retirement



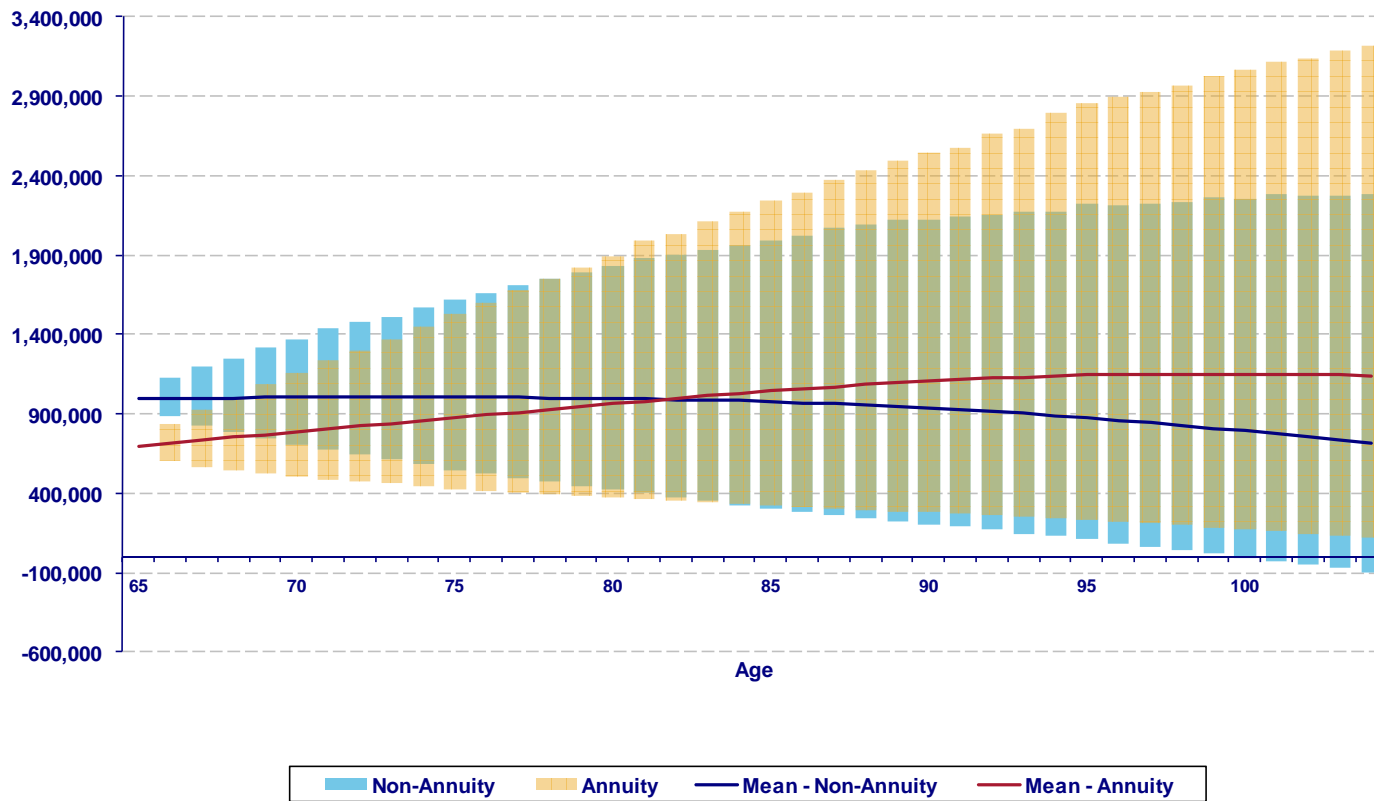
Assumptions: \$1,000,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; Low Fees

Figure 14.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$1,000,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Annuity; Low Fees

Figure 14.3: Remaining account balance - 90% Confidence interval

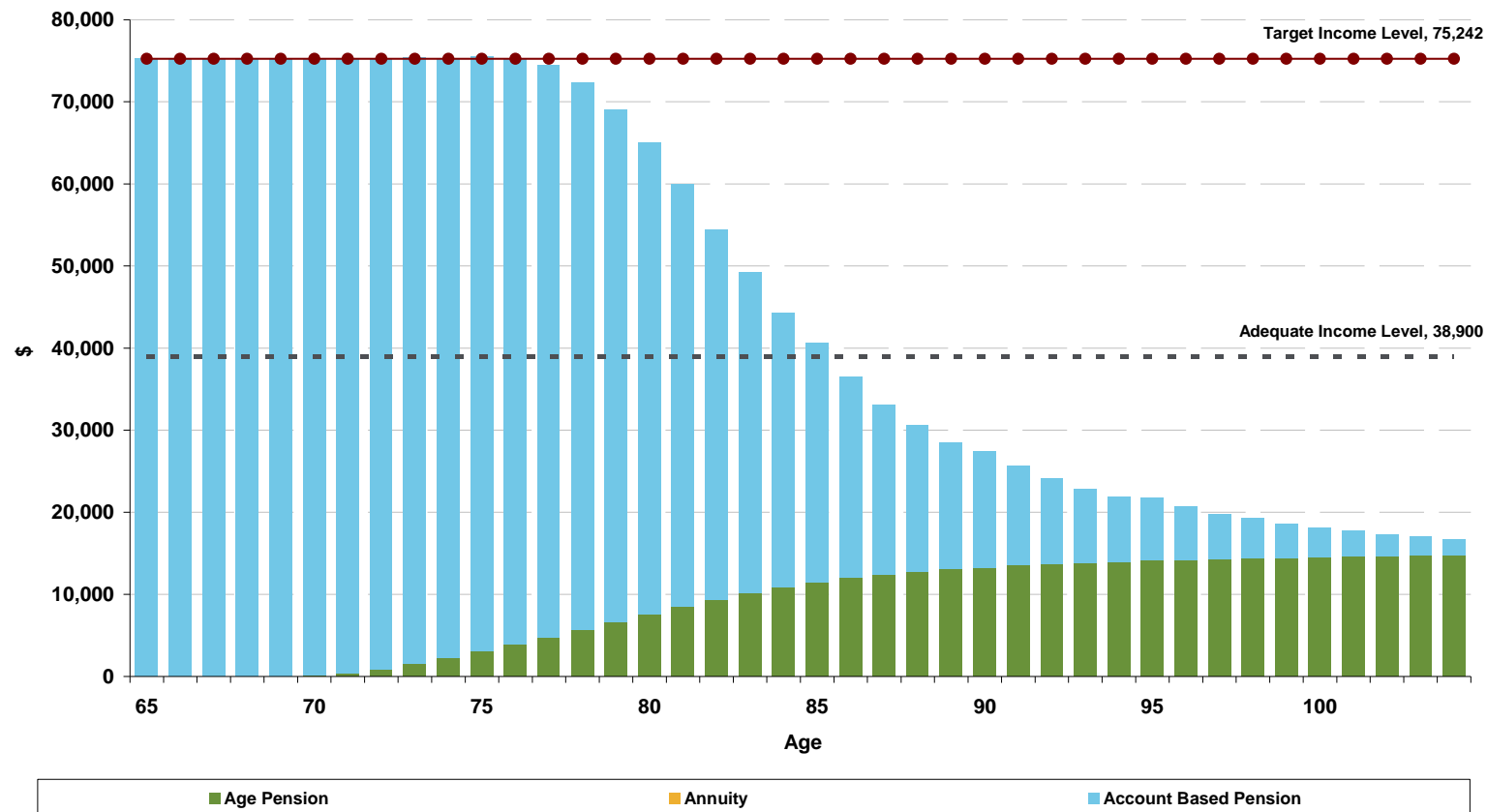


Assumptions: \$1,000,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; Low Fees



Figure 15.1: Average retirement income

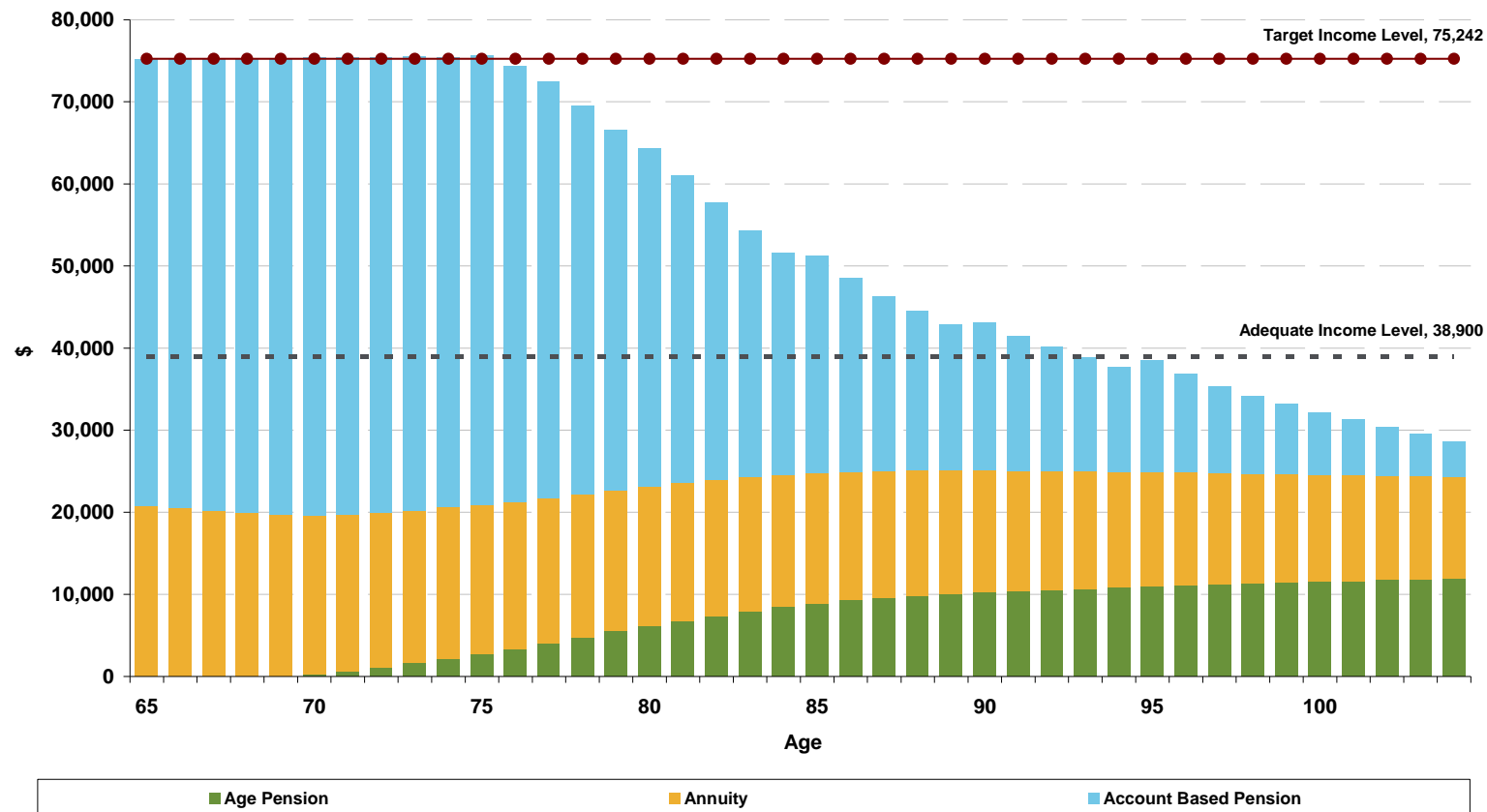
- No lifetime annuity purchased at retirement



Assumptions: \$1,000,000 Initial account balance; \$75,242 pa Target income; \$38,900 pa Adequate income; 70% Growth, 30% Defensive; Low Fees

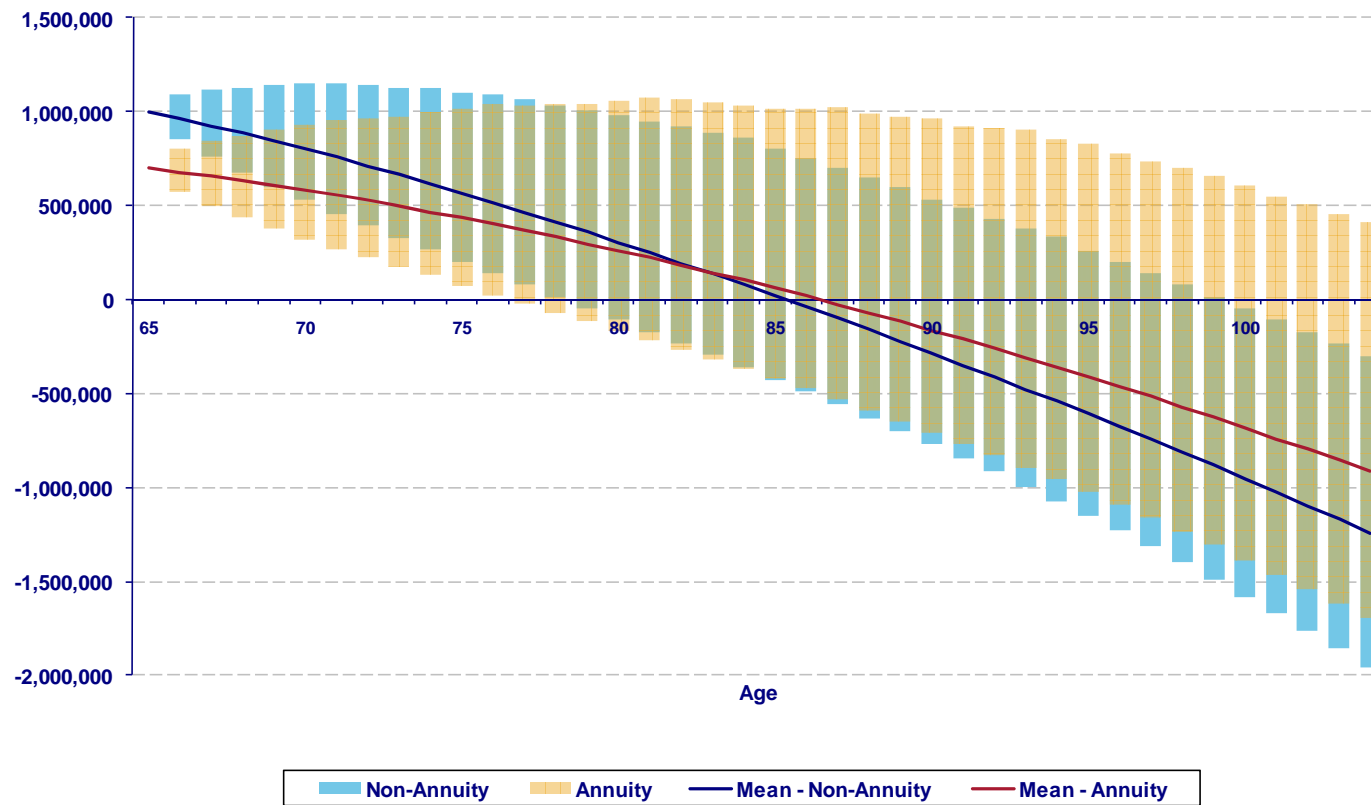


Figure 15.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$1,000,000 Initial account balance; \$75,242 pa Target income; \$38,900 pa Adequate income; 70% Growth, 30% Annuity; Low Fees

Figure 15.3: Remaining account balance - 90% Confidence interval

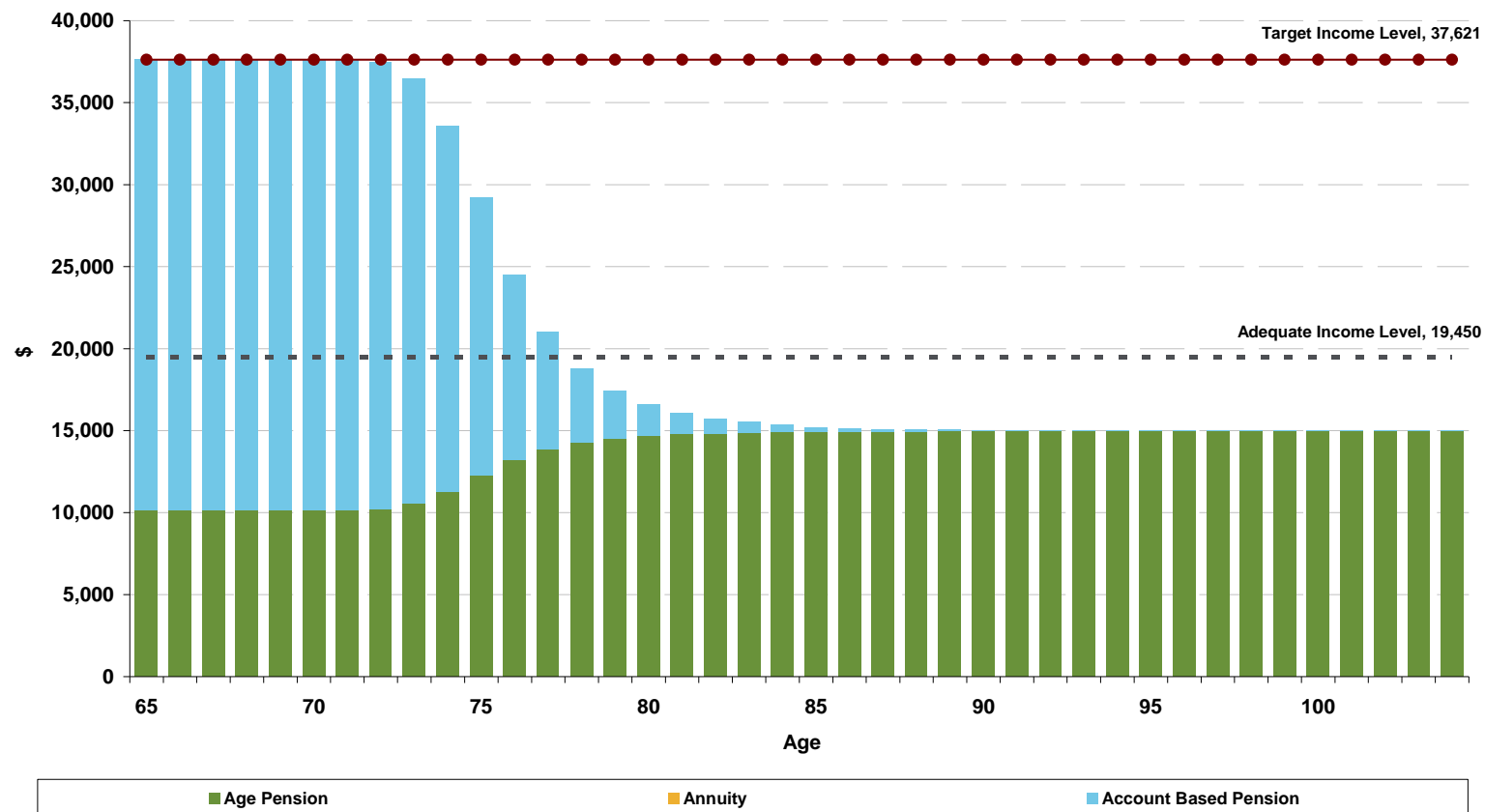


Assumptions: \$1,000,000 Initial account balance; \$75,242 pa Target income; \$38,900 pa Adequate income; 70% Growth; Low Fees



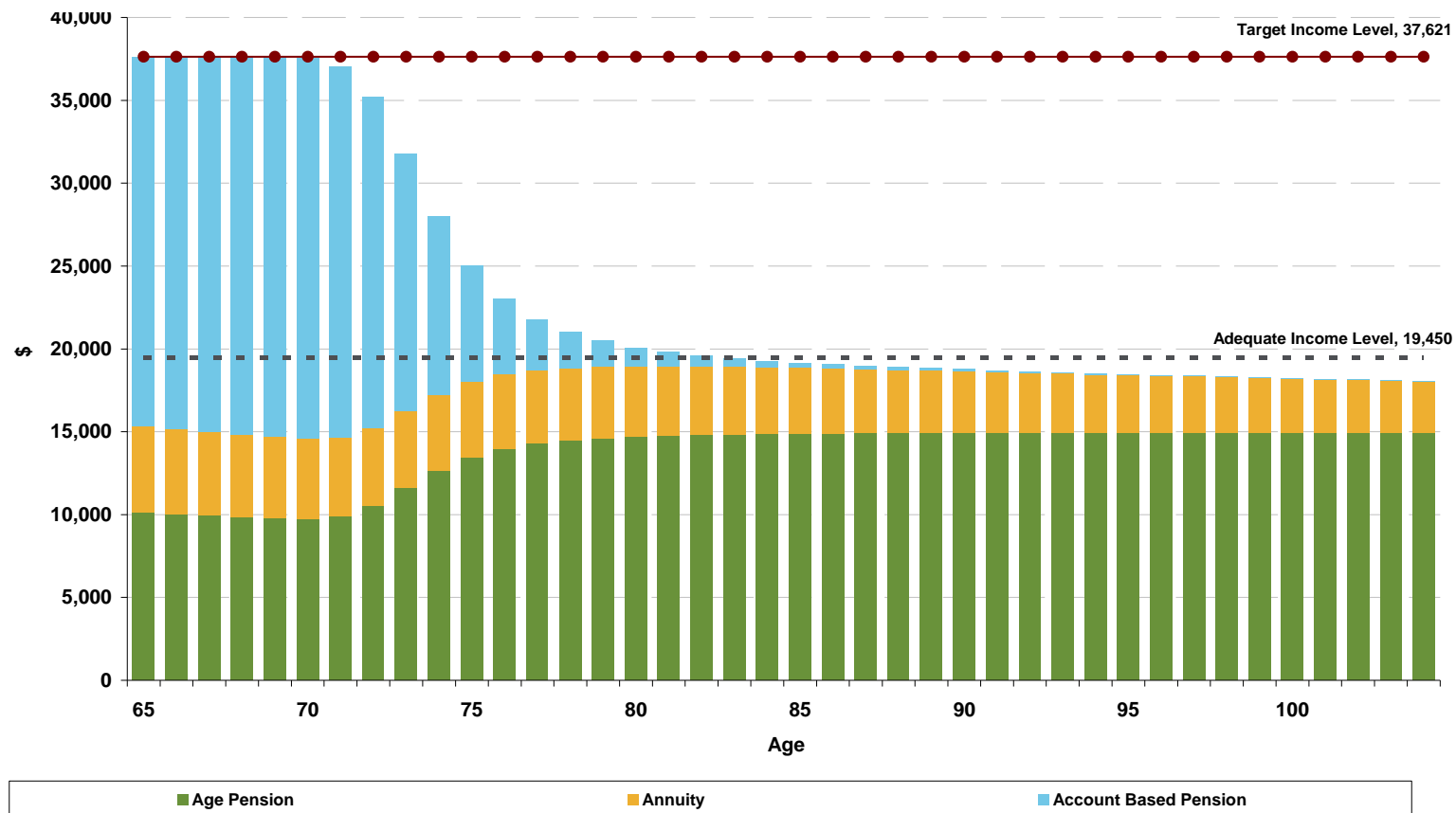
Figure 16.1: Average retirement income

- No lifetime annuity purchased at retirement



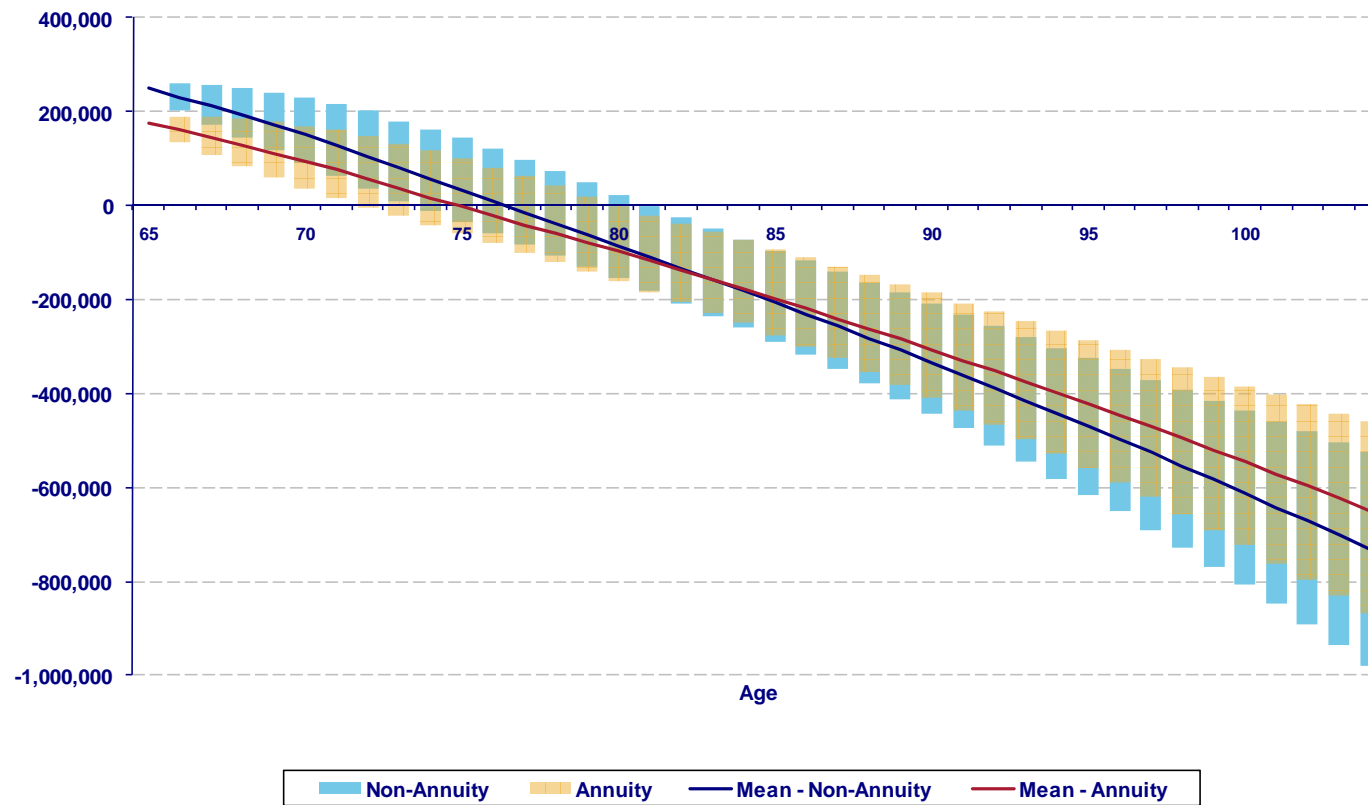
Assumptions: \$250,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; Low Fees

Figure 16.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$250,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Annuity; Low Fees

Figure 16.3: Remaining account balance - 90% Confidence interval

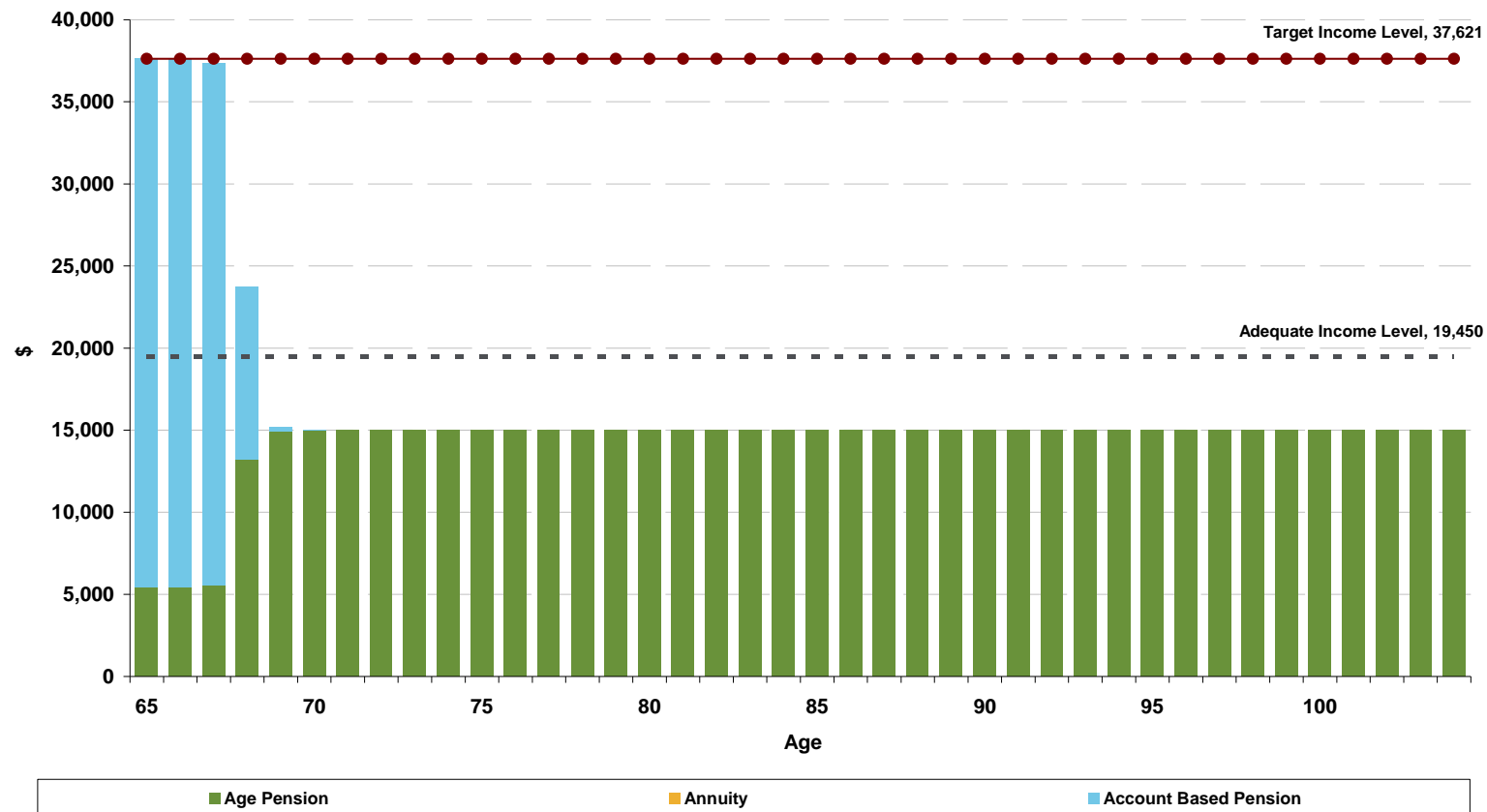


Assumptions: \$250,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; Low Fees



Figure 17.1: Average retirement income

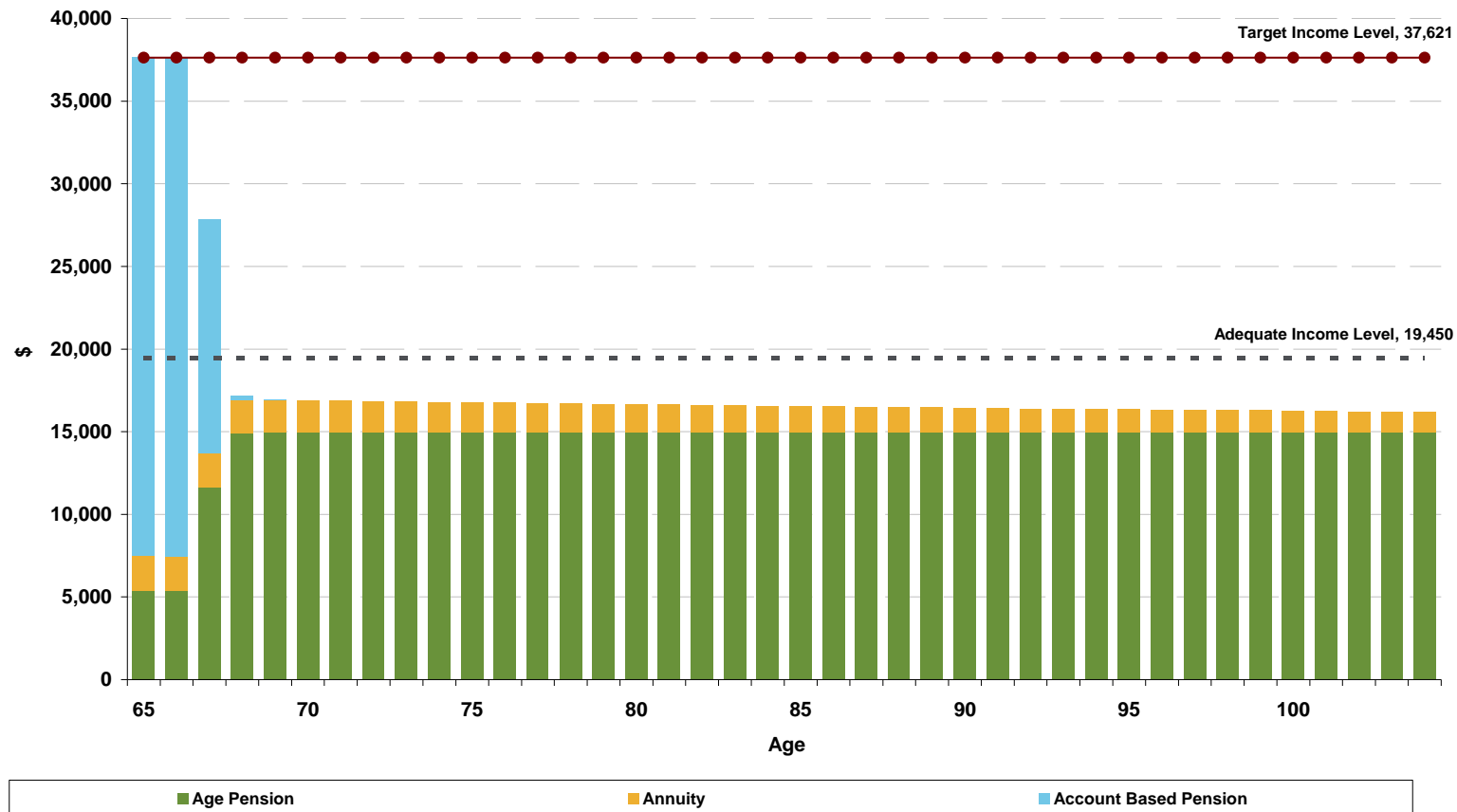
- No lifetime annuity purchased at retirement



Assumptions: \$100,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Defensive; Low Fees

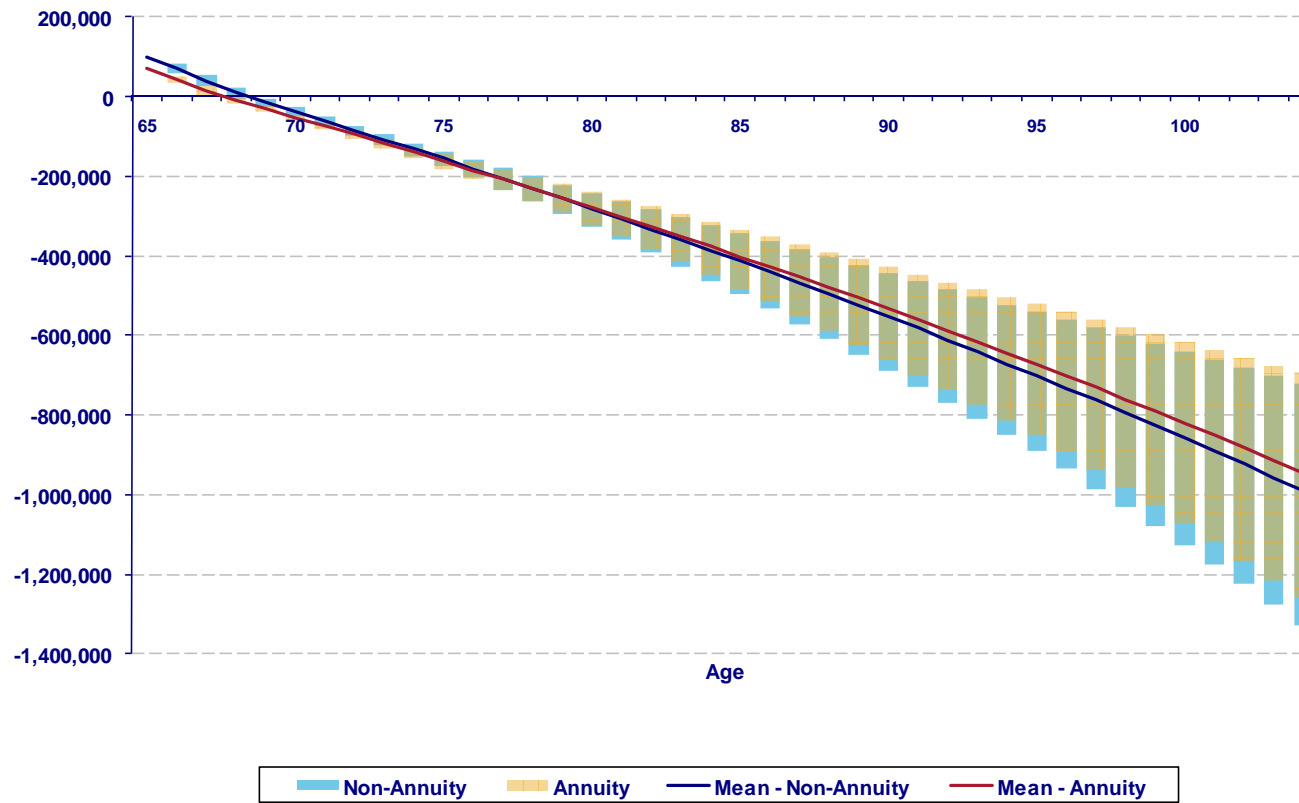
Figure 17.2: Average retirement income

- Lifetime annuity purchased at retirement



Assumptions: \$100,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth, 30% Annuity; Low Fees

Figure 17.3: Remaining account balance - 90% Confidence interval

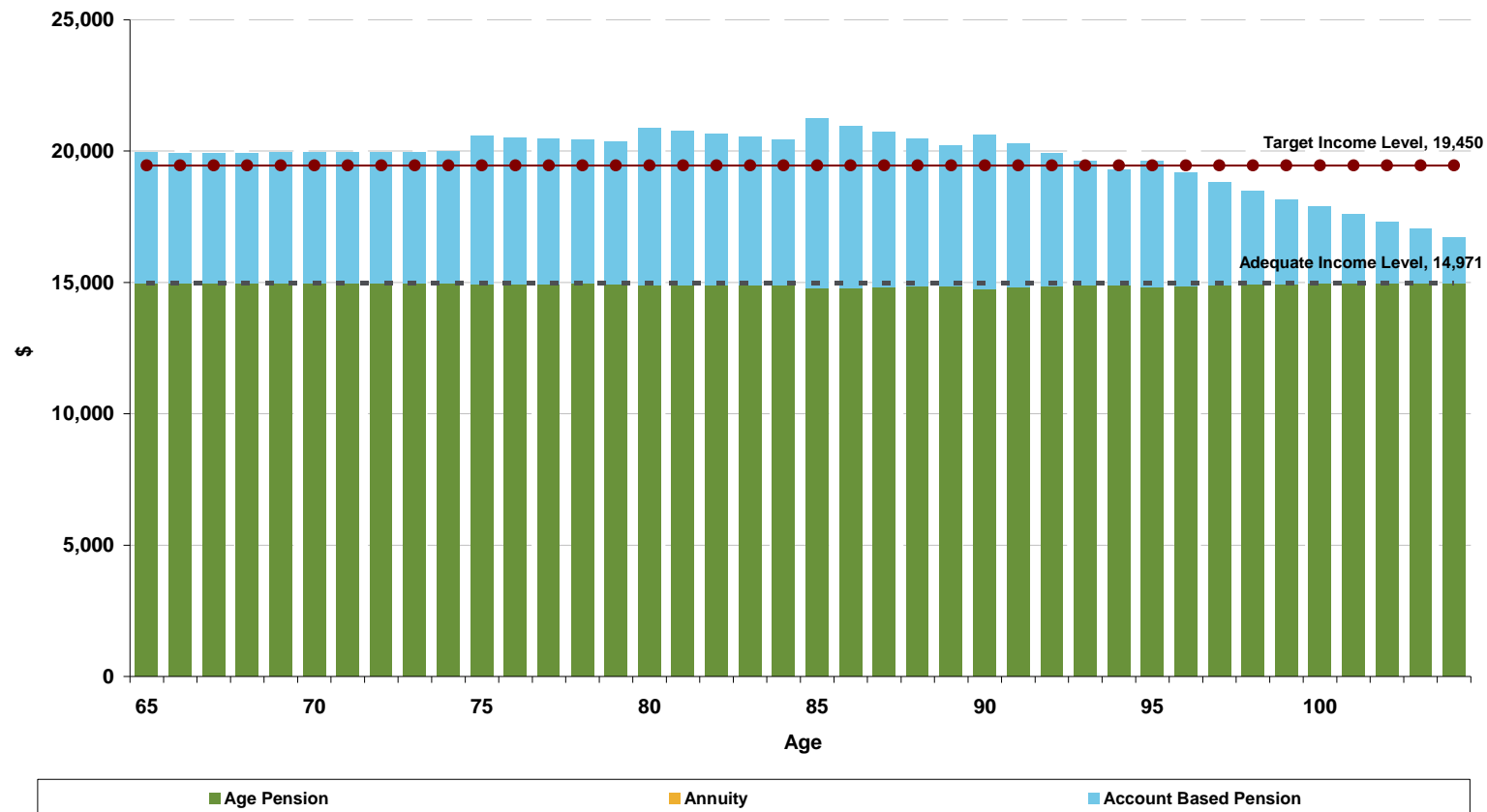


Assumptions: \$100,000 Initial account balance; \$37,621 pa Target income; \$19,450 pa Adequate income; 70% Growth; Low Fees



Figure 18.1: Average retirement income

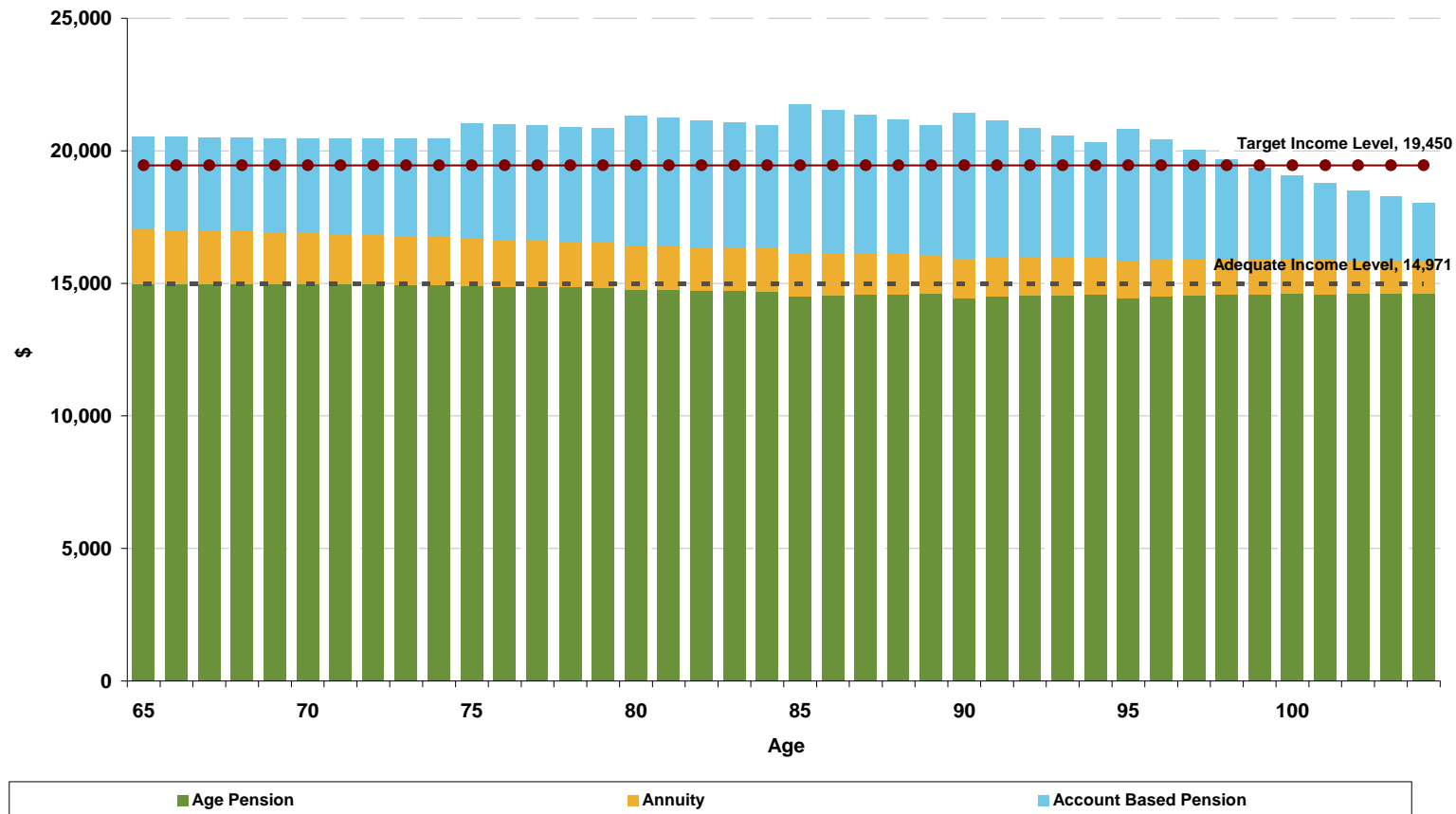
- No lifetime annuity purchased at retirement



Assumptions: \$100,000 Initial account balance; \$19,450 pa Target income; \$14,971 pa Adequate income; 70% Growth, 30% Defensive; Low Fees

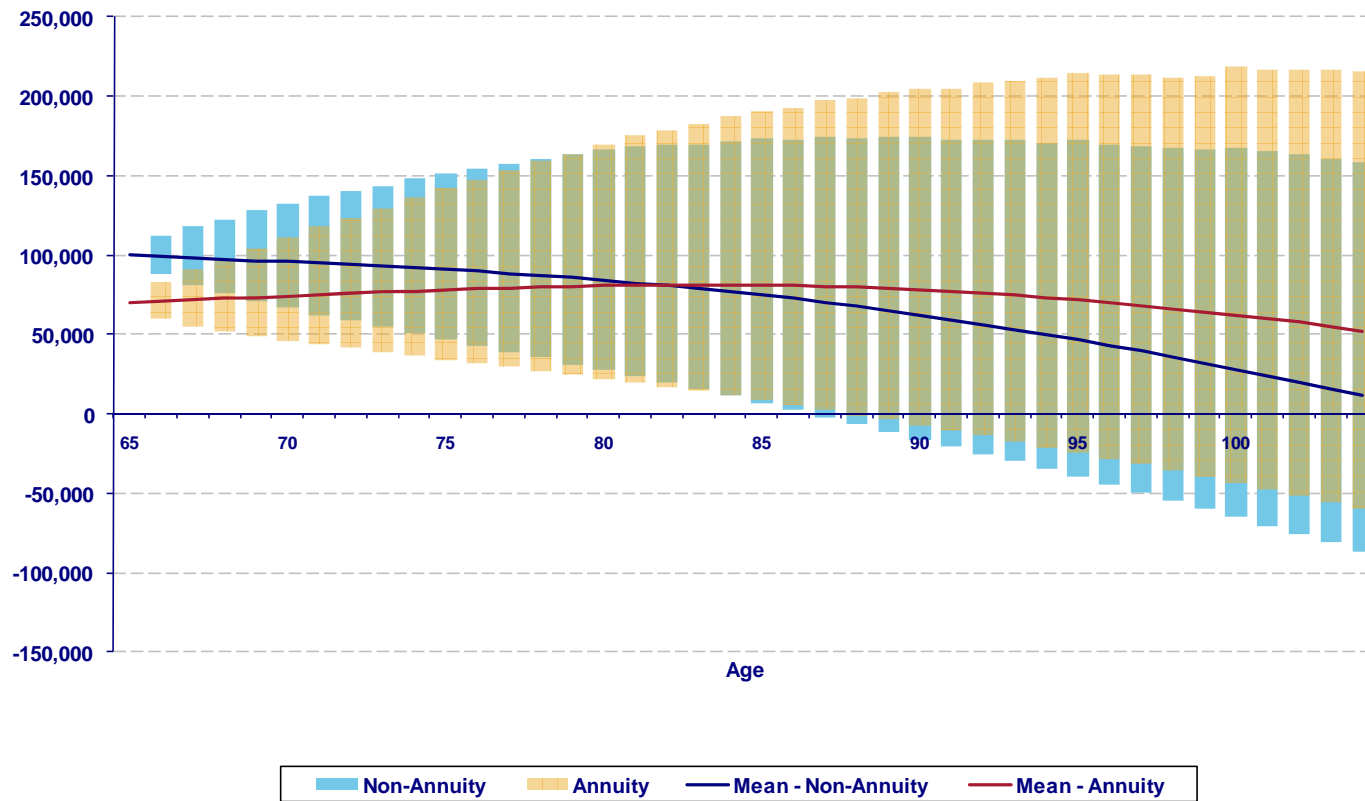


Figure 18.2: Average retirement income - Lifetime annuity purchased at retirement



Assumptions: \$100,000 Initial account balance; \$19,450 pa Target income; \$14,971 pa Adequate income; 70% Growth, 30% Annuity; Low Fees

Figure 18.3: Remaining account balance - 90% Confidence interval



Assumptions: \$100,000 Initial account balance; \$19,450 pa Target income; \$14,971 pa Adequate income; 70% Growth; Low Fees



Annuity Product Overview

7 September 2009

Richard Howes, Chief Executive – Challenger Life
Tony Bofinger, Appointed Actuary – Challenger Life



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1. Introduction and Executive Summary

The purpose of this paper is to provide an overview of a number of annuity products, both fixed and variable, for comparison purposes. Section 2 provides an overview of the basic variants in the annuity product-set. We start with a simple fixed rate, term certain annuity. We then introduce longevity protection by extending the fixed term to lifetime. Finally we introduce product complexity by including market risk sharing with the annuitant in the form of Variable Annuities. Section 3 deals with pricing. We examine the impact of various product “features” on payments made to annuitants. We also consider prices that would be available from the private sector and compare these to those that would be available from the government sector were product provided without subsidy.

The purpose of the paper is not to conclude that one type of annuity is unilaterally better than others. Rather it is to provide sufficient information to compare differences between product variants. A conclusion that the paper does draw, however, is that product features which provide annuitants with the possibility of greater payments or returns do so at a cost. This cost takes the form of increased risk to the consumer or estate planning consequences. The ubiquitous principle that “there is no free lunch” applies equally to the annuities market as to any other.

Specific observations can be made by way of an executive summary:

- *Fixed-rate term-certain* annuities are the simplest annuity offering a known regular fixed payment for a set period of time. Upon death of the annuitant, any value remaining passes to the annuitant’s estate.
- *Lifetime fixed annuities* pay a known regular fixed payment for the rest of the annuitant’s life.
- Both lifetime and term-certain annuities can be available as *inflation-indexed annuities*. This has the result of reducing payments early in the annuity term in return for growth in these payments in line with CPI.
- Both lifetime and term-certain annuities can be made available as *deferred annuities* meaning that they commence after a deferral period. Deferred annuities will generally provide higher payments relative to immediate annuities due to the time value of money and, in the case of lifetime annuities, early deaths meaning payments which will be very high if the annuity only starts to pay after average life expectancy.
- Lifetime annuities can be available with a *guarantee period* which sees remaining guaranteed payments pass to the annuitant’s estate if he or she dies during the guarantee period. Guarantee periods have the effect of lowering the payment that would otherwise be available.
- *Variable annuities* come in many different forms and can include features designed to provide the annuitant with exposure to an underlying portfolio of assets or market index. Variable annuities can result in higher returns earned by the annuitant relative to fixed annuities but this will be at the cost of either higher risk or at the expense of estate planning outcomes.
- Increased product complexity raises potential issues in both consumer protection and prudential risk. Product choice requiring consumers to make selections among complex alternatives with opaque fee arrangements raises the risks associated with poor financial planning advice and investor decisions. Challenges for Prudential regulation can emerge as product complexity increases since the hedging activities generally undertaken by the life offices providing the products will be highly involved and imperfect.
- For all of these products, payments and returns available from the private sector will be higher than those available from the government unless government products are subsidised. This is due primarily to funding rates in the private sector being higher. Since annuities are economically a form of borrowing, private sector life companies will be willing to pay higher rates just as other private companies fund at higher rates than the government. Viewed from another perspective these higher rates reflect a sharing of the risk premium from owning a risky portfolio of assets with policy holders. In contrast, the government funds at a risk-free rate.



2. Overview

Historically, one of the virtues of annuities has been their simplicity. A single up front premium is paid in exchange for a “vanilla” stream of guaranteed cash flows. This guarantee is provided by a prudentially regulated entity and hence, is secure. Indeed, during the strong equity and credit markets of the 1990s and 2000s this virtue became something of a handicap - annuities were overlooked since they did not offer the promise of capital growth that account-based product can provide, nor did they offer the levered up yields that credit intensive and structured debt investments provided. In Australia, annuities became a niche product sold for their social security assets test exemption rather than for their underlying merits as a simple and secure investment generating an attractive return.

The annuity market can be divided into “traditional annuities” (which include fixed rate and inflation linked, term-certain and lifetime, deferred and immediate annuities) on one hand, and variable annuities on the other.

2.1 Traditional Annuities

The simplest form of annuity, a *fixed-rate term-certain* annuity, essentially pays a known set of periodic cash flows over a defined period of time. They can be structured to return capital gradually over the life of the annuity, that is as a nil-RCV (residual-capital-value) annuity, at the end of the annuity (100 RCV) or a combination of the two. Shorter term fixed-rate term-certain annuities offer an alternative to term deposits offered by banks. Longer term annuities represent the retail equivalent of securities available in the bond market. Long term annuities are essentially the only way that a retiree can invest in a known set of cash flows over long investment horizons (30 year annuities are available in the market).

Traditional annuities are also available in the form of *lifetime annuities*. These provide cash flows for so long as the annuitant remains alive.

Traditional annuities (both term-certain and lifetime) are also available with explicit inflation protection. *CPI-linked annuities* pay regular cash flows which rise in line with consumer price inflation.

Deferred Annuities are not currently offered in Australia as a post-retirement product due to unfavourable tax treatment and regulatory limitations. Notably the income of the annuity would currently be taxed during accumulation. They provide a payment stream which does not commence for a defined period of time. These can be structured as term-certain deferred annuities or deferred lifetime annuities. Deferred lifetime annuities are the purest form of longevity insurance in that they can be constructed to commence payment on the life-expectancy of the individual.

2.2 Variable Annuities

Variable annuities refer to policies issued by life offices which differ from fixed annuities insofar as outcomes (including size of payments, early withdrawal benefits, death benefits, and tenor of the policy) are a function of market outcomes. The overall return achieved by a variable annuity is referable to an underlying portfolio of risky assets.

The simplest variable annuity is analogous to an allocated pension in that it is completely exposed to the underlying portfolio account or index. Regular payments are made by the annuity until the portfolio is exhausted. There is no explicit longevity protection nor is there market protection (just like a simple allocated pension). These products became popular in the United States because, relative to mutual funds, they provided a tax deferral.

This simple concept can be extended in a variety of ways and by adding various product features. These features are sometimes called “riders”. These product features include the following:

- *Guaranteed Minimum Death Benefit (“GMDB”)* – A GMDB provides for a minimum payment to the estate of the annuitant upon death. The simplest way to think about a GMDB is to imagine an account-based pension with a market protection mechanism (or “put option”) which protects the value of the account from declines



in the market below a certain level where the option is only exercisable on the death of the annuitant. A GMDB is essentially an estate planning tool.

- *Guaranteed Minimum Accumulation Benefit ("GMAB")* – Similar to a GMDB, a GMAB adds market protection to the simple unprotected variable annuity. In this case, however, the option is exercisable at various defined times. It is typically used by investors who do not plan to convert their savings into an income stream within the variable annuity but rather withdraw the balance after an accumulation period.
- *Guaranteed Minimum Income Benefit ("GMIB")* – The typical GMIB provides the annuitant with a minimum fixed regular payment until death. As such, even if the portfolio account is exhausted, the minimum payments continue. This form of a variable annuity represents a true hybrid between a traditional lifetime annuity, on one hand, and an account based pension on the other.
- *Guaranteed Minimum Withdrawal Benefit ("GMWB")* – A GMWB allows for early withdrawal of the account balance in the portfolio account where such amount is protected from market falls to a predefined minimum. This feature is designed to give the consumer flexibility.
- *Ratchets* – Ratchets have the effect of increasing capital protection with increases in the market. Typically, they protect the highest level attained by the market during the period over which the ratchet applies. Ratchets can be overlaid on top of the variable annuity during the accumulation phase or the drawdown phase. As one would expect, ratchets are very expensive.

There is an almost infinite myriad of combinations of product features which purport to give the annuitant the benefits of both traditional annuities and account-based pensions. In short, the annuitant can enjoy capital protection and estate planning benefits while retaining participation in the market. As an informed observer would expect, these benefits come at a cost relative to a traditional annuity. These costs take the form of fees levied on the account balance together with reductions in the guaranteed payments made and can represent a significant dilution of the guaranteed returns available from traditional annuities. This is discussed further in the next section.



3. Indicative Pricing

This section presents indicative pricing for a range of annuity products including fixed; inflation-indexed and variable; term-certain and lifetime; and deferred and immediate. In the case of immediate fixed and inflation indexed term-certain annuities, the rates shown are those currently offered by Challenger in the market. In the case of lifetime fixed and inflation linked annuities, the rates shown are those that Challenger would offer under current market conditions in the event that a significant extent of compulsion were introduced as part of reform of the retirement income system. In the case of deferred annuities the rates shown are indications of those Challenger would offer if taxation and regulatory impediments were removed. In the case of variable annuities, we present hypothetical pricing based on consistent market inputs for a sub-set of the more common product features.

Price comparisons demonstrate how varying the characteristics of the annuity impacts the payments that are made to the annuitant. The price tables also show differences in payments available at government bond yields versus those available from the private sector. Payments to annuitants will be higher under private provision than under public provision unless there is significant implicit subsidy.

3.1 Pricing basis

The Commonwealth borrows, by definition, at rates given by the government bond curve. Current market rates (as at 14 August 2009) are shown below together with corresponding rates from the swap market which is the most commonly used reference market for interest rates by private sector financial institutions.

Maturity	Govt Bond Yield	Swap Yield	Real Govt Bond Yield
15-Apr-15	5.31	5.87	2.99
15-Feb-17	5.35	5.96	3.05
15-Mar-19	5.41	5.99	3.01
15-May-21	5.47	6.00	2.97

As shown, swap yields are between 50 and 60 basis points above the corresponding government bond yields.

3.2 Term certain fixed annuities

The Australian retail term certain annuity market prices at a margin above the swap curve. The resulting yields and annual payments to the annuitant are shown in the table below. **All annuity payments shown in this paper are based on a \$100,000 policy.**

Term	NIL RCV* Govt Bond Yield**	NIL RCV Swap- equivalent yield	NIL RCV Annuity yield	Annual Annuity Payment (\$100,000 policy)	
				Private provider	Government provided without subsidy
10 years	5.36	5.94	6.63	\$13,993	\$13,179
15 years	5.46	6.03	6.78	\$10,828	\$9,937
20 years	5.48	6.04	6.82	\$9,311	\$8,357
Life expectancy (60 male)	5.46	5.89	6.71	\$7,747	\$6,759
Life expectancy (65 male)	5.48	5.99	6.79	\$8,419	\$7,437
Life expectancy (60 female)	5.44	5.84	6.66	\$7,383	\$6,390
Life expectancy (65 female)	5.46	5.91	6.73	\$7,840	\$6,850

* RCV = Residual capital value.

** Derived using generally accepted market practice (zero-curve methodology) from the government bond yield curve.



As can be seen from the table, the retail annuitant is currently able to earn approximately 130 basis points above the government bond yield. Were such annuities to be provided by the government without subsidising, the annual payments would be significantly lower than those provided privately (as shown) since they should reflect the government's lower borrowing rate.

3.3 Term-certain inflation-linked annuities

The Australian retail inflation linked annuity market prices at a margin above the inflation-linked government bond curve. The resulting real (or inflation-adjusted) yields and annual payments to the annuitant, assuming an initial investment of \$100,000 are shown in the table below.

Term	NIL RCV Real Govt Bond Yield	NIL RCV Real Annuity Yield	Private Sector Provision (\$100,000 policy)		Govt Provision without subsidy (\$100,000 policy)	
			First Annual Annuity Payment	Last Annual Annuity Payment*	First Annual Annuity Payment	Last Annual Annuity Payment*
10 years	2.96	3.93	\$12,289	\$16,034	\$11,701	\$15,267
15 years	2.99	4.02	\$9,007	\$13,624	\$8,369	\$12,659
20 years	2.96	4.05	\$7,388	\$12,955	\$6,699	\$11,747
Life expectancy (60 male)	2.85	3.94	\$5,644	\$13,698	\$4,900	\$11,895
Life expectancy (65 male)	2.91	4.01	\$6,409	\$13,027	\$5,688	\$11,563
Life expectancy (60 female)	2.79	3.89	\$5,206	\$14,650	\$4,441	\$12,495
Life expectancy (65 female)	2.86	3.95	\$5,751	\$13,553	\$5,010	\$11,807

* Assumes inflation averages 3% over the term of the annuity

As can be seen from the table, the retail annuitant is currently able to earn approximately 100 basis points above the real government bond yield. Again this translates to materially higher annuity payments under private provision.

3.4 Lifetime annuities

Challenger has calculated the corresponding indicative annual annuity payments that it would be willing to offer lifetime annuities to consumers under a compulsory regime. The table below presents this pricing for both fixed lifetime annuities and inflation-indexed lifetime annuities:

Annuitant	Life expectancy	Annual Annuity Payment (\$100,000 policy)		First Inflation-Indexed Annual Annuity Payment (\$100,000 policy)*	
		Private Sector Provision	Govt Provision without subsidy	Private Sector Provision	Govt Provision without subsidy
60 year old male	31 years	\$8,238	\$7,156	\$5,904	\$5,059
60 year old female	36 years	\$7,658	\$6,604	\$5,336	\$4,495
65 year old male	25 years	\$9,039	\$7,923	\$6,726	\$5,874
65 year old female	30 years	\$8,250	\$7,202	\$5,964	\$5,139

Note that the annual payments are slightly higher than those available on a term-certain basis to life expectancy. This is a somewhat surprising result (since the consumer is getting longevity protection and higher income) and is the outcome of two competing drivers. Firstly, the cost of capital of the life company providing the annuity reduces the payments it is able to offer. Secondly, the fact that deaths which occur earlier than life expectancy have a greater



financial impact on the life company than deaths which occur later than life expectancy increases the payment that the life office is able to provide. This second impact reflects the time-value-of-money and has the effect of offsetting the life company's cost of capital and so increasing the payments which can be offered.

An alternative way of conceptualizing this difference is as follows:

“Consider an individual without a bequest motive who cares only about his consumption in the current period and one period hence. If this individual invests \$1,000 in a non-annuitized asset with a rate of return 8 percent, then next period he will be able to consume \$1,080. On the other hand, if the individual invests \$1,000 in an annuity, and if with probability 0.03 the individual will not survive to receive the payment next period, then the insurer is able to pay $\$1,080/(1-0.03) = \$1,102$ to the annuitant, conditional on survival. The extra return provided to surviving annuitants is sometimes called the ‘mortality premium’ or ‘mortality credit’, because it is provided in return for giving up one’s right to the wealth upon death¹”.

3.5 Deferred annuities

Deferred annuities are arguably the purest form of longevity protection in that they can be structured to commence payment at the life expectancy of the individual calculated at the time of purchase. Due to the chance of dying prior to payments commencing, and the impact of the time value of money, modest investments can generate very high regular payments.

For comparison purposes term-certain deferred annuity prices (assuming taxation and regulatory impediments are removed) are shown below firstly for fixed annuities and then for inflation-linked annuities.

Deferral Period	Term *	NIL RCV Govt Bond Yield	NIL RCV Swap- equivalent yield	NIL RCV Annuity yield	Annual Annuity Payment (\$100,000 policy)	
					Private Sector Provision	Govt Provision without subsidy
Life expectancy (60 male) = 31 years	9 years	5.34	5.51	6.30	\$98,882	\$71,686
Life expectancy (65 male) = 25 years	8 years	5.38	5.53	6.31	\$75,332	\$58,304
Life expectancy (60 female) = 36 years	10 years	5.32	5.54	6.34	\$126,022	\$84,869
Life expectancy (65 female) = 30 years	9 years	5.35	5.50	6.29	\$92,766	\$68,172

* calculated as life expectancy at time payments are due to commence

¹ Brown (2007). Rational and Behavioural Perspectives on the Role of Annuities in Retirement Planning. *National Bureau of Economic Research Working Paper Series, No. 13537*



Deferral Period	Term (calculated as life expectancy at time payments are due to commence)	NIL RCV Govt Real Bond Yield	NIL RCV Real Swap- equivalent yield	NIL RCV Real Annuity yield	First Real Annual Annuity Payment (2009 dollars, \$100,000 policy)	
					Private Sector Provision	Govt Provision without subsidy
Life expectancy (60 male) = 31 years	9 years	2.55	2.85	3.65	\$40,155	\$27,488
Life expectancy (65 male) = 25 years	8 years	2.66	2.87	3.67	\$36,057	\$27,066
Life expectancy (60 female) = 36 years	10 years	2.54	2.86	3.66	\$44,283	\$28,205
Life expectancy (65 female) = 30 years	9 years	2.56	2.85	3.64	\$38,696	\$26,892

Life-time deferred annuity prices (assuming taxation and regulatory impediments are removed) are as follows:

Annuitant*	Payment commencement date (Life expectancy*)	Annual Annuity Payment (\$100,000 policy)		Inflation-Indexed Annuity Payment (2009 dollars, \$100,000 policy)	
		Private Sector Provision	Private Sector Provision	Annual Annuity Payment	Annuity Payments available from Govt without subsidy
60 year old male	31 years	\$207,101	\$146,869	\$79,146	\$52,405
60 year old female	37 years	\$320,507	\$210,003	\$104,122	\$64,207
65 year old male	26 years	\$182,261	\$137,095	\$80,297	\$58,105
65 year old female	30 years	\$208,370	\$150,358	\$82,032	\$55,455

*Characteristics at time of purchase

It is clear from the above that large payments are attainable with deferred lifetime annuities. As noted this is driven by the joint impact of the time value of money (the effect of which partly reflects inflation and is also reflected in the term-certain deferred annuity price table) and the chance of not being alive to collect the benefit. Indeed, approximately 50% of annuitants would not be expected to survive long enough to collect a single payment. Of those surviving to receive payments, the average payment stream would last approximately 9 years. In this sense it is closer to a pure insurance policy than other annuities or investment products. Perhaps an investment amount of \$10,000 would provide a more realistic analysis rather than \$100,000. In this case, annual payments (to supplement the age pension) would obviously be 10% of the numbers presented in the table above. A modest investment would therefore provides a very meaningful top-up to the age pension.

It is worth highlighting the extent of the difference in payments made under privately provided deferred annuities versus those that would be available from the government without subsidy. This is due to the fact that small differences in yields have an amplified effect on deferred annuities due to the long time periods involved and their deferred payment nature.



3.6 Variable Annuities

In this subsection we introduce pricing for a variable annuity providing a Guaranteed Minimum Income Benefit or GMIB. As noted earlier, it is the GMIB variable annuity which is the closest to being a true hybrid between an account-based pension and a traditional lifetime annuity.

Here we present pricing as an evolution from that for the traditional lifetime annuity. We first include a death benefit without introducing market risk. In other words, should the annuitant die before life expectancy (approximately), a commutation value, calculated as the remaining balance that would be left in an account based pension earning the same yield as the annuity, would be paid to the annuitant's estate. We then include a market protection element which allows the annuitant to share in any upside from a portfolio of risky assets. All prices are for privately provided annuities and assume a \$100,000 policy.

Annuitant	Life expectancy	Traditional lifetime annuity payment	Death benefit (no market risk)		GMIB variable annuity	
			Benefit fee*	Annual Payment	Benefit fee*	Annual Guaranteed Payment
60 year old male	30 years	\$8,238	40 bp	\$7,432	160 bp	\$6,535
60 year old female	36 years	\$7,658	30 bp	\$7,185	150 bp	\$6,204
65 year old male	24 years	\$9,039	70 bp	\$7,934	190 bp	\$7,106
65 year old female	29 years	\$8,250	50 bp	\$7,565	170 bp	\$6,669

* Deducted from account balance annually

The table shows that the inclusion of a death benefit for estate planning and protected market risk comes at the cost of reduced income in retirement. It is a reasonable claim that variable annuities provide the benefits of protected income and market upside but such benefits come at a cost. There is “no free lunch” – an appropriately structured GMIB variable annuity could reasonably expect to deliver a 20% lower guaranteed set of payments than a traditional lifetime annuity.

3.6.1 Variable annuities - other costs of complexity

As evidenced above, variable annuities carry direct costs associated with providing capital or income protection at the same time as market upside. Less direct costs of variable annuities derive from their inherent complexity. A natural consequence of this complexity is higher (though not necessarily transparent) fees and greater risk of loss due to lack of consumer product knowledge. A related consequence is heightened prudential regulatory challenges as variable annuities can create difficult risk management consequences for the providers as a result of their complexity. Variable annuities do not have an unblemished track record in either of these areas in the jurisdictions in which they are common.

3.6.2 Variable annuities – no substitute for compulsion

It is also important to note that the product features which variable annuities provide are not a substitute for compulsion. Offshore experience shows that these product features are usually balanced against cost resulting in limited uptake. The “build it and they will come” argument is no more appropriate here than for any other financial product or service. Interestingly it is possible, albeit a little cumbersome, to offer variable annuities wrapped inside an allocated pension under the current retirement income rules. If the underlying demand for such products were significant, one would have expected that they would already be offered in this “wrapped” form.

3.6.3 Variable annuities – the need for a guaranteed component

To the extent that variable annuities are part of a system of retirement incomes policy prescription involving compulsory annuitisation, it is vital that they be required to include a high level of either capital or lifetime income protection. Otherwise the policy change will fail to address a key shortcoming of the



current system being the excessive exposure that Australian retirees have to market risk. Australian retirees have the highest equity exposure of any OECD country.

We caution against solutions which allow funds (as opposed to regulated Life companies) to pool longevity risk without a guarantee for a number of reasons. Since such arrangements do not address increases in the average longevity of the population, they will not address the public finance issues created by population mortality improvements beyond current expectations. From an individual retiree perspective unguaranteed pools will vary in their effectiveness in reducing longevity risk, since such effectiveness is a function of the size and heterogeneity of the specific pool. Unguaranteed pools are also subject to market risk. Unguaranteed pooling also invites complexity which has implications for regulation and particularly consumer protection (both in terms of fees and the likelihood consumers will not appreciate the risks that they will continue to carry).

Public and private pension provision in Australia

27 August 2009

Report by Access Economics Pty Limited for
Challenger Financial Services

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Executive Summary

Challenger Financial Services asked Access Economics to report on the cost of capital implications of alternative ways of addressing the problem of longevity risk for retirees.

Many retirees tend to take too much of their retirement income by way of lump sums and too little as annuities, and hence run down their capital ‘too early’. In part, that is due to:

- **Short-sightedness**, given that life expectancies have risen more than most recognise. The average man can expect to live about 9.4 years longer than his Dad, and the average woman some 7.1 years longer than her Mum.
- **The age pension**, which shifts some of the risks of running short later on in retirement back on to taxpayers by guaranteeing a minimum income.
- **Complexity**, with many retirees opting for simpler products rather than annuities in the face of financial fine print and difficult-to-understand investment choices.
- **Lack of choice**, with the range of products on offer here less than in some other nations.
- **Control of capital**, as retirees have shown a preference for retaining control of their own capital to cover any large unexpected costs such as a home renovation or ill health.

The market failure of short-sightedness and the fiscal blowback from longevity risks to public age pension costs point to the potential need for policy action. Accordingly, some observers argue there are major advantages in the Government providing longevity risk products: in effect, allowing or compelling people to buy ‘top up’ age pensions direct from the Government.

This is seen as having two key advantages:

- The Federal Government – and its AAA rating – has greater access to capital markets at lower costs than do private providers, providing buyers of these annuities with the equivalent of a ‘free lunch’.
- Proponents argue that Governments may also have access to economies of scale in administration and delivery not as readily available to private providers of pension products. (Others argue that this is unlikely to be material, given that the full cost of running an efficient life office is low, and scalable.)

This report assesses the first of the above two points. It finds that government provision of such products would indeed benefit buyers of these annuities.

It would not, however, benefit Australia as a whole.

Somebody pays

Why not? Because an iron rule of economics is that “somebody pays”.

Labelling borrowing as ‘public’ or ‘private’ does not change the inherent risk in the transaction, but only who bears that risk.

Hence the marginal transaction – paying upfront now for an income stream to follow – is the same regardless of whether done publicly or privately. That suggests that, over time, public provision would either draw directly on the Budget or tend to dilute the cost of capital advantage to public sector borrowing as a whole.

Consider two economies:

- One has zero net government debt, and all private borrowing is subject to the full risk inherent in its underlying economic activities.
- The second economy is identical to the first, with the exception of a blanket government guarantee on all debt transactions, funded through an efficient income taxation system.

The first economy faces credit defaults on occasion, which are absorbed as costs by creditors. It therefore must endure a higher (pre-tax) private cost of capital to cover those risks.

The second economy has no such defaults, as all credit risk is borne by the government. This economy enjoys a lower (pre-tax) private cost of capital. However, all taxpayers face higher costs and the level of economic activity is also constrained by that higher tax burden.

That example highlights the basic point that some of the costs of default risk can be covered by governments, but only at the cost of externalising the risks toward other parts of the economy.

That makes creditors happy (in this case the buyers of the government annuities), as they are facing reduced risk, but has wider consequences for all. However, the initial apparent ‘savings’ on interest payments are in fact matched by costs elsewhere in the economy over time – it is just that the savings are more obvious and the costs more diffuse.

If it was otherwise, then that would suggest a ‘free lunch’ available to all economies simply by re-branding some or all of their private debt as public debt. While there may be short run circumstances where re-branding might offer advantages, as a long run proposition it is dubious.

No free lunch?

Hence the basic view in this area is that labelling something as public rather than private borrowing simply shifts costs rather than eliminating them.

Yet there may be a potential caveat to that basic view. At the margin, if the world wants more Australian Government guaranteed debt than is currently on issue, then issuing more under this type of program would indeed offer a ‘free lunch’ of sorts to Australians if the Government were to borrow more in its own name (and the private sector less).

Moreover, given the currently limited supply of Australian Government backed debt, there may be an argument that there is a degree of excess demand for new issues of Commonwealth Government Securities (CGS).

However, if such a ‘free lunch’ is potentially on the table, there are other ways to eat it.

The Government could expand *gross* debt without lifting its *net* debt. This could be achieved by, for example, issuing debt in exchange for a portfolio of assets (similar to the existing Future Fund), or in exchange for matching debt from foreign governments.

This would expose taxpayers to greater financial risk, but would exploit the ‘good deal’ potentially available on CGS without the need for additional net debt.

Are today’s starting points for debt the issue – or tomorrow’s?

Moreover, there is a caveat on the above caveat. That is, even if markets have a degree of unmet thirst for Australian Government guaranteed debt as of today, there is less likely to be any such unmet demand in coming decades, when Government debt is projected to rise.

That is important because markets tend to be less forgiving of governments which already have higher debt ratios.

While Australia’s net public sector debt position is currently very strong relative to that of other developed nations, that strength is facing pressure in both the short and long term:

- Short term, the Federal Budget is in deficit, and is likely to remain so for some time.
- Longer term, the intergenerational pressures associated with an ageing population threaten to produce significant primary deficits over coming decades.

Moreover, the range of emergency measures adopted during the global financial crisis mean that the contingent liabilities on the Federal Government’s balance sheet have just ballooned.

The Federal Government’s debt is still set to remain very low by OECD standards. That said, and other things equal, the deterioration underway in the current and future creditworthiness of Australian Governments adds to the reasons to believe that there is no economy-wide ‘free lunch’ to be had in the Federal Government directly selling annuity products to Australians.

Borrower or guarantor?

As noted above, the Federal Government is in a good position to manage default risk, but that management comes at a cost.

That applies not only to the direct borrowings of the Federal Government, but also to any private borrowings sheltered under a government guarantee.

In turn, that raises the possibility of the key beneficiaries of a government guarantee (private borrowers and lenders) paying a fair price through a levy arrangement for the insurance provided by any such government guarantee.

Note that in the case of a universal guarantee, this would result in no change to the overall cost of capital in the economy – only a shifting of risk away from less creditworthy pursuits toward those with less inherent credit risk.

If the guarantee were less than universal, it would instead provide an effective subsidy to those borrowers covered by the guarantee at the expense of those without similar protection.

Given that, there may be a case for public sector guarantees for privately provided annuity products, with that public guarantee coming at a cost to the private provider – that is, a solution analogous to the current guarantee for bank and State borrowing.

In turn, that could be an option for the customer – that is, they could choose to buy a guaranteed or non-guaranteed product, and private providers could purchase guarantees to match the mix of demand they faced.

In sum

Australians do need to change the way they take their retirement incomes to match our rising life expectancies – less needs to come by way of lump sums, and more by way of annuitised income, with that combination helping to ensure that our retirees don't outlive their means.

How to achieve that?

There are obvious benefits for retirees if they can ride on the back of the Federal Government's ability to borrow cheaply.

However, any such good news for retirees from that quarter would be offset by rising costs to others. Labelling borrowing as 'public' or 'private' does not change the inherent risk in the transaction, but only who bears that risk.

Or, in other words, the initial apparent 'savings' would disappear over time – public annuity provision is more likely to, for example, either add marginally to the overall cost of public sector borrowing and/or add marginally to the overall cost of commercial bank borrowing used to finance Australian home and business loans.

Access Economics
27 August 2009

1 Introduction

This report:

- Examines the pros and cons of public rather than private provision of guaranteed income streams; and
- Looks at the potential impacts of compulsion in either case.

The focus is on the underlying economic concepts rather than detailed modelling of the outcome of any particular policy proposals.

Policies aimed at reducing retirees' longevity risk – the risk that they live longer than their retirement savings do – have drawn the attention of the Henry Review into *Australia's Future Tax System*.

Australians have traditionally shied away from retirement income streams which guarantee an income for life, and have instead preferred to access their super in a lump-sum.

In part, that preference is likely to be due to a combination of:

- **Short-sightedness**, given that life expectancies have risen more than most recognise. The average man can expect to live about 9.4 years longer than his Dad, and the average woman some 7.1 years longer than her Mum, yet average retirement ages have only been inching up. Many people may not realise the extra years in retirement that they will enjoy and the extra savings they will therefore need to set aside.
- **The age pension**, which shifts some of the risks of running short later on in retirement back on to taxpayers by guaranteeing retirees a minimum income. The potential for the age pension to act as a backstop against longevity risk would be expected to form part of any rational retirement plan. Reliance on the age pension backstop shifts longevity risk onto other taxpayers. Some of the longevity risk is also borne by family members who receive reduced inheritances.
- **Complexity**, with many retirees opting for simpler products rather than annuities in the face of financial fine print and difficult-to-understand investment choices. Retirees' desire to "keep things simple" is understandable¹.
- **Lack of choice**, with the range of products on offer in Australia less than that of some other countries.
- **Control of capital**, as retirees have shown a preference for retaining control of their own capital to cover any large unexpected costs such as a home renovation or ill health. In many cases, control of capital is also important for estate planning, and so that retirees can maintain links with their children for as long as possible².

¹ There is a discussion on this point in the RBA Financial Stability Review, March 2009.

² B.D. Bernheim, R.J. Lemke, J.K. Scholz, "Do Estate and Gift Taxes Affect the Timing of Private Transfers?" (p3), NBER 2003.

Of the five reasons given above for why Australians might avoid annuities, only the first reason is a pure “market failure” – short-sighted expectations. With life expectancies continuing to rise, there is a growing risk that individual retirees spend their super savings too quickly and that more generally Australians fail to plan effectively for their later retirement years, relying on the age pension to support them later in life when their super is gone. If individuals underestimate their retirement years, but fund providers have an accurate (and higher) estimate of retirement years, then commercially offered annuities would be expected to struggle in the market place for want of customers. Evidence of such market failures would suggest that there might be a case for a corrective policy intervention.

The second reason – the potential for age pension costs to blow out – is not a market failure per se. However, it also offers a fiscal rationale for why the Federal Government might also want to consider a policy intervention.

The dual rationales of short-sightedness and fiscal protection underpin current retirement incomes policies. If these rationales were considered strong enough to justify further policy intervention so as to internalise some longevity risk to retirees, then the policy intervention could take a number of forms.

Two ‘polar’ approaches are possible – one simple, one ambitious:

- *First*, retirees could be required to use part of their super payout to buy a guaranteed income stream from a pension provider. As with the 9% SG, this would aim to overcome short-sightedness and provide a larger pool of investment funds to control costs and promote innovation in pension products. The Government’s role here could be as ‘simple’ as passing legislation.
- *Second*, an alternative approach (a version of which may be considered by the Henry Review) would be to allow retirees to ‘buy’ a guaranteed income from the Government, either using their super payout, or by staying on in the workforce for longer (and hence providing a boost to the economy, and to tax revenues). The Government’s role here could be expansive – for example, the Government could act as a full service provider by offering retirement financial planning advice, collecting and investing retiree’s investment funds and providing annuities. Private sector involvement could be zero.

There are obviously a range of sub-options that might be considered between these two polar proposals.

However, rather than consider detailed options for potential implementation, the focus of this report is to address the public sector cost of capital proposition which has been put forward in support of public annuity provision.

This proposition argues that Government can borrow at a lower cost than the private sector.

If the proposition is true, then that will affect the design of any proposal that aims to address longevity risk.

2 The current system

It is useful to distinguish between **individual longevity risk** and **systemic longevity risk**:

- For **individuals**, the risk is that they outlive their planned life expectancy, and hence their financial means. This risk can be eliminated by individual retirees banding together in a funding scheme where fund outflows (that is, retirees' annuities) are covered (in net present value terms) by fund inflows (retirees' contribution to the fund). Individual retirees are unlikely to live the precise average life expectancy – those living longer than the average will benefit from a lifetime annuity at the expense of those living shorter than the average. Longevity risk – both upside and downside – is therefore shared between the scheme's retirees.
- For **governments and private pension providers**, the risk is that the 'whole population' life expectancy or fund investment returns will change in an unexpected way. If the size of the fund pool is insufficient to pay fund outflows, then the annuities scheme will collapse without outside support or a change in the terms of the fund. Such a systemic risk could result for example from unexpectedly rising life expectancies or lower than expected long term rates of return from the fund's investments.

The Government provides an age pension, which it boosted further in the Federal Budget:

- This provides a degree of cover for longevity risk for individuals, though the retirement income adequacy of the pension by itself is low.
- Lower adequacy and higher pension reliance will persist while the superannuation system is immature and/or while super incentives fall short of encouraging adequacy for specific groups.
- Hence the age pension of itself is not sufficient to meet the demand for longevity risk products in Australia.

Yet the private provision of retirement income products is patchy, as the Henry Review has noted in its interim report on retirement incomes:

"The market in Australia for products that provide either a lifetime, or deferred income stream is not as developed as in some other countries"

"Better retirement income products should be available for purchase so a person can ensure an income higher than the Age Pension throughout their retirement"

Australia's future tax system – The retirement income system: Report on strategic issues

2.1 Current system – the Government age pension and its effect on private provision

While not universal, the Government age pension (including part pensions) casts a wide net:

- Access Economics longer term modelling indicates that many people – including many well off people – will eventually qualify for part pension, while those who don't are not a particular public policy concern.
 - Even 'more attractive' annuity products may not be attractive to this group, as their asset base and income flows are likely to cover both their longevity risk and bequest motives regardless of their individual longevity outcomes.
- The age pension does comprehensively insure against longevity risk, but at a low income replacement rate for most, and in a manner which encourages the shifting of the risk burden to the government, all the more so to the extent people are short-sighted as to their life expectancy.

That said, there are features of the age pension which make it an attractive backstop against the risk of living longer than expected:

- The pension is indexed to CPI inflation, and maintained at a minimum ratio to Male Total Average Weekly Earnings (MTAWE), meaning its real value will increase over time.
- The longer one lives, the lower one's capacity may be to enjoy spending. A number of studies – both here in Australia and overseas – have shown that discretionary spending declines over the later years of retirement. At the same time, those areas where costs increase with age, such as health and aged care, are largely covered by government services. That is likely to mean a lower retirement income 'adequacy' threshold for those who do outlive their peers.

3 Public sector provision and the cost of capital

Part of the Henry Review discussion on longevity risk focuses on the private versus public provision of annuities.

The Review rightly identifies the Federal Government as Australia's main provider of longevity insurance through the age pension.

Does that mean that the Government may also be able to offset the risks inherent in offering an income guarantee more effectively than the private sector (especially if the Government has to insure private sector guarantees)?

Such a possibility partly revolves on the stronger ability of the Government to pool risks, aided by its lower cost of capital compared to the private sector.

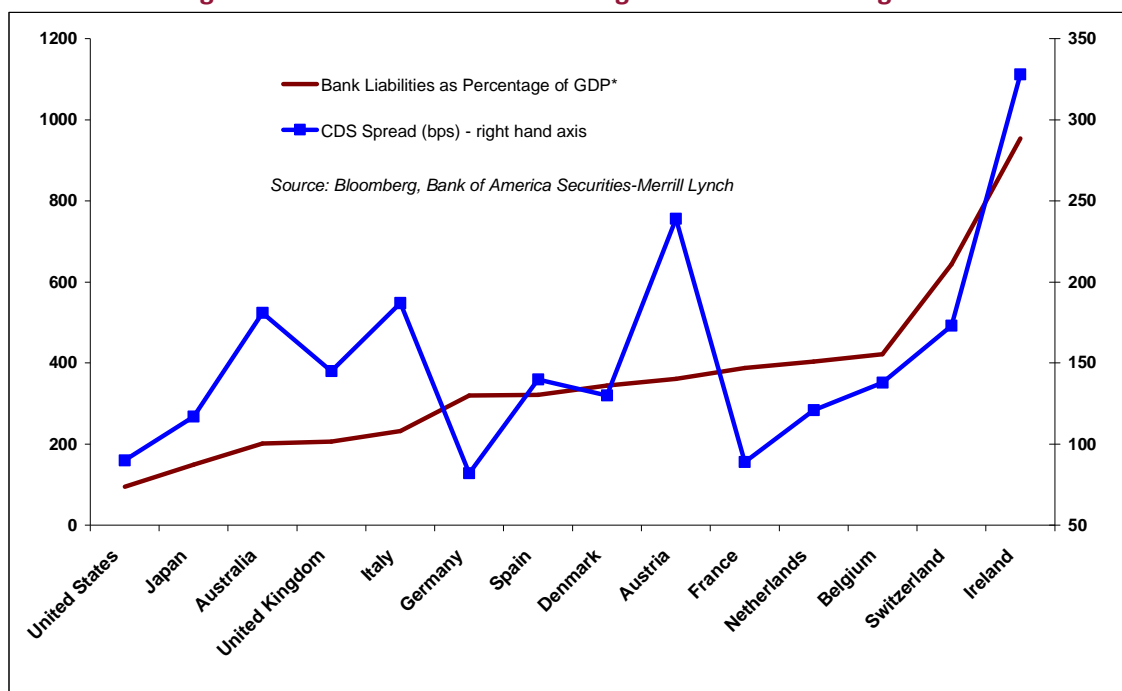
This section examines both the financial and economic costs of public sector borrowing, noting that:

- If markets are well informed, the cost of capital advantage enjoyed by governments is likely to be eroded as more borrowing increases the risk attaching to government debt.
- Even if markets do not fully adjust, the resulting risks are then passed to taxpayers – as higher taxes or lower spending if governments are forced to default debt.

3.1 Public borrowing and the cost of capital

Governments cannot borrow forever without paying a cost penalty.

Figure 3.1: Links between borrowing levels and borrowing costs



While governments in general enjoy low borrowing costs, those with greater levels of debt are considered at greater risk of default – and must pay higher borrowing costs as a result.

The chart above shows the size of national banking systems relative to national income, and matches that against the assessment being made in markets of the likelihood of default.

It is an illustration of the links between borrowing levels and borrowing costs – a linkage which is also important for governments, not just private sector borrowers.

Eventually, taking on additional debt will lead markets to rethink their assessment of a Government's financial position:

- That is more likely to be true when the government is borrowing to finance investments in business assets (rather than borrowing to smooth the impact on tax revenues and expenses through the business cycle, or borrowing to fund infrastructure which will provide long term benefits to taxpayers).
- Markets tend to hold the view that government activities are better risks than business activities.
- However, when governments borrow in order to fund the purchase of business assets (as would be the case for a public annuity offering), then that view is diluted.
- Sophisticated markets are able to look through the public sector 'label' placed on borrowing to the assets underneath, attaching similar levels of risk to those for private borrowers.

Governments which borrow to fund public sector investment in more risky assets are, other things equal, likely to be subject to higher borrowing costs.

A shift in the mix of services funded by borrowing can therefore influence the level of risk – both real and perceived.

Importantly, any resulting increase in borrowing costs would apply across the entire stock of existing government debt, meaning that a small change in the market's assessment of risk might translate into a larger impact on overall borrowing costs.

In the case of public annuity provision, the marginal transaction would be the same regardless of whether it was done publicly or privately.

That suggests that, over time, public provision would either draw directly on the Budget or tend to dilute the cost of capital advantage to public sector borrowing as a whole.

That raises the possibility that increased borrowing costs on all Government debt would offset the borrowing cost advantage on new debt – effectively negating the cost of capital advantage of public provision.

If it was otherwise, then that would suggest a 'free lunch' available to all economies simply by re-branding some or all of their private debt as public debt.

While there may be short run circumstances where re-branding might offer advantages, as a long run proposition it is dubious.

The global financial crisis helped to show that ‘hiding’ the ultimate owners of debt in order to gain a ‘lower’ cost of capital is not sustainable and ultimately damaging – it was sub-prime home owners regardless.

That means **debt sustainability matters** and that governments cannot borrow in a manner which steadily increases overall leverage in perpetuity.

Doing so would threaten fiscal sustainability, and hence external stability, the government’s credit rating and the cost of credit.

The Federal Government recently implemented a number of measures aimed at maintaining stability and confidence in the financial sector. Three of these measures are examined here. They all focus on Australian Government guarantees aimed at ensuring the continued flow of funding for particular purposes (and incidentally provide potential funding models for a government guarantee of private pensions). In two of these measures, these guarantees have come with an explicit “price” of a fee premium based on the credit rating of the borrower.

First, there is a guarantee for deposits and for wholesale debt securities issued by authorised deposit-taking institutions (Table 4.1).

Table 3.1: Deposit and wholesale funding guarantee

Credit Rating	Debt Issues Up to 60 Months
AA	70bp
A	100bp
BBB and Unrated	150bp

Source: The Treasurer, 24 October 2008.

Second, the Federal Government has also provided guarantees of State debt with the price of the guarantee rising both with a lower credit rating and with new (or marginal) borrowing (Table 4.2).

Table 3.2: Guarantee of State and Territory borrowing

Credit Rating	Fee (existing stock)	Fee (new issuance)
AAA	15 basis points	30 basis points
AA+	20 basis points	35 basis points

Source: The Treasurer, 12 May 2009.

Third, the Government also established a special purpose vehicle (SPV) to help provide wholesale financing to those motor vehicle dealers financed by two private financiers which exited the Australian market as a result of the global financial crisis. The SPV was established as a financing trust, with the joint support of the Government and the four largest Australian banks, to provide liquidity to car dealer financiers through the securitisation of eligible loans provided to car dealers. The expectation was that the SPV could be required for up to a year³.

There are differing views on when these measures will terminate, though the RBA clearly sees the first guarantee as a temporary response to the global financial crisis (see Appendix B).

³ RBA, Financial Stability Review, March 2009.

In setting the premiums on the bank guarantee the Government considered a range of factors. In particular:

“the premiums were set at a level that was between the then current market price – which was viewed as the product of very stressed conditions – and the price that was thought likely to prevail when more normal market conditions returned.”

If the premium is set too low then that would have encouraged “moral hazard” from banks – that is, they could borrow at a funding advantage where taxpayers wore the risk. In the current crisis, the Government set the premiums in recognition of the temporary market imperfections caused by “very stressed [financial] conditions”.

Such an approach has been supported on other occasions by a number of academic papers which state that, in the absence of market imperfections, the cost of capital for public projects should be the same as the cost of capital for comparably risky private ventures⁴.

There are hints that the premiums in Table 3.1 may be too low. The RBA Governor Glenn Stevens recently chided Australian banks for having been responsible for 10% of the entire world’s issuance of government-guaranteed bank debt over the past nine months (Appendix B). It is also evident in his comments:

“But the longer-term question is whether ... we would really want to keep moving in the direction of a world where the bulk of debt is government-issued or government-guaranteed. It seems to me that that could easily be a world in which investors end up being no more discerning about risk and return than the buyers of [collateralised debt obligations] a few years ago, and in which banks themselves ultimately rely on the guarantees to an inappropriate or even dangerous extent.”

The three measures mentioned above are of interest because they provide potential funding models for guaranteeing private pensions and provide examples of current Australian Government thinking in this area. The first and third models indicate very different levels of Australian Government involvement:

- The first – the deposit and wholesale funding guarantees provided to the banks – represents a minimalist approach from the Australian Government where the funding is channelled through existing private agents which pay a fee for the guarantee. This relatively hands-off role from the Australian Government is facilitated by the fact that these private agents are already closely regulated by APRA (just as providers of guaranteed lifetime annuities are subject to prudential regulation).
- The SPV approach has the Australian Government playing a stronger hands-on role in ensuring adequate funding (for car dealerships). A more hands-on role from the Government was probably needed because foreign-owned car dealership financiers were relatively unregulated, so a replacement financing vehicle needed to be built within the Government tent and a few highly supervised private players.

There would seem to be two messages here.

⁴ See for example, the research noted by Grant S and Quiggin J (2001) *Public investment and the risk premium for equity*, <http://www.uq.edu.au/economics/johnquiggin/JournalArticles03/EPEconomica03.pdf>.

First, if the Australian Government was to provide funding support in the form of guarantees for providers of private annuities then it would likely insist on maintaining very close supervision of private industry. That said, the existing supervision of this sector is already notable – a factor which has hampered the annuity market in Australia in the past (including high effective reserve ratios). If the Australian Government felt that current very close regulation was less desirable for some reason, then the Government might consider an alternative funding model where it took on the risk, but it minimised private sector involvement.

Second, industry could also expect to pay a premium that reflected the borrowing advantage that the Australian Government has as a result of its credit rating.

That said, for now the increased borrowing already announced by the Federal Government is unlikely to threaten the immediate sustainability or Australia's credit rating.

Adding the debt for other levels of government to the Federal debt, total government net borrowing rises to about 14.2% of GDP, which is below the 21.7% median AAA estimate published by Standard & Poor's (S&P) in February 2009.

Are the official estimates of the Commonwealth debt path likely to be accurate?

In one sense the debate over Federal Government debt projections is academic – debt will keep rising while deficits continue to linger, and the difficulty of substantially reining in spending in coming years suggests that there is a risk that the latter linger for longer than the official forecasts allow.

That said, some perspective is useful here.

There is the potential for net debt in Australia to move rather higher than the official forecasts allow. While that would still be rather smaller as a share of GDP than in most other developed countries (for example, the IMF predicts 80% net debt for countries such as the US, UK, Germany and France by 2014), the discussion in Section 3.4 below notes that there would be problems were Australia's net debt ratio to go over 60%.

3.2 Potential economic costs of increased public borrowing

An iron rule of economies is that "somebody pays".

Labelling as 'public' or 'private' borrowing does not change the inherent risk in the transaction, but only who bears that risk. Some of the costs of default risk can be covered by governments, but only at the cost of imposing those risks on other parts of the economy.

That makes creditors happy, as they are facing reduced risk, but it also has wider consequences.

To see this, it is useful to consider why markets show a strong preference for government debt over private borrowing.

The key reason behind that preference is a simple one – governments are generally seen as less likely to default on repayment of a loan than corporations.

That is because governments have unique advantages when it comes to avoiding default: they can force taxpayers to bear the costs of repaying a loan in the event of financial trouble.

Both of the above involve passing on some or all of the costs of repaying debt to taxpayers. Governments enjoy superior credit ratings to private firms in part because they have the ability to pass on the cost of servicing that debt to taxpayers.

Assuming taxpayers have the capacity to pay back debt, credit markets are not concerned by any potential costs associated with higher taxes, or reduced government spending. Such a transfer of costs is a key benefit for debt investors, who are only interested in recovering their money.

It does, however, come at a price – lower living standards for taxpayers and collateral damage to the economy as higher taxes discourage investment and workforce participation.

Indeed, to the extent that these external costs are not considered by ratings agencies, they reflect a key difference between the cost of capital as measured by the market, and the true ‘social’ cost of capital in the economy as a whole.

Where credit markets do not fully adjust to reflect the new state of government finances, this potential for ‘collateral damage’ (which is not reflected in borrowing costs as measured by credit markets) is making up the difference.

Or, in other words, any initial and apparent ‘savings’ on interest payments are likely to be matched by costs elsewhere in the economy over time.

Consider two economies:

- One has zero net government debt, and all private sector borrowings are subject to the full risk inherent in their underlying economic activities.
- The second economy is identical to the first, with the exception of a blanket government guarantee on all debt transactions, funded through a relatively efficient income taxation system.

The first economy faces credit defaults on occasion, which are absorbed as costs by creditors.

It therefore must endure a higher (pre-tax) private cost of capital to cover those risks.

The second economy has no such defaults, as all credit risk is borne by the government. This economy enjoys a lower (pre-tax) private cost of capital. Instead, all taxpayers face higher costs and the level of economic activity is also constrained by a higher tax burden.

The above example highlights the basic point that some of the costs of default risk can be covered by governments, but only at the cost of externalising the risks toward other parts of the economy. Creditors face reduced risk, but at the cost of wider consequences for all.

3.3 Is there a free lunch for the economy as a whole?

Hence the basic view in this area is that labelling something as public rather than private borrowing simply shifts costs rather than eliminating them.

Yet there may be a potential caveat to that basic view. If the world wants more Australian Government guaranteed debt than is currently on issue, then issuing more under this type of program would indeed offer a ‘free lunch’ of sorts to Australians if the Government were to borrow more in its own name (and the private sector less).

Markets like public debt – often with good reason. Even in the case of a serious default, governments have a habit of surviving. While companies disappear after defaulting on debts, governments often return to financial health and therefore to bond markets. This gives rise to ‘repeated game’ scenario – ensuring governments think much more seriously about default than companies do.

Moreover, given the currently limited supply of Australian Government backed debt, there may be an argument that there is a degree of excess demand for new issues of Commonwealth Government Securities (CGS).

However, if such a ‘free lunch’ is potentially on the table, there are other ways to eat it.

The Government could expand *gross* debt without lifting its *net* debt. This could be achieved by, for example, issuing debt in exchange for a portfolio of assets (similar to the existing Future Fund), or in exchange for matching debt from foreign governments.

This would expose taxpayers to greater financial risk, but would exploit the ‘good deal’ potentially available on CGS without the need for additional net debt.

Indeed, we may already be enjoying some of the benefits of this ‘free lunch’, as any excess demand would depress the cost of the existing CGS market – an advantage which would be diluted by new issuance.

3.4 What level of debt is sustainable?

It is clear that governments cannot borrow in perpetuity without affecting their long term fiscal sustainability.

As noted in the Federal Government’s *2007 Intergenerational Report*, accumulating debt is not a sustainable long-term solution, particularly in situations where budget deficits are expected to continue for a period of time, since at some point the debt needs to be repaid. In addition, the compounding effect of interest costs would see net debt rise very rapidly.

The IMF and World Bank have conducted extensive research into what level of debt is generally seen as sustainable.⁵ They conclude that, irrespective of what probability of debt distress is considered tolerable, the empirical evidence suggests that debt thresholds should be established in light of the quality of a country’s policies and institutions.

Table 3.3 presents this as an operational matrix, defining indicative policy-dependent debt limits based on the (rounded) results of Bank and Fund staff’s empirical analyses.

⁵ IMF and World Bank (2004) Debt Sustainability in Low-Income Countries—Proposal for an Operational Framework and Policy Implications, <http://www.imf.org/external/np/pdr/sustain/2004/020304.htm>.

While these thresholds are only indicative, they nevertheless provide a useful tool to indicate the point after which debt distress is more likely to eventuate. These limits are seen to provide a useful basis to guide future borrowing (and lending) decisions – perhaps with a conservative bias, given that the underlying NPV data in the empirical analyses are derived on the basis of historical discount rates.

It suggests that, for a country like Australia with strong institutions, a government debt in excess of 60% may become a worry in terms of sustainability.

- The IMF further recently commented that Australia is susceptible to downside risks such as falls in commodity prices, especially due to its relatively high level of external liabilities. By end 2008 net foreign liabilities for Australia were over 60% of income – though this includes private as well as public sector debt.⁶

Table 3.3: Indicative policy-dependent debt and debt-service thresholds (in %)

	Assessment of Institutional Strength and Quality of Policies		
	Poor	Medium	Strong
NPV of debt-to-GDP	30	45	60
NPV of debt-to-exports	100	200	300
NPV of debt-to-revenue	150	200	250
Debt service-to-exports	15	25	35
Debt service-to-revenue	20	30	40

Source: IMF and World Bank (2004).

3.5 Starting points for public finances

Given the discussion above, it is worthwhile examining the direct and indirect debt profile of the government as well as the broader costs of borrowing.

That is because there is a ‘caveat on the above caveat’. That is, even if markets have a degree of unmet thirst for Australian Government guaranteed debt as of today, there is less likely to be any such unmet demand in coming decades.

That is important because markets tend to be less forgiving of governments which already have higher debt ratios.

While Australia’s net public sector debt position is currently very strong relative to that of other developed nations, that strength is facing considerable pressure in both the short and long term:

- Short term, the Federal Budget is in deficit, and is likely to remain so for some time.
- Longer term, the intergenerational pressures associated with an ageing population threaten to produce significant primary deficits over coming decades.

⁶ IMF (2009) World Economic Outlook (WEO) - Crisis and Recovery, April 2009, <http://www.imf.org/external/pubs/ft/weo/2009/01/index.htm>.

Moreover, the range of emergency measures adopted during the global financial crisis mean that the contingent liabilities on the Federal Government's balance sheet have just ballooned.

Other things equal, the deterioration now underway in the current and future creditworthiness of Australian Governments adds to the reasons to believe that there is no economy-wide 'free lunch' to be had in the Federal Government directly selling annuity products to Australians.

3.5.1 Direct debt

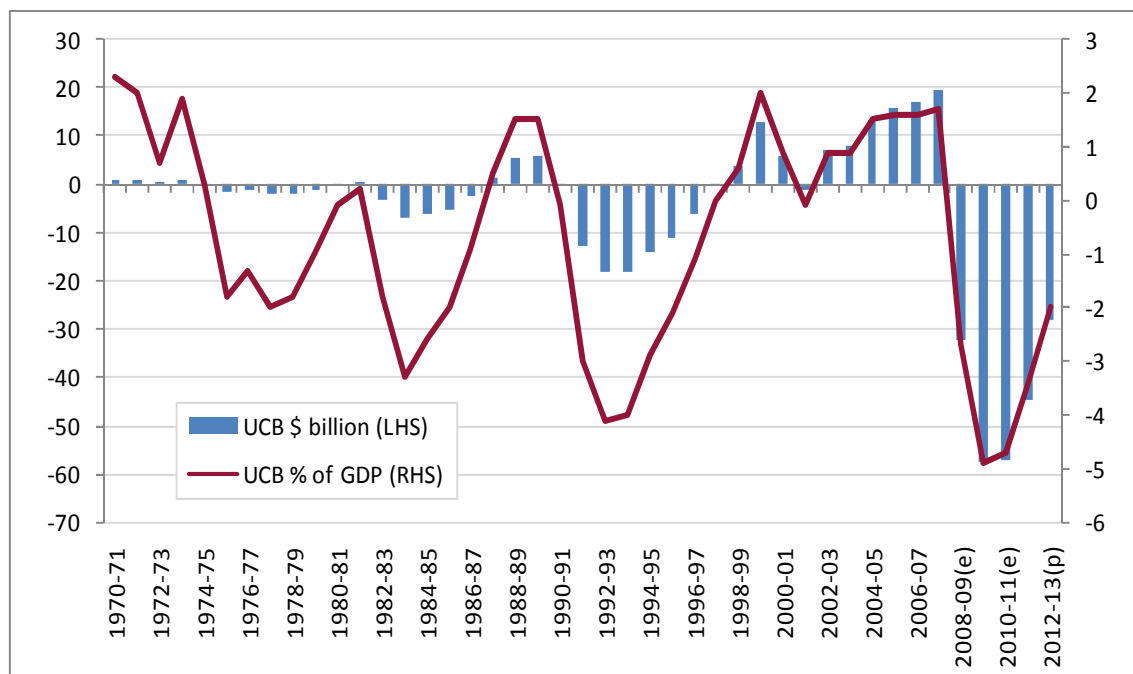
The 2009-10 Budget highlighted a marked turnaround in Federal Government finances:

- The 2008-09 Budget forecast underlying cash surpluses of around \$80 billion from 2008-09 to 2011-12.
- In contrast, this Budget predicts deficits totalling \$191 billion over the same period – a turnaround of \$270 billion. The deficit for 2009-10 is \$57.6 billion or 4.9% of GDP, larger than the previous peak of 4.1% in 1992-93 (and the peaks in the 1970s and 1980s).

As the global financial crisis hit in late 2008, government revenues were greatly reduced while there was more call on government spending – both through automatic stabilisers (such as more unemployment benefits) and through discretionary spending which aimed to prop up falling private economic activity.

The deterioration in revenue means that the Government is now borrowing notably.

Figure 3.2: Official forecasts of the underlying cash Budget (UCB) balance

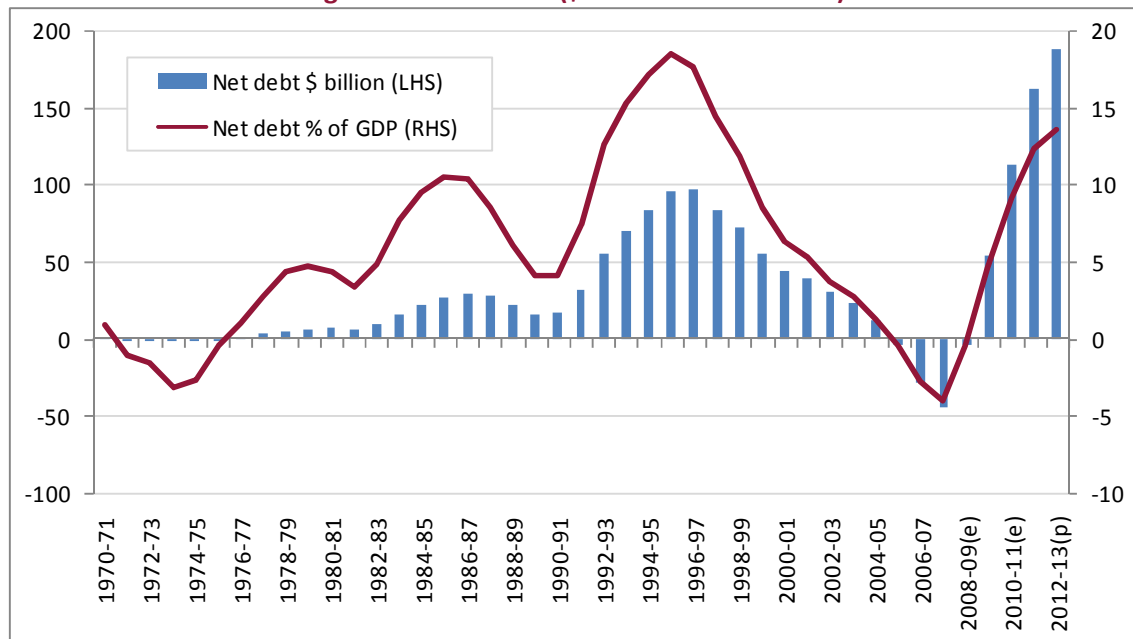


Source: Commonwealth 2009-10 Budget Paper 1, Statement 10.

The result is borne out in Figure 3.3, which sees net debt at \$188.2 billion or 13.6% of GDP by 2012-13. (Since the Budget the Government has noted it estimates net debt to return to zero

by 2022.) The total stock of Commonwealth Government Securities (CGS) on issue at 30 June 2010 is projected to be \$169.9 billion, an increase of \$58.0 billion on 30 June 2009.

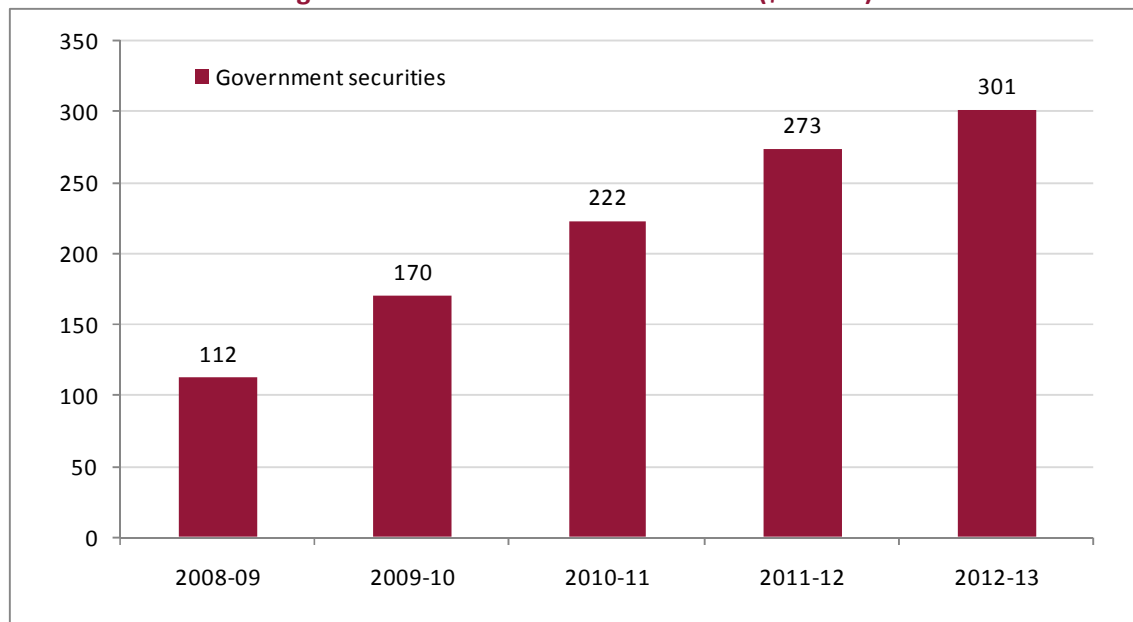
Figure 3.3: Net debt (\$ billion and % of GDP)



Source: Commonwealth 2009-10 Budget Paper 1, Statement 10.

On official forecasts, the total stock of CGS on issue (which is a proxy for gross government debt) is expected to peak at \$301 billion by 2012-13 (over 20% of GDP). It is likely that this elevated level of debt will be with Australia for some years to come.

Figure 3.4: Government bond issuance (\$ billion)



Source: Commonwealth 2009-10 Budget Paper 1, Statement 9.

3.5.2 Broader or contingent liabilities

In addition to the sizeable direct debt the Federal Government has taken on board in the wake of the global financial crisis, there has also been an increase in indirect or contingent liabilities

Contingent liabilities represent possible costs to the government arising from past events or decisions which will be confirmed or otherwise by the outcome of future events that are not within the Government's ability to control. They include loan guarantees, non-loan guarantees, warranties, indemnities, uncalled capital and letters of comfort. These possible costs are in addition to those recognised as liabilities in the consolidated financial statements of the Australian Government general government sector.

The government reports on its significant contingent liabilities in general terms as part of its *Statement of Risks* released with the Budget. Many contingent liabilities are not quantified – for example, the guarantee on State borrowing. Further, items that are quantifiable generally have a relatively remote chance of actually occurring. Nevertheless they should be taken into account when looking at the overall borrowing and debt exposure of the government.

Table 3.4 below provides an overview of the contingent liabilities the Federal Government is exposed to where approximate values could be obtained. The recent economic turmoil associated with the global financial crisis has added markedly to these contingent liabilities mainly as a result of guarantees of bank deposits. **The result is quantified contingent liabilities of around \$930 billion at present. This is around 78% of GDP in 2009-10. When outstanding gross debt is taken into account together with the contingent liabilities, this takes the total government potential exposure to over 90% of GDP in 2009-10.**

Table 3.4: Summary of significant contingent liabilities

Liability	Approximate amount (\$ billion)
Attorney-General's	
Indemnities relating to the Air Security Officer program	\$2.0
Defence	
Defence and Defence Materiel Organisation - Indemnities	\$3.2
ASC Pty Ltd — Australian Government indemnities provided to Electric Boat Corporation under the services agreement	\$0.0
Litigation cases	\$0.1
Finance and Deregulation	
Australian Industry Development Corporation - Guarantee	\$0.1
Litigation	\$4.3
Sale of Sydney Airports Corporation - Indemnity	\$0.5
Foreign Affairs and Trade	
Export Finance and Insurance Corporation - guarantee	\$3.0
Health and Ageing	
Guarantee Scheme for aged care accommodation bonds	\$7.7
Medical Indemnity Exceptional Claims Scheme	\$0.0
Human Services	
Medicare Australia litigation	\$0.1
Immigration and Citizenship	
Systems development — liability limit	\$0.2
Infrastructure, Transport, Regional Development and Local Government	
Code Management Company — indemnity	\$0.1
Innovation, Industry, Science and Research	
Liability for damages caused by Kistler space activities	\$2.2
Liability for damages caused by space activities	\$3.8
Treasury	
Guarantees under the Commonwealth Bank Sale Act 1995	\$5.3
International financial institutions - Net Liability	\$8.7
Reserve Bank of Australia — guarantee	\$77.0
Standby loan facility for the Government of Indonesia	\$1.5
Australian Business Investment Partnership	\$26.0
Car dealer financing — OzCar	\$0.6
Financial Claims Scheme - Deposit guarantee	\$650.0
Guarantee of deposits in authorised deposit-taking institutions	\$19.7
Guarantee of wholesale funding of authorised deposit-taking institutions	\$104.1
Terrorism insurance — commercial cover	\$10.0
Total	\$928.0

Source: Commonwealth 2009-10 Budget Paper 1, Statement 8.

4 Conclusions and implications

Given the direct and indirect costs of government borrowing, it is unclear that the public sector has or will continue to have a cost of capital advantage over the private sector:

- Such a conclusion is supported by a number of papers which state that, in the absence of market imperfections, the cost of capital for public projects should be the same as the cost of capital for comparably risky private ventures.⁷
- Such a conclusion is further likely to hold even more over the long run as other fiscal pressures like health and aged care come to pass and increase their call on government borrowing. These pressures will be most pronounced at precisely the time that a greater call on government resources would be needed to militate against longevity risk arising from an ageing population.

The government is in a position to manage default risk to the benefit of specific creditors, but that management comes at a cost.

That applies not only to the direct borrowings of the government, but also to any private borrowings sheltered under a government guarantee.

That raises the possibility of the key beneficiaries of a government guarantee (private borrowers and lenders) paying a fair price (through a levy arrangement) for the insurance provided by the government guarantee.

Note that in the case of a universal guarantee, this would result in no change to the overall cost of capital in the economy – only a shifting of risk away from less credit-worthy pursuits toward those with less inherent credit risk.

⁷ See Grant S and Quiggin J (2001), op cit.

Appendix A: Government Guarantees on Deposits and Wholesale Funding

Source: RBA, Financial System Review, March 2009

On 12 October 2008, the Australian Government announced guarantee arrangements for deposits and wholesale borrowing, following similar announcements in some other countries. Further details of these arrangements – including the announcement of a guarantee fee on large deposits – were released on 24 October following advice from the Council of Financial Regulators. These arrangements were designed to support confidence of depositors in authorised deposit-taking institutions (ADIs) and to help ensure that these institutions continued to have access to capital markets and were not disadvantaged compared to banks in other countries where guarantee arrangements had been announced.

The guarantee on deposits is provided under two schemes, the Financial Claims Scheme and the Australian Government Guarantee Scheme for Large Deposits and Wholesale Funding (the Guarantee Scheme).

Under the Financial Claims Scheme, total deposit balances up to and including \$1 million per customer held in eligible ADIs – Australian-owned ADIs and Australian-incorporated ADIs which are subsidiaries of foreign-owned banks – are automatically guaranteed by the Australian Government without charge. The Financial Claims Scheme is estimated to cover the entire deposit balances of over 99 per cent of depositors (by number) with eligible ADIs, as most depositors have relatively small balances.

For customers with total deposit balances over \$1 million at a single eligible ADI, the ADI can access a government guarantee for that portion of the balance over \$1 million through the Guarantee Scheme. To do so, the ADI must apply to the Scheme Administrator (that is, the Reserve Bank of Australia as agent for the Government). The ADI application must include details of the accounts on which the guarantee may be made available, and an undertaking to meet other conditions, including the payment of a risk-based monthly fee by the ADI on the amounts guaranteed. This fee is the same as that applying to wholesale funding (see below). Customers are not obliged to have the guarantee apply to the portion of their total deposit balances over \$1 million, and the fee only applies to the amount of each customer's total deposits above \$1 million that is guaranteed. In most cases, ADIs recover the fee from depositors.

Deposits with foreign bank branches are not guaranteed under the Financial Claims Scheme, given that branches are not locally incorporated entities and independently capitalised in Australia, but are instead part of the foreign bank incorporated overseas. Foreign bank branches are eligible to participate in the Guarantee Scheme, though there is no fee-free threshold and additional conditions apply. For example, approval requires an attestation that the parent bank is meeting prudential requirements in its home jurisdiction, and there are limits on the term and quantity of guaranteed liabilities based on the branch's liabilities outstanding prior to the Guarantee Scheme's introduction. The foreign bank branch must also undertake that the funds will not be used to directly support the parent bank.

The Financial Claims Scheme became effective on 18 October and the Guarantee Scheme became operational on 28 November. A temporary guarantee had applied from 12 October,

while the relevant legislation was being passed for the Financial Claims Scheme and the rules and operational infrastructure of the Guarantee Scheme were being established. Deposit guarantee arrangements will remain in place until 12 October 2011, ahead of which the Government intends to consider subsequent arrangements. The Government noted in its announcement that the Guarantee Scheme would be reviewed on an ongoing basis and revised if necessary.

Eligible ADIs are also able to apply to have their new and/or existing eligible wholesale funding securities guaranteed, for a fee, under the Guarantee Scheme. The guarantee for wholesale funding will operate until market conditions normalise and is subject to the same review procedures as for deposits. As with the guarantee for large deposits, access to the Guarantee Scheme is voluntary and subject to an approval process. A fee is payable on all guaranteed liabilities, with the fee levied monthly. While the same fee applies regardless of the term of the security, fees vary with the credit rating of the ADI.

Only senior unsecured debt instruments of a non-complex nature issued by ADIs are eligible for the guarantee. Eligible ADIs can choose to apply for the Government guarantee for particular securities, or programs, and have other securities unguaranteed. For short-term liabilities, eligible instruments are bank bills, certificates of deposit (including transferable deposits), commercial paper and certain debentures, with maturities up to 15 months. For long-term liabilities with terms to maturity of 15 months up to 60 months, eligible instruments are bonds, notes and certain debentures. Foreign bank branch access to the Guarantee Scheme for wholesale funding involves the same additional conditions and restrictions as outlined for deposits.

Explicit deposit insurance schemes have been common overseas for many years. Faced with the situation of heightened uncertainty and declining confidence in late September/early October 2008, a number of governments around the world responded by increasing the monetary cap on the amount of deposits guaranteed under such schemes. For example, in the United States, the cap on insured deposits with eligible institutions was increased temporarily from US\$100,000 to US\$250,000, while the minimum cap required in European Union (EU) countries was increased from €20,000 to €50,000. Some EU countries including Austria, Denmark, Germany and Ireland went further by providing a guarantee over all deposits, introducing unlimited caps. Most countries that introduced unlimited caps nominated a set period for the arrangements to apply, typically around two years.

Around the same time as they extended deposit protection arrangements, many governments also provided guarantees over wholesale funding, partly in response to the Irish Government's decision to do so. The details of the individual schemes vary considerably across countries, although the EU countries agreed to common principles so the approaches they have adopted are fairly similar. While most governments, both within the EU and outside, that provided support to wholesale funding markets did so by allowing private financial institutions to issue government-guaranteed debt, the approach taken in Austria and France differed in that a separate state-controlled agency was established to raise funding, which is then available to be on-lent to eligible private financial institutions.

The fees charged for the government guarantees on wholesale funding are typically based on the credit rating of the issuer (Australia, Canada and New Zealand), or credit default swap premiums (France, the Netherlands, Spain and the United Kingdom). In contrast, in the United States the fee charged is dependent on the term of the instrument but not the rating of the

issuer. The fee structure adopted in the Netherlands and New Zealand also depends partly on the term of issuance. In a number of countries, including Canada, New Zealand and the United Kingdom, the fee has been revised lower from initial settings, while in the United States it has been revised higher.

Most governments other than Australia's nominated a set deadline for the availability of the guarantee. While the EU guidelines permit schemes that accept applications for up to two years, the EU countries generally set an application deadline of the end of 2009. In Canada, the United Kingdom and United States, considerably shorter periods were set, though in each case the application cut-off date has since been extended, to the end of October 2009 in the United States and to the end of December 2009 in Canada and the United Kingdom. The instruments eligible for the guarantees generally were limited to a maturity of up to three or five years.

As in Australia, governments have typically restricted the offer of a guarantee to senior unsecured debt instruments that are non-complex in nature. They have also restricted the guarantee to debt issued by certain financial institutions. For example, in Ireland, the Netherlands and the United Kingdom, the guarantee is only available to those institutions that have a significant presence in those countries' financial systems. In the United Kingdom, eligibility is also dependent on an institution having raised, or planning to raise, Tier 1 capital by a certain amount, either by government subscription or from other sources.

Appendix B: Challenges For Economic Policy

Glenn Stevens' address to the Anika Foundation Luncheon, Sydney – 28 July 2009 (extract)

Part of the way ahead will, at some point, involve winding back the extensive government guarantees (and in some cases extensive public ownership) of financial institutions around the world. These measures were necessary last October in the extreme uncertainty of the time, and played a critical role in stabilising confidence in the core of the financial system, and re-opening key capital markets. But they are undesirable as a permanent feature of the landscape. Countries that issued very generous or even unlimited guarantees of deposits will want to make sure such steps truly were emergency measures, by scaling them back to a more sustainable set of deposit insurance arrangements. Likewise, it would be desirable that guarantees for wholesale raisings in capital markets lapse into disuse as conditions improve.

To date, in excess of US\$800 billion of government-guaranteed debt has been issued in public markets by banks around the world. An unknown additional sum has been placed into private hands directly. Taking account of the additional debt governments are issuing for regular fiscal purposes, plus the funding for bank rescue packages, the shape of global capital markets is changing significantly. Government and government-guaranteed debt of one form or another is rapidly increasing globally. This has been accommodated so far because it has, by and large, matched investors' shifting risk preferences. Certainly people will worry, longer term, about increases in long-term interest rates potentially 'crowding out' private borrowers. To date, though, long-term rates remain historically pretty low for public borrowers, despite the prospect of very large debt issuance. They have increased somewhat, but this is best understood as an unwinding of the extreme risk aversion of 2008 and early 2009.

But the longer-term question is whether, even without adverse effects on borrowing costs, we would really want to keep moving in the direction of a world where the bulk of debt is government-issued or government-guaranteed. It seems to me that that could easily be a world in which investors end up being no more discerning about risk and return than the buyers of CDOs a few years ago, and in which banks themselves ultimately rely on the guarantees to an inappropriate or even dangerous extent. More generally, while some countries do need significant regulatory reforms in the financial sector, do we want to throw away the genuine advances of risk management and globalisation of the past generation?

Surely the better world for the decades ahead is one where a global financial system, having been stabilised at a time of crisis by public intervention (at major cost to shareholders and incumbent managers as well as taxpayers), plays its proper role of capital allocation and risk management. To be sure, it failed to perform as promised in the recent past. But it would be preferable, in my judgement, to work at making the system more effective in doing that job, than to retreat into the financial repression of an earlier state of the world. The banks of the United States and Europe are starting down this path on their wholesale issuance, having recognised that it is in their own interests to do so. It would make sense for Australian banks, which have accounted for 10 per cent of global issuance of government-guaranteed bank debt over the past nine months, to step up their efforts to do likewise.

August 2009



CDC

THE RATING OF AUSTRALIA AND THE PROPOSAL FOR PUBLIC PROVISION OF ANNUITIES

The implications for Australia's credit rating of the introduction of
public provision of annuities as part of retirement income policy
A Report by Chris Dalton Consulting Pty Ltd

The Rating of Australia and the Proposal for Public Provision of Annuities

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1. About CDC Pty Ltd

Chris Dalton Consulting Pty Ltd (CDC Pty Ltd) is a boutique credit risk research and advisory firm. This report has been compiled by the following senior consultants:

Chris Dalton, Director, B.Ec (Monash), MBA (Melbourne Business School), MAICD, FFTA, MAIST

Chris is the Chief Executive Officer of The Australian Securitisation Forum, the peak industry association for participants in Australia's securitisation. He is also a Director Trustee of the Emergency Services and State Superannuation Fund, a 150,000 member exempt public sector super fund. Prior to these roles Chris was the Country Head of Standard & Poor's (S&P). This role had responsibility for the management of S&P's credit ratings, risk solutions, managed fund research, index services and financial data and information businesses in Australia and New Zealand. Chris joined S&P in 1990 and successfully established Standard & Poor's as the leading ratings agency of mortgage and asset-backed securities. In 1997 Chris was awarded a McGraw-Hill award for management excellence and spent 3 years in New York in senior management of the global structured finance group. Prior to joining S&P he held roles in corporate banking, treasury, technology and auditing with Elders Finance & Investment Company Ltd, Shell Australia Ltd and Coopers & Lybrand

Louise Griffiths, Consultant, B.Ec (Sydney University), GAICD

Louise has over 20 years experience in finance and credit risk assessment with a focus on government owned entities, infrastructure and risk consulting. Louise joined Standard & Poor's in 1993, and initially lead the infrastructure finance rating team and focussed on assessment of sovereign and sub-sovereign credit risk including local governments, government owned businesses, utilities, transportation infrastructure, public private partnerships and project financing in Australia and New Zealand and emerging Asian markets. In 2001 Louise established S&P's risk consulting business in the Asia Pacific region, providing risk consulting advice to financial institutions. Prior to her 15 years with Standard & Poor's, Louise worked with the Victorian Department of the Treasury on financial policy around state regulated non-bank financial institutions, state owned financial institutions and government borrowing agencies.

2. Executive Summary

1. The number of Australians aged between 60 and 74 will be double the number of people aged 25 to 39 by 2014 and eclipse the 10 to 24 year age group by four times¹. Ageing and longevity risks are significant risks to government finances. The recent Global Financial Crisis (GFC) has exacerbated the problem. The IMF estimates that for advanced economics that for the period to 2050, the fiscal burden of the GFC will be about 10% of aged related costs. The other 90% will be extra spending on pensions, health and long term care. The need for policy change to address this in Australia is urgent.
2. In an increasingly globalised economy the long term rating of the Commonwealth of Australia is critically important for governments, banks and corporates to access capital in global markets. Credit rating analysts can be expected to positively view pro-active measures to address the ageing and longevity risks facing Australia. The proposal for private sector annuities as part of a revised retirement income policy could be expected to be viewed positively as a policy change that limits the future call on the public purse from retirees.
3. Ratings agencies look for a demonstration of willingness by governments to address emerging fiscal issues, as well as evaluating the government's current fiscal strength and flexibility. Australia's current rating benefits from the proactive policy of superannuation where the working population can build up retirement assets and potentially lessen the potential call on the public purse for pensions.
4. A downgrade or move from a stable to negative outlook of the rating would be a signal of deterioration in the creditworthiness of the Australian Government which would cause global investors to re-price its risk premium and or ration investment in the Australian economy.
5. Forecasts by rating agencies indicate the cost pressure of the ageing population and longevity risk will become a serious budgetary matter by 2020, less than three elections away.
6. Analysis by Standard & Poor's indicates a status quo approach to the ageing and longevity risks could result in Australia's rating being downgraded to the 'AA' category by 2020 and even reach sub-investment grade by 2050.
7. The Government has acknowledged the significance of the ageing and longevity risks. The former government led the creation of the Intergenerational Reports specifically addressing the issues² of retirement incomes policy, demographic change, health and aged spending along with climate change and water are highlighted by the current Federal Government as the key long-term policy issues³ Australia faces.

¹ Residential Development Council "Australia on the Move" report July 2009

² Australian Government, 2002, Budget Paper No. 5, *Intergenerational Report 2002-03*, Commonwealth of Australia, Canberra. And, Australian Government, 2007, *Intergenerational Report 2007*, Commonwealth of Australia, Canberra

³ Kevin Rudd "The Road Ahead" , *The Age*, 25 July 2009, page 5

8. While the issues of an ageing population and longevity risk will manifest themselves over the longer term, failure to address them now will increasingly weaken Australia's fiscal position and is likely to place pressure in coming years on the rating of Australia. Acting now will be easier than addressing this problem in 10 years time when the proportion of the voting population reliant (or soon to be reliant) on age-related services including the age pension will have increased.
9. Australia's relatively high degree of pensioner poverty reduces the Government's political flexibility to cut age-related expenditure to limit the increasing costs of ageing and longevity.
10. The proposal to adopt a comprehensive annuity scheme as part of the Government's retirement income policy will be seen by ratings analysts as being a proactive and efficient policy to limit the future impact on Australia's public finances. It would create a competitive and diverse domestic annuity market and avoid the problem of adverse selection which has been a major structural impediment to the development of voluntary annuity markets.
11. If the Government was to step in as a direct provider of annuities this would reverse a rating positive trend which has seen successive Australian Governments seek to transfer commercial risk to the private sector e.g. sale of Housing Loans Insurance Corporation and Commonwealth Bank of Australia.
12. Ratings agencies would be likely to view negatively a proposal for the Government to either directly or through the Future Fund (or similar structure) enter the financial services market to provide annuity products. Such a policy would increase the Government's balance sheet and indicate to rating agencies both a higher contingent risk exposure as well as a higher risk tolerance by the Government.
13. Direct Government provision of annuities is likely to significantly distort financial markets and asset prices in a small economy such as Australia's.
14. Government can play a very important and beneficial role in growing the annuity market by providing the regulatory framework in which the market can operate and safeguard the interests of annuity holders. Further it can benefit the market by issuing long dated and inflation indexed bonds for annuity providers to use in matching assets and liabilities. It would be sub-optimal for the Government to devote its resources to the direct provision of annuities when it could provide tremendous assistance through setting and aiding the mechanics of a competitive and innovative market and transfer risk to private annuity providers.
15. The private sector with its mix of local and global financial services firms, that already possess the required product risk and administrative infrastructure, coupled with the existing strong and comprehensive regulatory regime would be considered by rating agencies to be better placed from a risk perspective to operate and provide an expanded annuity scheme.
16. The prospect of a large annuity market is likely to attract new global financial services firms to Australia which would complement Australia's ambition to be a major financial centre.
17. The qualitative implications of having the private sector provide annuities is likely to be very highly regarded by the rating agencies as they seek an indication from the Government of how it will deliver on the near term recovery of the Government's balance sheet following the impact of the GFC as well as address longer term and ageing longevity obligations.

3. Factors Affecting the Rating of Australia

3.1 Current Sovereign Credit Ratings of Australia

The Commonwealth of Australia holds extremely high credit ratings, reflecting high quality, extremely strong creditworthiness with minimal credit risk. The major rating agencies, Standard & Poor's (S&P) and Moody's Investor Services (Moody's), rate the Australian Commonwealth at the highest level ('AAA'/'Aaa') for both local and foreign currency ratings. Fitch Ratings (Fitch) has rated Australia's foreign currency rating at one notch below the highest level, at 'AA+', reflecting a slightly harsher view on the level of foreign indebtedness in Australia.

Table 3.1 Commonwealth of Australia Credit Ratings

	Moody's Investors Service	Standard & Poor's Ratings Agency	Fitch Ratings
Foreign Currency			
Long term	Aaa	AAA	AA+
Short term	P-1	A-1+	F1+
Outlook	Stable	Stable	Stable
Local Currency			
Long Term	Aaa	AAA	AAA
Short term	P-1	A-1+	F1+
Outlook	Stable	Stable	Stable

Source: S&P, Moody's, Fitch

The rating reflects an assessment of a range of factors from political stability, the institutional framework of the economy, the near term outlook for the economy and the fiscal position including the balance sheet of the sovereign. In Australia's case there are a number of positive fundamental factors supporting the high investment grade foreign currency rating.

Factors such as the small size of the Australian economy and its dependence on overseas capital to fund the current account deficit are characteristics that introduce vulnerability to the rating of the Commonwealth.

Despite the slight differences in foreign currency ratings, the three agencies generally agree on the strengths and weakness of the Commonwealth of Australia and have not changed ratings as a result of the global recession, credit rationing, increased contingent liabilities from guarantees of the banking sector, and the fiscal stimulus measures of the recent budget.

Key strengths from a credit rating agency perspective can be summarised as the following.

- Open trade policies, free-floating exchange rate, and a market orientated regulatory regime that provide a favourable environment for growth.
- A local economy that continues to show resilience to global slowdowns despite exposure to volatile agriculture and mining sectors.
- While near-term trends are not positive with deficits projected to continue beyond 2013, a history of long-standing fiscal prudence and previously strong budgetary position underlies expectations that **fiscal discipline will return over the medium term**.

- Low levels of general government debt - well below medians - provide a degree of fiscal flexibility. The rapid rise forecast in Commonwealth Government net debt over the near term is manageable due to a low starting point.
- Strong institutional frameworks with high levels of political consensus, strength and conservatism of Australian banks and banking system, and a well-developed domestic capital market.

Risks cited by rating agencies to the rating focus on two key areas.

- Persistent and widening current account deficits and heavy net external indebtedness well above median ranges for rating category, leaving Australia exposed to shifts in international confidence. Within this, high levels of household indebtedness are particularly noted by Fitch, which has Australia one notch below its highest rating.
- **Rising social welfare spending and risks of long term shift in budget balances to address costs of an ageing population.**

Importantly, the level of conviction that each rating agency has on the ability of the government to deliver budgeted outcomes is an overriding qualitative factor in the rating consideration. This assessment is akin to the evaluation of a company's board and executive management's discipline and appetite for business and financial risk that is conducted by rating analysts when assigning a corporate bond rating.

While the agencies each have broadly consistent sovereign rating criteria, each references slightly different key ratios. Each agency may factor in slightly different assumptions underlying their calculations of these ratios, and the financial data they publish are derived from each agency's proprietary database and may not be highly consistent. The general thrust of the analysis are consistent and support the view that it is qualitative rather than quantitative considerations driving the ratings, especially at this highest rating level.

Table 3.2 provides the key ratio's published by Moody's in their May 2009 report on the Government of Australia.

Table 3.2 Selected Indicators

	2004	2005	2006	2007	2008	2009f	2010f
Real GDP Growth	3.9	2.8	2.7	4.2	2.4	-1.1	0.8
Inflation	2.3	2.7	3.3	3.0	4.3	2.5	2.5
General Government Balance/ GDP	1.1	1.5	2.0	0.7	1.8	-2.4	-2.8
General Government Debt/ GDP	17.0	16.7	16.1	15.4	14.9	16.4	16.6
General Government Revenues/ GDP	47.1	46.1	44.6	43.5	41.9	48.2	48.5
Current Account Balance/ GDP	-6.1	-5.8	-5.3	-6.3	-4.2	-5.2	-4.8

Source: Moody's Investor Services⁴

⁴ "Government of Australia" Credit Opinion, Global Credit Research, Moody's Investor Services, 5 May 2009

3.2 Sovereign Criteria

A complex range of quantitative and qualitative analytical factors are combined in the determination of a sovereign's ability and willingness to repay its debt obligations on time and in full. Sovereigns by their very nature are different to other borrowing entities. There may be a point where a sovereign government will decide that the political, social, and economic costs of paying a debt are higher than not repaying that debt. There is no way to compel a sovereign to repay debt or to recover debt by handing over assets. Given ratings measure both the ability of a sovereign to repay debt and its willingness, a heavy weighting on qualitative factors is incorporated into the assessment.

Ratings are forward looking measures, so the rating committee heavily weights trends and potential developments including political risks and economic shocks in forming a forward looking view of debt servicing capability.

A government's medium term plans are scrutinised alongside independent forecasts. The interaction between public sector finances, external debt and a range of other variables including export growth, asset quality in the banking system and potential changes in local or overseas interest rates are considered. Strong policy responses to emerging issues are critical to maintaining credit quality in the face of negative trends, and a robust policy framework is crucial for strengthening both the economic environment and sovereign creditworthiness.

It is important to note, that despite the publication of a range of key ratios for each sovereign and in some cases median ratios for various credit rating levels, quantitative analysis does not drive credit rating outcomes. Long Term credit ratings focus on the medium term and within that timeframe, movements of key ratios compared to history and past forecasts are a better indicator of ratings outcomes than comparisons to data of other countries and median ratio measures.

Each of the ratings agencies published separate criteria that describes their approach to rating sovereign governments. While each has a slightly different emphasis in the way they describe their approach, the key factors are broadly similar and the ratings outcomes are generally synchronised. The key rating factors can be grouped as

Resiliency to Withstand Shocks

- Political Risk & Institutional Strength
- Economic Structure
- Economic Growth Prospects

Government Fiscal Discipline

- Fiscal Flexibility
- General Government Debt Burden
- Contingent Liabilities
- Monetary Flexibility
- External Liquidity
- External Debt Burden

Attachment 1 provides a combined summary of the key ratings factors of the three agencies and Attachment 2 is an overview of S&P's sovereign rating criteria.

A note on sovereign credit ratings

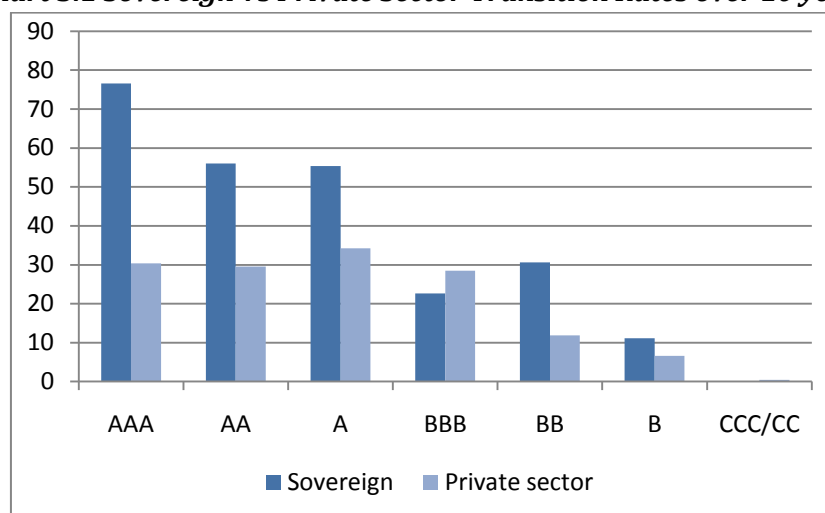
While credit ratings attempt to be “absolute” measures of the probability of default (and in some cases recovery), sovereign credit ratings are considered more as a “relative” measure of credit quality. Corporate default ratings can be quantified on something close to an absolute scale based on many years of data, over economic cycles, across large numbers of rated entities to determine how accurately these ratings predict default.⁵ Without this data it should be noted that there is a higher degree of relativity in a sovereign rating than a corporate bond rating.

However, this does not necessarily dictate that there will always be sovereigns rated at the ‘AAA/Aaa’ level. Not so long ago, there were a significant number of international banks rated at the highest ‘AAA/Aaa’ level. Even before the Global Financial Crisis (GFC), there were very few banks at this level, and now in the post GFC environment it could be argued most major international banks would have speculative grade ratings if it were not for sovereign government support. Likewise General Electric Corporation has lost the ‘AAA/Aaa’ credit rating it held since 1956. It is hard to imagine how many corporates or banks could ever again have the market and credit strength required to sit at the ‘AAA/Aaa’ level. Likewise it is therefore not impossible to envisage there being no or very few sovereigns rated at the ‘AAA/Aaa’ level within 20 years. Those developed countries who had previously occupied this space, will be dealing with the significant constraints of ageing demographics. Those countries without the demographic bulge ahead of them, generally do not yet have the track record of resilient and diversified economies and stable politics and institutions to attain the ‘AAA/Aaa’ level.

While not explicitly stated, ratings stability is an important consideration when rating sovereigns, especially with regard the impact they have on the private sector and government ratings within each country. The ratings agencies all state their aims of looking through economic cycles to determine an underlying position.

Chart 3.1 on the next page compares rating transition data for sovereign ratings versus private sector ratings at the same category. **Over a ten year period, sovereign ratings display a significantly higher degree of stickiness than private sector ratings.** After 10 years, over three quarters of sovereign ‘AAA’ ratings are still rated ‘AAA’ whereas only a third of other ratings are still at this high level. This supports an argument that rating agencies are extremely reluctant to change sovereign ratings, especially at the highest levels. This does not mean that sovereign ratings are not changed, but it would appear there has to be overwhelming weight of factors for consideration to be given to rating changes.

⁵ Default is defined generally as the failure to meet payments on time and in full as specified in the loan or bond documentation. IN the absence of a specific definition, the Basel II definition of 90 days past due is the generally excepted measure.

Chart 3.1 Sovereign Vs Private Sector Transition Rates over 10 years

Source: Standard & Poor's

3.3 Why are Foreign Currency Ratings Different to Local Currency Ratings?

Local currency ratings reflect the sovereign's ability and willingness to repay debt denominated in the domestic currency. A sovereign's ability to repay its debt on time reflect the ability to raise additional taxes, cut costs, liquidate assets or obtain financing from the central bank. Each of these measures has possible downsides including dampening growth, depleting productive national resources, and fuelling inflation and social discontent. Each government therefore undertakes a cost benefit analysis of repaying versus rescheduling debt and this willingness to repay debt must be factored into creditworthiness considerations.

In assessing the risks in repaying sovereign debt denominated in foreign currency, the ability of the government to access foreign reserves either held with the central bank or convert currency through the foreign exchange market in a timely fashion must be evaluated. This factor may not always be in the direct control of the sovereign government. In a country with a high capital account deficit driven by high private sector foreign currency debt, lack of confidence amongst global investors or the foreign exchange market may lead to a currency crisis.

The sovereign's own foreign currency debt levels would increase and foreign currency reserves may already be depleted. As a result the entire country's external position must form part of the analysis. Monetary flexibility and geo-political risk are considered by the ratings agencies as the most significant factors that drive a difference between local currency and foreign currency ratings. Australia's current level of private sector external debt and its associated funding and rollover risks leave Australia's foreign currency rating subject to a change in sentiment among global investors.

4. The Significance of Longevity Risk in the Rating of Australia

4.1 Longevity Risk - Ratings Agency Considerations

The impact of changing demographics on sovereign government's creditworthiness is widely acknowledged as the greatest challenge facing global public finance. While current commentary focuses on the impact of the GFC, the cost of protecting the various banking systems, and the impact on sovereign budgets of fiscal stimulus measures, the issue of longevity will persist after these issues have been digested. And unlike the unpredictable nature of global recessions or localised impact of war, almost all developed economies will be affected by this well understood and highly predictable change.

Moody's view a government's ability to increase pension contributions, postpone retirement age and lower pensions as important tools in the management of public finance liabilities. Views of the resilience of a government's fiscal position reflect in part the ability and willingness of a government to take these steps and other expenditure reduction steps in order to reduce the impact on budget deficits. Fitch looks for a robust and cohesive macroeconomic policy framework that incorporates the management of these key risks to government.

S&P has undertaken by far the most extensive analysis of the rising longevity risk and the impact of this megatrend on ratings over the longer term. In the years of 2004, 2005, 2006 and 2007, it published global graying reports which attempted to quantify the size of the challenge facing sovereign governments by the ageing population⁶.

S&P produced estimates of the increased spending on age-related services resulting from increased dependency ratio's arising from demographic modelling. Under a scenario where there was no significant change to current government policy, S&P estimated the increase in age related spending and the impact on government fiscal indicators. Assuming the increasing age-related deficits were funded by new debt, S&P then estimated the impact on sovereign ratings over the next 40 years.

S&P acknowledge changes would initially be slow, deficits averaging around 4% of GDP in the mid 2020's (for a selection of developed economies), would increase to around 6% of GDP by 2030 and 14% by 2050. For the same sample, the initial impact on net debt would be modest until around 2015, increasing thereafter to rise from just above 30% of GDP in 2015 to 80% of GDP in the mid 2030's.

Under a no change scenario, S&P forecasts net general government debt to increase to an "overpowering" 180% in 2050. In the group of sovereigns analysed by S&P the impact of higher age related spending, combined with the higher debt servicing costs under a no change scenario, will grow total government spending from an average of 44% of GDP today to 56% of GDP by 2050⁷.

⁶ M Kraemer "In the Long Run, We are All Debt: Aging Societies and Sovereign Ratings", *Standard & Poor's Global Graying Report 2005*, 28 June 2005; M Kraemer "Global Greying: Ageing Societies and Sovereign Ratings", *Standard & Poor's Global Graying Report 2006*, 27 June 2006; M Kraemer "What a Change a Year Makes: Standard & Poor's 2007 Global Graying Progress Report", *Standard & Poor's Global Graying Report 2007*, 19 Sept 2007.

⁷ S&P Global Graying, 27 June 2007

As Government age-related spending grows, the economic weight of government increases with it.

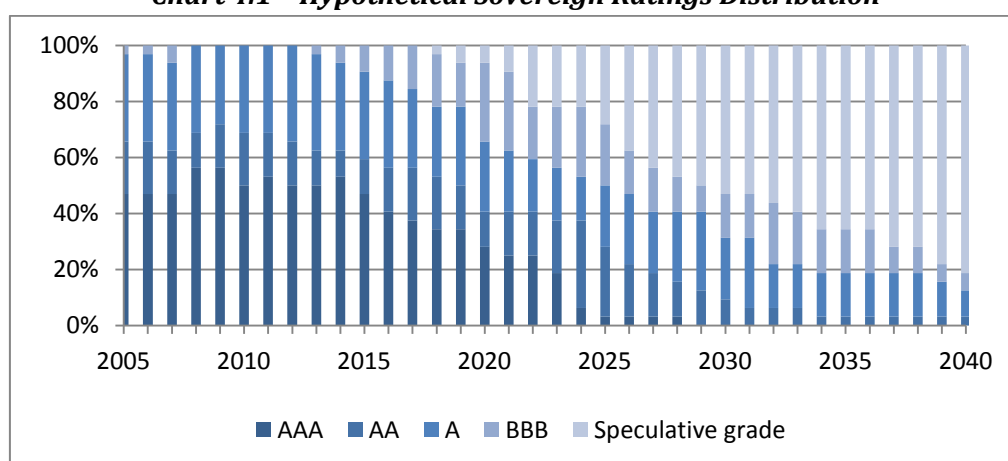
The key elements of age-related spending considered by S&P were the aged pension, healthcare and long-term care.

Aged pensions are expected to exert the most pressure on government spending with an average of 8.7% of GDP across the sample in 2005 increasing to an estimate of 12.8% of GDP in 2050. Public healthcare and long-term care spending is much harder to forecast as it will depend to a significant extent on technological developments over the period, however this will represent an increased percentage of GDP. Any offsetting reduction in unemployment benefits were also taken into consideration, however tightening labour markets would expect this offset to be minimal. Likewise education spending is unlikely to reduce in most knowledge-based societies, and any reduction in the number of children eligible for child-care benefits may be offset by more generous programs to boost labour force participation. If these estimates are realized, the diversion of national product towards the state sector will change the nature of many societies.

Under the ‘no policy change’ scenario, S&P has indicated that many highly rated sovereigns will be under pressure from early in the next decade. While in the near term, many qualitative and quantitative factors are taken into account in determining sovereign ratings, over the much longer term perspective, “prolonged fiscal imbalances tend to become a dominant factor”⁸.

By comparing general government balances with the median for each rating category averaged over the period 2000 to 2008, many “AAA” rated sovereigns will hypothetically fall to at least AA by 2020 and then to speculative grade by 2030. (See Chart 4.1) However, S&P goes on to state, “It is inconceivable that governments will allow debt and deficit burdens to spiral out of control.”⁹ **This analysis is timely reminder to sovereigns that they need to take action now to address the looming fiscal burden of an ageing population.** Attachment 3 provides further details of these hypothetical changes to selected sovereign ratings over the next 40 years.

Chart 4.1 – Hypothetical Sovereign Ratings Distribution



Source: Standard & Poor's Global Graying Report June 2007

⁸ M Kraemer "What a Change a Year Makes: Standard & Poor's 2007 Global Graying Progress Report", *Standard & Poor's Global Graying Report 2007*, 19 Sept 2007.

⁹ *ibid*

While the impact of the ageing demographic will be felt more harshly after 2020, the argument for reform is an urgent one. “The financial linkages between social security and fiscal policy call for decisive defensive steps now”¹⁰ The twin targets of fiscal consolidation and benefits reform can immediately generate a cushion against the cost of future entitlements.

From a political perspective, as the general population ages, so does the proportion of the electorate that is entitled to aged pensions and other benefits. “If no fiscal or structural reforms occur, the resulting social inequities and tensions would have the potential to undermine the very foundations of solidarity and cohesion on which most societies are based.”¹¹ Without reform, S&P have stated that this would likely lead to “a deterioration in economic prospects, as rising tax levels could cause the accelerated outward migration of ever more mobile factors of production (especially capital and skilled labour), endangering the very sources of growth and fiscal revenue.”¹² So while the key ratio of General Government Balance-to-GDP is driving the hypothetical ratings, this downwards trends would also be supported by high debt and debt servicing burdens, and potential weakening in economic prospects and institutional stability.

4.2 Impact of a “Do Nothing” Policy on the Drivers of Australia’s Rating

Clearly it is understandable, given this backdrop that the management or mismanagement of the longevity and ageing issues are areas of focus for the rating agencies. Moody’s has highlighted the long term risk that longevity and aging pose to their current rating of the Commonwealth when they noted “any trend or event that caused a long term shift in budget balances to significant deficits and an increasing public debt burden might put downward pressure on the rating. Such trends could include, for example, fiscal costs associated with an aging population.”¹³

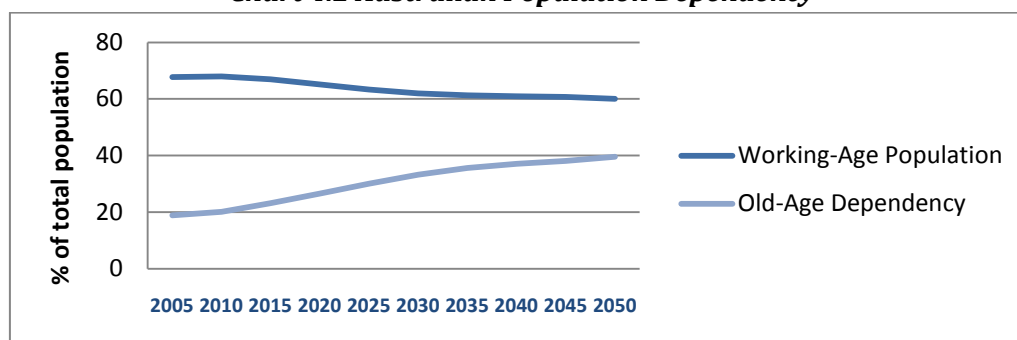
From the mid 2020’s there will be a rapid reduction in the population of working Australians supporting an increasingly ageing population. The demographic profile in Australia shows the old age dependency ratio (population over 65 to working age population) more than doubling over the next 40 years. While the definition of “working age” in Australia can now be increased to 67, the trend remains unchanged. When current trends in fertility and inward migration are combined with increasing longevity, this is a problem that is not going away.

¹⁰ M Kraemer “Global Greying: Ageing Societies and Sovereign Ratings” , *Standard & Poor’s Global Grayling Report 2006*, 27 June 2006;

¹¹ *ibid*

¹² *Ibid*

¹³ Moody’s Investors Service Credit Opinion: Government of Australia, 5 May 2009

Chart 4.2 Australian Population Dependency

Source: S&P

In the 1980's, Australia adopted the Superannuation Guarantee (SG) levy as part of its retirement income policy. The intent of the SG levy was to reduce the increase in expenditure related to the age pension. Australia is one of only a few nations that have proactively adopted policies to prefund a portion of retirement income streams of its ageing population.

In addition, the Future Fund was established in 2004 to fund the government's own employer pension obligations. The benefit of this policy was recognised by rating agencies in their credit assessment of the Commonwealth. S&P's rating report dated April 14, 2009 state "the government has been building up financial assets to fund its pension obligations, improving Australia's inter-temporal fiscal position"¹⁴

Moody's Credit Opinion on the Government of Australia¹⁵ also addresses the longevity issues. The report indicates a challenge to Australia's future creditworthiness is the expected "rising social welfare spending". While Moody's note the Government's current fiscal flexibility it does make a special mention of the potential impact of the aging and longevity risks. "Although Australia's demographics and policy framework leave it well positioned to deal with population aging relative to other industrial countries, the government's own analysis indicates the health and aged-care spending will lead to the emergence of a funding gap over the next 40 years. While the fiscal burden is well into the future, policy measures to address it will have to be initiated in the near term". Failure to manage costs of an ageing population as a key factor that may cause "a long term shift in budget balances to budget deficits and an increasing public debt burden might put downward pressure on the rating"¹⁶. Moody's then go on to state that given the Commonwealth's proactive response to date through superannuation policies and healthcare reforms, they anticipate that government policy will address any sustained fiscal deterioration threatened by these demographic changes.

S&P, as part of its global graying study, has undertaken extensive work on the impact of age-related spending on the rating of the Commonwealth. In 2006, S&P estimated total age related government

¹⁴ Kyran Curry, "Commonwealth of Australia", Standard & Poor's, April 14, 2009.

¹⁵ Thomas Byrne, "Despite weaker Fiscal Position, Australia Aaa Rating Unaffected", Moody's Investors Service, May 5, 2009.

¹⁶ Ibid

spending in Australia will grow to 17.3 % of GDP by 2050, significantly lower growth than other sovereigns in the sample.¹⁷ (See Table 4.1)

The bulk of the increase comes from increased healthcare spending followed by pension costs. It should be noted, this estimate factors in only current levels of pension and other spending, whereas the reality is that as more of the voting population reaches retirement age, there will be increased pressure to raise the level of pensions and expenditure on other age-related services.

Table 4.1: Age-Related Government Spending -Australia

(% of GDP)	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Pensions Spending	4.8	4.7	5	5.4	5.7	6.1	6.3	6.5	6.8	7.0
Health Care Spending	5.6	6	6.4	6.8	7.2	7.5	7.9	7.9	7.9	7.9
Long-Term Care Spending	0.8	0.8	0.9	1	1.2	1.4	1.6	1.8	2	2.1
Unemployment Benefits Spending	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.3
Total Age-Related Spending	12	12.2	12.9	13.8	14.6	15.5	16.3	16.6	17	17.3

Source: Standard & Poor's Global Graying Report 2006

In 2006, the S&P analysis indicated that under a no change scenario, Australia may hold onto its 'AAA' rating until 2015. However the mounting fiscal pressures would likely result in an 'AA' rating by 2020, just over 10 years away, and a rapid deterioration thereafter to 'A' by 2025, 'BBB' by 2030 and speculative grade by 2035. This analysis was based on pre Global Financial Crisis assumptions that showed Australia preserving a budget surplus and negative net debt position until at least 2015 before the drag of increased spending brought the budget into deficit and net debt increased (See Table 4.2).

Table 4.2: S&P Estimates of General Government Balance and Net Debt – Australia

Australia	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
	5	0	5	0	5	0	5	0	5	0
Real GDP (% change)	2.5	3	2.8	2.6	2.3	2.1	1.9	1.8	1.9	1.9
General government balance/ GDP (%)	0.8	0.6	0	-1.1	-2.3	-3.8	-5.4	-6.7	-8.4	-10
Net general government debt/ GDP (%)	-2	-5	-6	-2	5	17	34	55	78	105

Source: Standard & Poor's Global Graying Report June 2007

While Australia's credit rating will continue to benefit from the negative net debt starting position and strong fiscal discipline of recent years, current budgetary and economic outlooks must place the current credit rating of Australia under pressure.

While Moody's and S&P both issued post-budget affirmations of the rating, Fitch appears to be ahead of the pack in holding Australia's credit rating one level below the highest rating. According to current budget data, the general government balance is forecast to stay in deficit for the medium term before returning to surplus in 2015. As a result of these deficits, net debt levels will increase to peak at 13.8 %

¹⁷ S&P Global Graying Report 2006

of GDP in 2013 before starting to fall to 3.7% by 2020. (See table 4.3) With the loss of at least 5 years of fiscal surpluses, and consecutive increases in general government net debt, it is hard to see how the 'AAA/Aaa' rating is not already under significant pressure from both S&P and Moody's.

Table 4.3 Budget Estimates Australia

	2013p	2012p	2011e	2010e	2009e	2008
General government balance/GDP, %	-2.0%	-3.4%	-4.7%	-4.9%	-2.7%	1.7%
Net general government debt/GDP, %	13.6%	12.4%	9.2%	4.6%	-0.4%	-4.0%

Source: Australian Government, 2009, Budget Paper No 1, 2009- 2010

The reality is that ratings are not driven by quantitative analysis alone but by a range of qualitative assessments of the rating agencies. Rating analysts seek to identify emerging trends and factor any risks into their determination of the rating. A robust public policy environment, a track record of achieving strong surpluses and managing debt, a commitment by past governments to making tough political decisions to support strong fiscal discipline, and a resulting solid government balance sheet are all factors that support Australia's strong ratings.

The qualitative aspects of any change in government policy will be closely scrutinised and will have a significant impact on the credit rating going forward. Concerns regarding potential deterioration of the banking system in the weakened economy, and the ability of the current and future governments to extract growth benefits from the range of fiscal stimulus introduced in the last budget will be critical. While the restoration of the government's fiscal position is mapped, it will be a slow process.

Continued demonstration of a commitment to ongoing principals of fiscal prudence including addressing the impending costs of aged-related services will be paramount to preserving the current rating.

4.3 Comparison to the Retirement Income Policy and Ratings of Peer Group

Many OECD countries are facing similar demographic trends which will place constraints on the degree of flexibility governments will have in framing budgets after 2020. The aging of the population, particularly the baby boomer generation, increasing life expectancy arising from the advances in medical technology and low birth rates will increase expenditure and reduce the relative size of the working age population from which the governments can raise tax revenue.

OECD Governments are aware of the looming fiscal squeeze they face. According to The Economist¹⁸, the developed countries on average have about four people of working age for every person over 65. But by 2050 this will have come down to only two workers for every pensioner. That will impose a huge burden on public finances. The Economist argues that pensions will have to become less generous, and most people will have to keep on working well beyond 65. Pension and healthcare reform are topics universally raised in OECD countries as needing forward-looking policies to address and manage future budgetary risks arising from the ageing and longevity risks. The impact of the risks vary from country to country as do the policies governments are implementing to address them.

¹⁸ The Economist The end of Retirement June 25, 2009

As interest in the issue of longevity risk grows across capital markets, how Australia responds will increasingly be measured against the responses and ratings prospects of other 'AAA' rated economies. Table 4.4 below indicates the potential impact ageing and longevity risk could have on the ratings of several OECD member countries if no action is taken by governments to address the potential impact on the public finances. While the sample governments are all currently rated highly, their ratings could fall as early as 2020 under a status quo policy position.

**Table 4.4 Hypothetical Ratings Outcomes
Under No Policy Change Scenario**

	2007	2020	2030	2040
Australia	AAA	AA	A	Spec.
Canada	AAA	AAA	A	A
Japan	AA	Spec.	Spec.	Spec.
Sweden	AAA	AAA	A	Spec.
USA	AAA	A	Spec.	Spec.

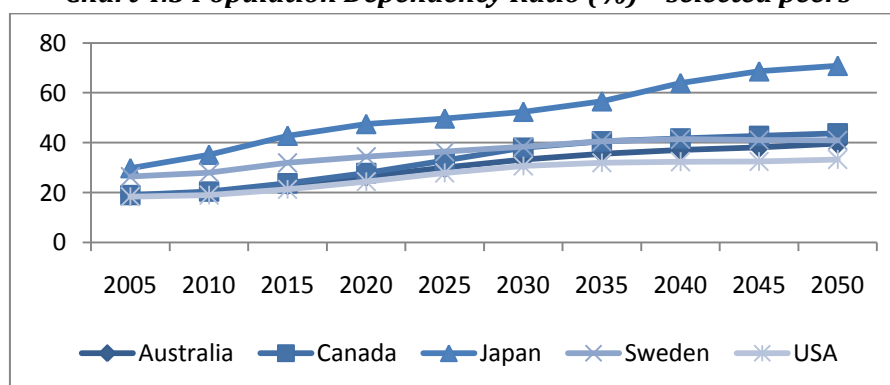
Source: S&P Global Graying Report 2007

Australia will need to adopt fiscal policies to mitigate the risks of structural budget deficits as a result of the ageing of the population. Expanding the balance sheet of the Government through the public provision of annuities to retirees will increase the degree of risk the Government will need to manage and could accelerate the downgrade trend hypothesised above. Attachment 3 contains further details of the S&P Graying report and the estimated changes to ratings in a no policy change scenario.

The growing challenge to a peer group of governments is illustrated in the ratio of working age population to over 65's (See Chart 4.3). Japan in particular has a daunting task. By 2050, the median age in Japan will fall from an already older 42.9 years to just over 52 years. With extremely low fertility rates and restrictive immigration policies, population levels are forecast to fall in absolute terms and the working age population is forecast to be only 50% of the population in total by the middle of the century. By then, Japan's dependency ratio is estimated to be around 71%.

Australia is forecast to reach a dependency ratio of nearly 40% by 2050, which is only slightly below Canada and Sweden. The USA, from a significantly younger average starting point, is forecast to have a retirement population of only a third of the working age population, led in part by the increasing inward migration and the higher fertility rates of the growing Hispanic and Latino population.

Chart 4.3 Population Dependency Ratio (%) – selected peers



Source: S&P Global Graying Report 2006

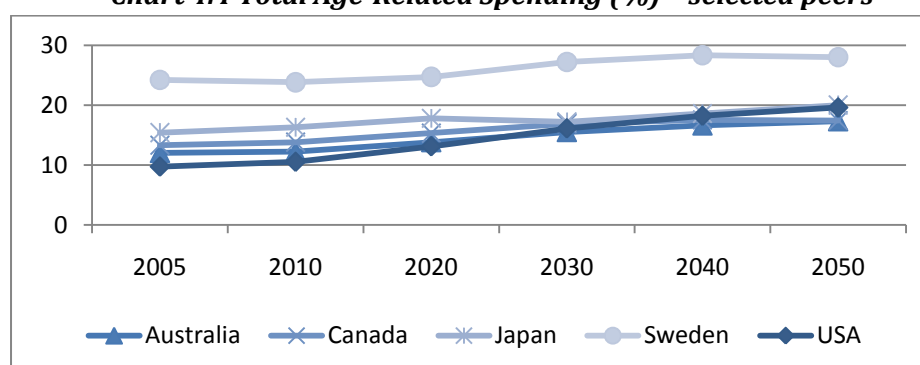
These changing demographics will have profound impact on government spending over the next 50 years. Sweden already has amongst the highest age-related spending in Europe. Its large general government sector, and the significant budgetary call of its public pension, is considered by the rating agencies a constraint on its fiscal flexibility at the 'AAA' level. With a major drag on public finances, Sweden has built up assets in the National Pension Fund of around 30% of GDP, and the private pension funds have assets of above 50% of GDP. In order to address this significant obligation, a balancing mechanism has been implemented in the Swedish pension system, which indexes pensions to restore any imbalance of assets (fund balances and estimated contribution revenues) below liabilities (pensions). Sweden has also indexed benefits to current life expectancy, providing a significant buffer to future obligations.

Estimated low growth in total age-related spending in Canada provides support to its 'AAA' rating. Canada acted to reform the tax payer obligations arising from its public sector pension plans in the late 1990's. Contributions were increased and the benefit formulae adjusted. Cash flow surpluses were increasingly given over to investment boards with mandates to develop higher longer term returns through diversified portfolios, rather than the previous investment plans of government only debt. Canada's pension plan now holds assets of 40% of GDP, surplus to fund these considerable future obligation.

As a contrast, S&P has estimated that, under a no change scenario, general government expenditure in Japan is forecast to grow substantially to 65% of GDP in 2050 with a combination of age-related spending and the growing interest bill from funding of increased deficits and debt. Japan undertook some reforms of its defined benefits pension fund system in 2004, by increasing member contributions, delaying the start of payments, and reducing the amount of payouts. However further structural reforms of both the pension and healthcare systems will be required before Japan's budget position can start to appear more sustainable. The political gridlock that effects policy decisions in Japan will continue to make any significant reform difficult.

The US will experience more modest growth in dependency ratios due to a younger population, but with the lowest starting point of age related spending, at below 10% of GDP in 2005, will more than double by the middle of the century.

Chart 4.4 Total Age-Related Spending (%) – selected peers



Source: S&P Global Graying Report 2006

There have been significant changes in the global economy and the fiscal positions of all peers since S&P last updated their forecasts in the global graying report. The latest report was released in 2007

and presented forecasts for the 2010 based on 2005 or 2006 financial positions. In this period, Australia and Sweden will have moved from a forecast surplus to a deficit, and Canada's debt to GDP ratio will have increased by almost 30%. Contrary to this trend, in 2010 Japan is expected to have improved net general government debt-to-GDP as forecast in that report by almost 7 percentage points – due to some of the reforms introduced to Japan's budget position in the last few years.

Significant caution should be used in anticipating ratings based on net general government debt measures alone. S&P recently indicated “we expect that the U.S.'s net general government debt will rise to about 90% of GDP by 2013; we expect that of the U.K. to rise to nearly 100%.”¹⁹ However they have affirmed the USA 'AAA' rating and only downgraded the UK's 'AAA' rating outlook to negative. S&P indicates that one of the key strengths underlying the US rating is the key international role of the US dollar that provides the US with substantially more fiscal flexibility than other countries (including the UK).

S&P also stresses the importance of the market view of the handling of government finances. As a result of the international role of the currency, the US government will face limited widening of credit spreads despite significant increases in debt “as long as the market viewed its plan for fiscal consolidation as credible”²⁰. Despite the significant increase in debt for the longer term, the UK will maintain its 'AAA' rating if the rating agencies are convinced there is fiscal consolidation in place to return the government's finances to a sustainable footing.

So while the fiscal ratios released in the S&P Graying Reports have been superseded by the impact of the GFC, the assumptions underlying the S&P estimates have not changed so the general trends can be considered valid. Support for financial systems and fiscal stimulus measures have not lessened the impending demographic challenge.

Increases in age-related spending, weakening in budget balances and increased levels of debt all remain, now overlaid on fiscal positions already weakened by the stimulus and rescue measures in response to the GFC. The demographic challenge remains to be added as a significant risk factor to ratings that could already be considered under pressure from weakening fiscal positions.

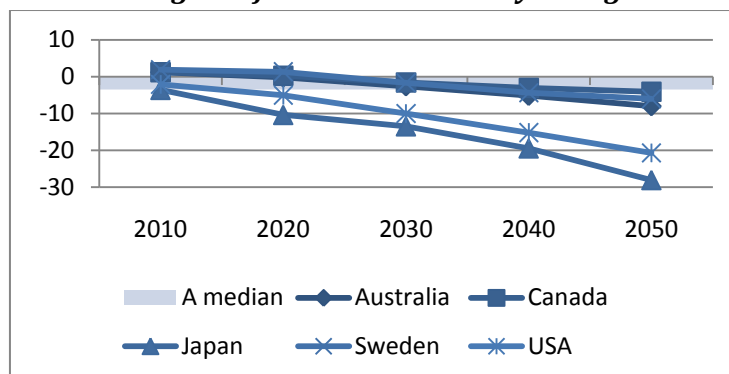
Japan's fast-aging population still poses enormous challenges for the economic system and the fiscal position of the country and it will show the most dramatic deterioration in financial profile under an estimated no policy change scenario. In Japan, the implications for public finances will be severe. Prior to the GFC and without any fiscal or structural policy measures, by 2050 the general government deficit was estimated to rise sharply to 37% and net debt will reach 530% of GDP. In contrast, Canada's strong performance under a no policy change scenario reflects its strong initial fiscal position with government surpluses running at about 1 to 2% of GDP in recent years. Unfunded pension liabilities remain but these will tail off due to the recent pension reforms. In addition to its starting position, Canada also has more flexibility than most of Australia's peers to adjust immigration policies to increase the working age population.

¹⁹ “Credit FAQ: Why It Is Unlikely That The Ratings On The U.S. Government Will Be Lowered In The Near Term” Standard & Poor's June 11 2009.

²⁰ *ibid*

The earlier forecast of budget deficits under a no-policy-change scenario is outlined in Chart 4.5. The chart highlights the median budget deficit to GDP of 'A' rated sovereigns in 2009, of only 3.5%.²¹ While this is not the only measure driving the deterioration in ratings, it does paint a strong picture of the directions ratings are expected to head if there are no changes.

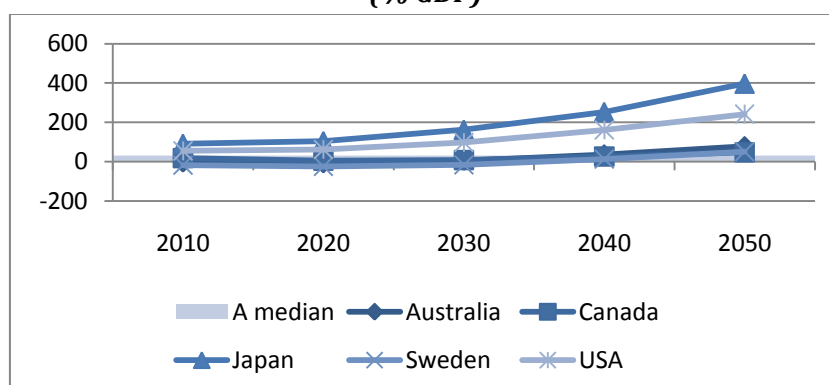
Chart 4.5 Forecast Budget Deficits under No Policy Change Scenario (% GDP)



Source: S&P Global Graying Report 2007

Likewise, earlier forecasts of net debt to GDP are shown in Chart 4.6 and compared to the median levels of net debt for 'A' rated sovereigns in 2009. All peers weaken against this 'A' rated median, with Japan and US shown as significant outliers over time.

Chart 4.6 Forecast General Government Net Debt under No Policy Change Scenario (% GDP)



Source: S&P Global Graying Report 2007

Japan's diversified and mature economy is more comparable to sovereigns rated 'AAA' than peers in the 'AA' category. However the challenges faced by Japan in the medium to longer term already see it rated below 'AAA'. Significant among these is the chronic challenges driven by Japan aging population combined with a weak starting point with a large fiscal deficit, and heavy outstanding general government debt. The ongoing structural reforms required in social security and the health insurance systems, or changes to immigration policies will be hard to implement in the current political environment, and so a deterioration for Japan's rating is expected with a potential fall to 'A' category

²¹ "Sovereign Risk Indicators", Standard & Poor's, February 26, 2009

within the next 5 to 10 years and fiscal indicators in a no change scenario that would be more typical to performances currently associated with speculative-grade sovereigns.

The S&P report indicated that the US rating could fall to 'A' level by 2020 if there were no changes to the current policy stance. However the rating agency view of the financial flexibility provided to the US creditworthiness by the importance of the US dollar in the global economy, could postpone this downgrading. Sweden and Canada are forecast to retain their AAA rating by 2020, due to their strong fiscal balances today and the pension reform already undertaken.

5. Rating Agency View of Public Provision of Annuities

5.1 Additional Risks likely to be a Concern

For government fiscal policy, an ageing population is a huge headache. In countries where public pensions make up the bulk of retirement income, these will either consume a much larger share of the budget or they will have to become a lot less generous. The latter can be expected to be met by solid political resistance. And because of a huge increase in the number of over-80s, a lot more money, and careful thought, will be needed to provide long-term care for them as they become frailer. The case for changes in Australia's retirement income policy is clear. **The Government needs to formulate policies now to provide incomes for retirees that are not funded from the public purse.**

To date, Australia has taken a pro-active approach in starting to address the retirement income needs of its ageing population through the introduction of the mandatory superannuation system in 1991. The retirement assets of Australia are growing and are significant in world terms at more than A\$1 trillion. However the challenge of having a policy and framework to appropriately transition the accumulated retirement assets into predictable retirement income streams is yet to be fully reflected in policy. The rating agencies will be increasingly interested in how governments are responding to this longer term demographic challenge.

The proposal, to require Australian retirees to take a sizeable proportion (30%) of their retirement savings either as an immediate or deferred lifetime annuity, would be of positive significance to credit rating agencies in considering the policy settings of the Government to maintain a conservative fiscal strategy over the longer term.

Rating analysts typically consider the "whole of government" debt when evaluating creditworthiness and the rating of a sovereign. Moody's²² states "this holistic representation of the balance sheet includes items that are not normally recognised under current accounting conventions, such as off-balance sheet liabilities (guarantees)". Rating analysis of governments and corporates attempts to evaluate the assets and liabilities of the organisation from an economic perspective regardless of how they may be treated in accounting statements. Analysts will however differentiate debt and liabilities based on the certainty of the financial obligation. Table 4.1 illustrates how government liabilities can be represented in terms of the certainty of the obligation and the impact on fiscal policy and budgets.

Contingent liabilities are not treated the same as the liability of Commonwealth Government Securities but they are still analysed based on the product of exposure at risk and probability of materialising. This would be a similar treatment of the contingent liability of the Government committing its balance sheet to provide for increasing longevity and market risk through the means tested Aged Pension in the absence of some form of compulsory annuitisation.

²² Moody's Sovereign Analytics "Not all Public Debt is the Same: navigating the Public Accounts Maze" February 2009

Table 5.1 Australian Government Liability Matrix

	Certain	Conditional	Uncertain
Contractual Obligation	Commonwealth Government Debt	Contingent Liabilities Banks and States	Federal Public Service Pension Liabilities
Firm Policy Commitment			Pensions Social Security and Medicare
Possible Policy Commitment		Implicit State and Local Government Debt	

Retirement income policies must address both the accumulation phase and the retirement phase. The OECD argues that while governments should have policies that encourage participants in labour markets to accumulate an adequate level of wealth at retirement, such a goal is not sufficient in itself to guarantee a living standard during the retirement years.

In considering retirement income policy, it is often overlooked that investment strategy and hence risk post retirement is proportionately more important than pre-retirement. Russell Investments²³ estimates that for each dollar decumulated in retirement, 10 cents comes from savings in a person's working years; 30 cents come from investment return during the accumulation phase and 60 cents of investment growth during the decumulation phase. The OECD points out that the second component

²³ Russell investments Insights - November 2008

of a retirement income policy is to ensure that wealth is decumulated properly.²⁴ An appropriate retirement income policy must help retirees maximise the income benefit and duration of their accumulated retirement assets.

Analysis by Mercer²⁵ portrays the prevalence of lump sum benefits negatively as a feature of Australia's retirement income policy and it can be expected that ratings analysts would have a similar concern. Introducing a retirement income policy that includes annuities would be a step to address this negative feature. Mercer argues there are "significant problems" regarding the use of the final retirement assets, where systems allow benefits to be taken as a lump sum. Mercer point out that employees lack financial knowledge to appropriately manage a potentially significant lump sum benefit with the consequence that the accumulated retirement assets are exhausted far too quickly.

The lump sum mentality prevalent in Australia has not been discouraged by the minimal tax advantages of converting the accumulated retirement assets into income-style benefits. Mercer argues that enhancements are required to limit access to, or reduce the tax effectiveness of, lump sum payments and to increase the amount required to be taken in income form such as an annuities. **This view coincides with the OECD²⁶ view that there is a growing need for insurance based products, such as annuities, to provide retirees with a guaranteed income as long as they are alive.**

The challenge of providing adequate retirement income policies have been exacerbated by the GFC . Over the last 12 months, Australian superannuation funds have been among the worst performers in the world. Australian super funds have been savaged by the financial crisis with losses of almost 27% last year, the second worst performance of all 30 OECD countries. Further **Australia has one of the highest rates of old-age poverty, according to analysis by the OECD. The OECD report noted more than one in four senior Australians in poverty, with the low age pension cited as one of the major reasons.**

The challenge for Australia is to manage the demographic change while preserving or even enhancing post-retirement incomes. Current policies may provide incentives for opportunistic behaviour, where retirees have incentives to consume their accumulated wealth shortly after retirement and then to rely on the publicly-financed age pension safety net in the following years. Such short-term behaviour of retirees would exacerbate the risk to government finances and increase pressure on the credit rating of the sovereign.

The OECD suggests a high degree of annuitisation preserves retirement incomes and therefore works to protect public finances. Further the OECD²⁷ also suggests a spin off benefit of annuitisation is that it increases the sophistication of the country's financial services markets which would further assist the Government's aspirational objective to promote Australia as a financial services centre.

²⁴ Ignazio Visco "Retirement Savings and the Payout Phase: how to get there and how to get the most out of it" OECD Financial Trends Vol 2009/1

²⁵ Ben Facer, "Lessons to learn from DC systems in the Asia Pacific region" mercer.com 23 July 2009

²⁶ "Pensions at a Glance 2009: Retirement Income Systems in OECD Countries", OECD, June 2009

²⁷ Stewart, F.(2007), "Policy Issues for Developing Annuities Markets", OECD Working Papers on Insurance and Private Pensions, No. 2

Moody's²⁸ in commenting on the impact of the GFC on sovereign ratings note that the wide scale "risk socialization" where governments have deployed their balance sheets and raising sovereign debt to counter the GFC has been of historic proportions.

Moody's note the challenge for a 'Aaa' rated government such as Australia who have expanded their balance sheets and increased debt will be to "grow out of its debt". For the Australian Government this will be to manage its growing age-related expenditures and grow at a rate to contain the impact of increased government debt issued to counter the GFC and Australia's infrastructure needs over the next two decades.

To require 30% of all superannuation withdrawals to be taken as an annuity stream would contribute to a solution to the ageing population without a cost to the budget and without weakening the income available to the post working age population. Access Economics²⁹ research indicates that if 30% of retirement savings were invested in annuity products, a saving of up to 5% in the cost of the age pension could be achieved by 2040³⁰. At the same time it is estimated that post retirement incomes could increase by between 0.3 to 0.4 % of GDP. The potential for this level of savings would be viewed positively by sovereign ratings analysts in that it could provide future governments with a greater degree of financial flexibility.

The proposal will also result in immediate qualitative benefits. A significant increase in retirement incomes above the full aged pension will reduce pressure on government to justify the sustainability of current aged pension arrangements. With less people dependant on the aged pension over the near term, there should be less pressure to increase the base rate over the near term. And the government remains free to use financial capacity to provide incentives for people on low incomes to increase their retirement savings, ahead of the impending dependency bulge from 2020.

²⁸ How Far Can Aaa Governments Stretch Their Balance Sheets?, Moody's Special Comment February 2009

²⁹ Challenger Submission on the Retirement Income System 6 March 2009

³⁰ Access Economics 2009

6. Rating Implications of Public versus Private Sector Annuities

6.1 Risk to Government of Direct Provision of Annuities

Over the last two decades rating agencies have increasingly factored in the bi-partisan approach by the two main Australian political parties of removing commercial business enterprise risks from the Government's balance sheet. Privatisation of the Commonwealth Bank, Qantas and Telstra has been a positive factor in the rating of Australia. Rating agencies have viewed favourably the policy of various Australian Governments to contain Government activity to traditional provision of services such as defence, healthcare, education and income and age support.

A key element of rating analysis of companies is management's track record in executing business and financial strategies. Inconsistent execution or frequent changes in strategy can diminish the faith rating analysts have in strategic intent and credibility of the organisation. Rating analysts utilise the same approach in evaluating the creditworthiness of governments. Analysts look to the policies of the government to evaluate tolerance of financial and business risk.

Government policies which introduce a greater degree of fiscal risk or introduce new risks to the balance sheet will weigh heavily in the determination of the rating. The fiscal conservatism of Australia's major political parties and the ongoing policies to remove commercial risk from the balance sheet of the government have been positive factors in Australia's credit rating.

Introducing investment in annuity products as a key part of Australia's retirement income policy would be considered as a positive response to the issue of adequacy of income in retirement. **However, any consideration by the Commonwealth to directly create and provide annuity products would indicate to rating agencies a significant change in the philosophy of the role of government from that followed over the last two decades.**

Rating analysts could be expected to view negatively any move by the Government sector to enter into a new financial services business providing annuity products to retirees. Rating analysts would consider the investment, administration and longevity risks the Commonwealth would take on to enter into the annuity market as contingent liabilities of government. **This view would be held regardless of whether the annuity scheme was provided directly through a Government department or agency (e.g. Centrelink) or via an investment fund such as the Future Fund.**

In rating an organisation or government rating analysts evaluated both debt obligations reported on the balance as well as those debt like obligations that are off balance sheet. In evaluating the creditworthiness of the Commonwealth, rating analysts consider the risk and financial obligations of government related bodies such as EFIC and the Future Fund.

Prior to the GFC it was common for many financial institutions to fund assets off-balance sheet. The experience of the GFC has demonstrated how quickly the risk and liability of such financial strategies can come back on balance sheet. The balance sheets of many global banks such as Citibank increased dramatically when liquidity in capital markets dried up bringing off balance assets back on balance sheet.

Rating analysts look closely at off-balance sheet and contingent liabilities when evaluating credit risk. In the case of Australia's rating the contingent risk of the credit guarantees given by the Export Finance and Insurance Corporation, a statutory authority, is factored into the modelling of Australia's liabilities even though the absolute risk of these is a modest 1% of GDP.

If the Government decided to directly provide annuities, the credit risks of such a policy would also be modelled and evaluated by rating analysts. While annuities will be backed by assets transferred from retirees, there is a significant degree of market and investment risk that will need to be managed by the Government in order to meet the contractual obligations under the annuities. Table 6.1 sets out some scenarios that could be evaluated, in a ratings context, to quantify the additional contingent risk to the Government's balance sheet through public provision of annuities.

Scenario A (worst case) is an indicative representation of the potential absolute increase in the size of Government liabilities from current total (accumulation and pension) superannuation assets should it commit to a policy of public provision of annuities, with only a 10% take up of government annuities. For the purpose of comparing relative orders of magnitude, these potential new contingent liabilities of \$103billion are presented in Table 6.1 alongside the Budget estimate of net debt of \$188billion in 2013. This is an amount equal to almost 54% of the estimated 2013 net debt.

Scenario B (base case) recognises that the actual contingent risk transfer would occur over time as superannuation assets are moved from the accumulation to pension phase. In this scenario it is assumed in 2013 that 20% of the \$1.03 trillion in superannuation assets belong to retirees, and that 10% of those assets have been used to purchase a government annuity. In that case the Government's contingent liability would rise by \$21billion. This represents an additional 11% of the forecast net position taking this comparison of government liabilities to almost \$209billion in 2013.

The risk to the Government in providing annuities will be crystallised when markets and investment risk materialises as it did in the GFC. In this situation the contingent liability of a public provision of annuities policy can turn into a real liability. The GFC has demonstrated the drastic impact on investment markets and valuation of retirement assets. Australian superannuation funds lost around 27% of value during the GFC. If we stress the contingent liability of \$20.6billion in Scenario B, a future 25% decline in the market value of retiree assets transferred to government, could result in an actual liability of \$5.15billion reducing the value of assets to meet annuity obligations to \$15.45billion.

Table 6.1 Hypothetical Net Debt with Contingent Liabilities from Public Annuities

Whole of Government Liabilities	Scenario A \$million	Scenario B \$million
	Worst case	Base Case
General Government Net Debt Est. 2012-13³¹	188,175	188,175
Assets backing public annuities based on \$1.03 trillion Superannuation (Mar 2009³²)	103,000	20,600
Total estimate debt plus contingent annuity liability		208,775

Sources: Budget Papers and APRA

³¹ Australian Government, Budget Paper No.1, Statement 10 2009-10, Commonwealth of Australia, Canberra.

³² APRA Quarterly Superannuation Performance March 2009 (issued 25 June 2009)

The obligation to meet the contractual payments under annuities provided by the Government would be a new contingent liability for the Government. The risks relating to investment, inflation and longevity would be real and will be burdensome as the population ages with a greater proportion being dependent on the Government sector for income from the annuities. **A policy of public provision of annuities will represent a further allocation of scarce Government capital to this service provision to retirees. As with any commercial initiative the cost of capital must be a major factor in evaluating the merits of public provision of annuities.**

Some argue that the Government has the infrastructure to provide annuity products to retirees. To avoid a negative reaction from rating agencies to an announcement of taking on new commercial risks, the Government would have to demonstrate it has or could acquire the experience, skills and infrastructure to provide annuity products. Establishing such a venture would likely be considered a new and significant risk to the Commonwealth's long term rating.

The Government established the Future Fund in 2006 to manage funds to assist in meeting its unfunded liabilities for defined benefit pensions of Commonwealth public servants. The Future Fund has progressively built a capability to manage its asset base. Theoretically the skills and resources of the Future Fund could be increased to provide adequate capability to manage a Government commitment to provide annuity product through the public sector. Centrelink has a national infrastructure to assist in administering a new form of Government provided annuity product.

The history of Australian governments being directly involved in the financial services sector has not been stellar. The collapse of financial institutions owned by Australian state governments in the 1980's such as State Bank of Victoria, Tricontinental Corporation and State Bank of South Australia are examples of the significant risk government can take on when using the balance sheet of government in the financial services sector.

6.2 The Merits of Private Sector Delivered Annuities

In contrast, the private sector in Australia is much better placed in terms of experience, skills and infrastructure to provide annuity products. Australia's insurance and investment markets comprise a competitive landscape of local and global insurance companies and financial services firms who could relatively easily mobilise to provide a choice of annuity products.

The financial services and superannuation markets in Australia are well regulated and could take responsibility for overseeing and regulating an expansion of the annuity market as part of a revised retirement income policy. Australia already has an established and tested regime of prudential supervision of both life insurance and superannuation. APRA and other regulatory bodies of Government have the skills and experience to administer an expanded market of private sector annuity providers. The fact that Australia has this regulatory infrastructure already in place would allow the Government to relatively quickly implement a policy of private sector annuities as part of a revamp of its retirement income policy.

Mercer³³ note Australia's success in developing private delivery of retirement accumulation products has promoted low fees, wide choice for employees and value added benefits such as low cost banking products education and effective online and telephone support.

In implementing a policy of including an annuity component in retirement income policy it seems logical to utilise the infrastructure in the private sector. Competition among private sector providers would generate a wide selection of competitively priced annuity products with competition driving ongoing innovation, product enhancement and customer service.

The IMF³⁴ believes the financial markets have a key role to play in managing aged-related risks. The 2006 report by Groome, Blancher and Ramlogan argues governments should encourage and influence market developments to appropriately share the aged-related risks between the private, public and household sectors.

ASFA adds weight to the case for annuities to address longevity risk in a report by its Director of Research Ross Clare³⁵. The report suggests there are two choices:

- Force retirees to defray their longevity risk; or
- Provide adequate well-priced products that encourage and reward retirees for defraying their longevity risk.

ASFA goes further to argue that "requiring an amount of superannuation savings to be taken as a lifelong income stream would better integrate the Age Pension and the superannuation system and provide greater protection against longevity and inflation risks."

The ASFA report states the government should direct its energies to promoting the development of the post-retirement income market, rather than directly managing annuities. ASFA considers the lack of long term government index bonds which could back longevity insurance products as an impediment to this market's development. Taxation disincentives also exist for life annuities compared to other retirement products. The preference by Australians to retain access to their capital during their decumulation phase can be addressed by changed incentives.

6.3 The Impact of the Government Being a Major Asset Manager

The Government's response to the proposal for annuities as part of its future retirement income policy could have a significant impact not only on the contingent liability position of the Government but also the operations of the Australia capital markets and the economy more generally.

Australia's capital and investment markets are among the most developed and sophisticated in the world but are still small reflecting the size of the Australian economy and population.

³³ *ibid*

³⁴ Aging and Financial Markets W.Todd Groome, Nicolas Blancher and Pameshwar Ramlogan F&D (a quarterly magazine of the IMF) September 2006 Volume 43, Number 3

³⁵ Affording our old age, Superfunds July 2009 www.superannuation.asn.au

If the Commonwealth Government were to directly provide annuities it would have to become a major market maker in the primary domestic equity, fixed income, property and derivative markets. This would arise simply due the quantum of funds it would need to invest to back the long term obligations under the annuities. This is in addition to the already significant impact the Commonwealth Government will have as a borrower to fund the increased deficit and new infrastructure plans. Such an active and significant role in asset markets would likely be viewed negatively by international investors and rating analysts who currently view Australia as an open well regulated capital market free from government intervention.

The development of a competitive world class annuity market will in turn enhance the strength of the local capital markets, in itself a qualitative ratings factor. As the impact of longevity risk on the economies of Europe and Japan becomes a more pressing consideration for global investors, this early response will allay concerns that the AAA credit rating is under threat. Highly jittery international investors will be looking for markets with long term stability not short term returns.

The financial links between social security and fiscal policy call for action and clear policy to set in place a framework to cope with Australia's ageing population and the increasing life expectancy of the population. S&P warns that "policy drift that relies on an economic miracle to take away the pain of ageing populations will be totally insufficient"³⁶ A policy of introducing private sector annuities as part of the Government's retirement income policy would be seen by rating agencies as being a decisive forward looking policy to protect the public finances as ageing and longevity play out in the population.

S&P also cautions that a "muddling through" approach is likely to lead to deterioration in economic prospects could "endanger the sources of growth and fiscal revenue". The current speculation in the Australian media of a policy of having retirees with small superannuation balances transfer those funds to the Government in return for a top up of their Aged pension is likely to be seen a "muddling through policy".

A policy of public provision of annuities to retirees, while addressing ageing and longevity, is likely to be viewed by rating agencies as failing adequately safeguard public finances by imposing both large contingent and real risks to future fiscal policy. Rating agencies are looking for 'AAA/Aaa' rated countries to have policies that generate budget surpluses. Policies that weaken the fiscal position or potentially introduce structural budget deficits are likely to lead to rating views with downgrades to the Outlook of the sovereign rating or the rating itself.

A policy of public provision of annuities either for all retirees or those with small superannuation balances can be expected to be considered by rating agencies as a sub optimal use of the Government's capital to maintain fiscal solvency.

³⁶ S&P "What a Difference a Year Makes: Standard & Poor's 2007 Global Graying Report" September 2007

Attachment 1 - Summary of Key Ratings Factors

The key rating factors analysed by Moody's, Fitch and S&P are similar with slight differences of emphasis. The following describes the general approach:

▪ Resiliency to Withstand Shocks

These factors consider the ability of the sovereign to meet its obligations in the face of “adverse economic, financial and political events without having to impose intolerable economic sacrifice on its population.”³⁷

Political Risk & Institutional Strength

The stability, transparency and predictability of the political institutions are important considerations as they impact on economic policy making and the legal and social framework. Consideration is given to:

- Transparency in economic policy decisions and the degree of consensus on key goals of political action;
- Levels of governance, independence of central banks, and regulatory and supervisory frameworks for financial system; and
- Public security and geo-political risk.

Economic Structure

The structure of the economy can be a significant indicator of the sovereign government's resilience to shocks.

- Established market economies tend to be more highly rated than public sector dominated economies. A market economy is considered less susceptible to policy problems and more respectful of creditor's rights.
- The economic scale is significant as small economies can be easily buffeted by external forces whereas large economies can withstand much greater shocks.
- The level of innovation and investment in human capital are factored into the assessment economic structure.
- The level of domestic savings relative to GDP can also be strong signal of the level of resilience and flexibility in the economy.
- Across all agencies, there is a high correlation between ratings and GDP/ capita.

Economic Growth Prospects

Broadly equitable income distribution and a growing standard of living can both support public sector debt and better withstand economic and political shocks.

- Sustainable economic growth, with governments that take advantage of upturns to prepare for risks associated with inevitable downturns considered favourably.
- High growth rates usually seen in the middle rankings rather than 'AAA' ratings. Higher rated highly developed economies tend to have lower growth trends.
- The change in real GDP per capita is considered a key quantitative indicator of these factors.

³⁷ “Rating Methodology: Sovereign Bond Ratings”, Moody's Investors Services, September 2008.

▪ Government Financial Robustness

The next group of factors considers the strength of the government's finances and its susceptibility to event risk. It should be noted that the measures reviewed by the agencies include "general government" which includes state & local as well as national government. This provides a better base for comparison otherwise highly centralized systems (such as France) would look more highly indebted than more decentralized systems (Canada). Sovereign creditworthiness needs to reflect the demand for public services and the intergovernmental revenue sharing relationships across all systems.

Fiscal Flexibility

The focus is on general government revenue, expenditure and borrowing flexibility and trends rather than absolute levels of deficit or surplus.

- Broad tax base with the ability to adjust tax rates without constitutional, political or administrative problems. The ability to sell assets as a means of accessing capital to repay debt is also considered under revenue flexibility.
- Effectiveness of expenditure programs that provide services demanded by the population, and investment in infrastructure and education level adequate to support sustained growth. While these investments may result in high deficits, they are considered positive as they underpin growth.
- Pension obligations reflect a growing fiscal pressure. S&P has specifically stated that "some highly rated sovereigns could begin to come under downward rating pressure in the medium term if there are insufficient fiscal adjustments and structural reforms to counter the financial problems of the ageing societies".³⁸
- Appropriateness of the fiscal and monetary policy mix.
- Surplus/ deficit trends in light of monetary policy and external factors. The focus is on flexibility not absolute levels as it may be appropriate to have high deficits if the debt burden is low and infrastructure needs are significant or when counter cyclical measures are required.
- Therefore the key ratio of General Government Balance/ GDP (%) is not relevant in isolation.

General Government Debt Burden

Given sovereign government's unique taxing and monetary powers as well as the diversity of domestic capital markets, debt levels (Net General Government Debt to GDP) are not highly correlated to ratings over the medium term.

- The strength of the domestic capital markets to provide long term and low cost market based financing may enable a sovereign to support a higher debt to GDP ratio than a sovereign without a strong domestic capital market that is more reliant on external funding or other more variable sources.
- In the Gulf States for examples, low debt to GDP ratios reflecting strengthening balance sheets has led to upgrades but not as much as might be expected due to political risk, lack of economic diversity and low levels of transparency.
- Debt to revenue metrics are generally treated warily. A low number may indicate either a positive in the ability to raise taxes or a negative in the weak tolerance for taxes.

³⁸ "Sovereign Credit Ratings: A Primer" Standard & Poor's 29 May 2008.

- Interest payments as a proportion of total revenues provide a measure of debt affordability as does the degree to which a government's policy choices are constrained by debt servicing obligations.
- A strong track record in honouring debt obligations is valued.

Contingent Liabilities

Consideration is given not only to direct government obligations but also to a range of contingent obligations that have shown to have significant impacts on government finances, especially in recent times.

- The robustness of the financial sector is a key contingent liability of sovereign governments. The performance of this sector during the recent financial crisis, and the rescue packages provided by sovereigns around the world, has shown how finance sector quickly becomes a real liability of government.
- Contingent liabilities in the form of unfunded pension obligations are considered significant. Responses to address these impending obligations are a key policy area reviewed by the ratings agencies. "Governments have many ways to alter the net present value of pension liabilities, such as postponing retirement age, increasing contributions and lowering pensions."³⁹
- The financial health of non-financial public sector entities (NFPSE) is also taken into consideration. NFPSE's are frequently instruments of government policy that are established to serve policy ends. If these entities are unproductive, unprofitable or weakly capitalised they are likely to require government support and therefore should be treated as contingent liabilities of the government sector. Even when these entities are highly efficient and productive, their debt levels should be factored into the analysis of overall government debt levels. Large public sectors are therefore viewed with caution – especially any NFPSE that have required subsidies, capital injections, enjoy monopoly positions, have access to preferential funding or pay higher prices to suppliers.

Monetary Flexibility

The effectiveness and appropriateness of monetary policy is an important consideration, in the context of fiscal policy, exchange rate regimes, and the debt of finance sector and capital markets.

- This assessment becomes increasingly complex in a more inflationary environment where sources of inflation come from outside the domestic economy.
- The change in CPI is a key indicator with higher inflation levels generally correlated to lower ratings
- The state of the domestic capital markets is also a considerable factor. Governments are less likely to default on debt when it is held by a wide cross section of domestic investors rather than where it is held by a few major banks or even offshore investors. Measures of the depth of the capital markets can be a consideration in the rating.

³⁹ "Rating Methodology: Sovereign Bond Ratings", Moody's Investors Services, September 2008.

External Liquidity

The ability for a sovereign government to generate foreign exchange is a key factor in assessing credit quality (both for local currency and foreign currency ratings). The factors considered include:

- Where there is substantial external debt burden (public and private sector combined) then movements in exchange rates, interest rates, foreign investor sentiment and other offshore factors have a greater impact on management of external liquidity
- Gross external financial needs are measured through ratio's such as: Current Account payments plus short term liabilities to non residents) /Current account receipts plus foreign exchange reserves
- High foreign currency reserves and more liquidity are more important at the lower rating levels where a significant portion of debt is linked to foreign currencies.

External Debt Burden

The external balance sheet (resident's assets and liabilities) as compared to Balance of Payment flows shows the broadest measure of a countries external financial situation. Key factors considered include:

- External Debt (net of reserves and financial sector assets) /Current Account Receipts
- Maturity profile, currency composition, interest rate sensitivity and the level of private sector (and especially financial sector) debt
- Robust domestic sources of finance, sound domestic financial sector, and productive Foreign Direct Investment all minimize risks of high debt burdens.

Attachment 2 - Standard & Poor's Sovereign Rating Criteria

Sovereign Ratings Methodology Profile

Political risk

- Stability and legitimacy of political institutions
- Popular participation in political processes
- Orderliness of leadership succession
- Transparency in economic policy decisions and objectives
- Public security
- Geopolitical risk

Income and economic structure

- Prosperity, diversity and degree to which economy is market oriented
- Income disparities
- Effectiveness of financial sector in intermediating funds; availability of credit
- Competitiveness and profitability of nonfinancial private sector
- Efficiency of public sector
- Protectionism and other nonmarket influences
- Labour flexibility

Economic growth prospects

- Size and composition of savings and investment
- Rate and Pattern of economic growth

Fiscal flexibility

- General government revenue, expenditure and surplus/deficit trends
- Revenue-raising flexibility and efficiency
- Expenditure effectiveness and pressures
- Timeliness, coverage and transparency in reporting

General government debt burden

- General government gross and net (of assets) debt as a percent of GDP
- Share of revenue devoted to interest
- Currency composition and maturity profile
- Depth and breadth of local capital markets

Offshore and contingent liabilities

- Size and health of non-financial public sector enterprises
- Robustness of financial sector

Monetary flexibility

- Price behaviour in economic cycles
- Money and credit expansion
- Compatibility of exchange-rate regime and monetary goals
- Institutional factors, such as central bank independence

External liquidity

- Impact of fiscal and monetary policies on external accounts
- Structure of the current account
- Composition of capital flows
- Reserve adequacy

External debt burden

- Gross and net external debt including deposits and structured debt
- Maturity profile, currency composition and sensitivity to interest rate changes
- Access to concessional funding
- Debt service burden

Attachment 3 – Rating Analysis of No Change to Government Policy

S&P Long Term Scenarios of Selected AAA/AA Rated Sovereigns

	Net general govt debt (% of GDP)					General govt balance (% of GDP)¶					Hypothetical ratings			
	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050	2007	2020	2030	2040
Australia	-4	-8	5	36	78	1.2	-0.2	-2.6	-5.2	-8	AAA	AA	A	Spec.
Austria	47	42	54	80	105	-1.3	-1.7	-4.1	-5.4	-5.8	AAA	AAA	A	BBB
Belgium	66	44	50	85	134	0.3	-0.8	-4.2	-7.6	10.2	AA	AAA	BBB	Spec.
Canada	18	5	9	26	48	1.2	0.2	-1.6	-3.1	-4.1	AAA	AAA	A	A
Denmark	12	-8	-23	-33	-39	2	2	2	2	2	AAA	AA	AA	AA
Finland	-16	-26	-20	6	39	2	1.4	-1.4	-3.4	-5.1	AAA	AA	BBB	Spec.
France	56	58	77	115	167	-1.8	-3.4	-5.8	-9.2	11.8	AAA	AA	A	Spec.
Germany	56	43	48	68	99	-0.6	-1	-3	-4.9	-7.2	AAA	AAA	AA	A
Ireland	1	-3	14	57	132	1.3	-0.6	-3.7	-8.3	14.2	AAA	A	BBB	Spec.
Japan	92	105	163	253	397	-3.6	10.4	13.5	19.5	28.1	AA	Spec.	Spec.	Spec.
Luxembourg	-28	-12	32	107	197	0.8	-2.4	-8.2	14.3	19.6	AAA	A	Spec.	Spec.
Netherlands	36	33	54	102	161	0	-2.1	-5.7	-9.9	12.6	AAA	A	Spec.	Spec.
New Zealand	-3	-17	-6	35	93	2	1.1	-2.8	-6.8	10.2	AA	A	Spec.	Spec.
Norway	171	-263	-285	-223	-97	19.2	17	9.2	-2.7	10.7	AAA	AAA	Spec.	Spec.
Portugal	62	74	115	206	355	-2.9	-6	10.2	18.4	28.6	AA	BBB	Spec.	Spec.
Slovenia	23	40	85	178	326	-2.1	-4.9	10.1	18.3	27.8	AA	BBB	Spec.	Spec.
Spain	16	-3	-1	51	151	1.6	1.2	-2.7	-9.7	15.9	AAA	AAA	BBB	Spec.
Sweden	-17	-24	-16	14	51	1.9	1.3	-1.7	-4.4	-6	AAA	AAA	A	Spec.
U.K.	40	47	67	106	162	-2.2	-3.3	-5.5	-8.8	12.4	AAA	AAA	A	Spec.
U.S.	55	62	98	161	242	-2.1	-5.1	-10	15.2	20.7	AAA	A	Spec.	Spec.

Source: "What A Change a Year Makes: Standard & Poor's 2007 Global Graying Progress Report", Standard & Poor's 19 Sept 2007