



Institute
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of Actuaries

Pensions Conference 2015

24 – 26 June
Hilton Hotel, Glasgow



An ALM Approach to DC Savings

Brnic Van Wyk
QSuper, Brisbane, Australia
24 June 2015

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Background



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Australia

Three pillars:

1. Means-tested Age Pension from age 65
 - Moving to 67 and then maybe 70
2. Compulsory occupational defined contribution system
 - Mandatory employer contributions (currently 9.5% - to go to 12%)
3. Voluntary employer and member contributions



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Australia

- Less than 200 large industry and retail funds
- Small number of large public sector funds
- Corporate funds are limited
- Self managed superannuation funds (maximum 4 members)

Benefits

- Mandatory preservation until age 55 (moving to 60)
- Tax-free cash lump sum at retirement (if moved to a pension account)
- No lifetime annuity market – account based withdrawals (no maximum)



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The Good, the Bad and the Ugly

Good

- Compulsory contributions for most
- Voluntary tax advantaged contributions
- Means tested social security

Bad

- Some systemic inefficiencies – multiple funds, choice of fund
- Undiversified investment risk – Equity and peer risk dominate

Ugly

- Little formal annuitisation
- Gap between age for lump sum and social security



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QSuper

- Fund for current and former employees of the Queensland public service and their families (two-thirds Health and Education)
- 540,000 members (55,000 DB; 250,000 inactive; 34,000 pension)
- Closed DB section ~ \$25billion
- Default DC with 8 cohorts/investment strategies
- Investment Choice DC with 8 investment options
- Member direct investment platform
- Soft compelled 17.75% contribution rate (5% member)
- 90% of DC members are in the default – *QSuper Lifetime*

} ~\$60billion



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The Evolution of Default DC



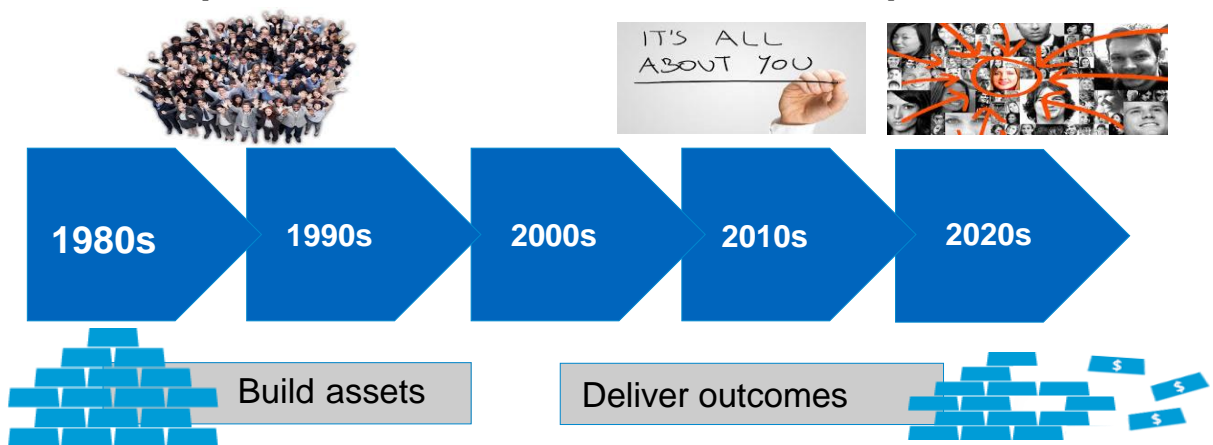
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Value and member outcomes are key drivers for change

First super revolution

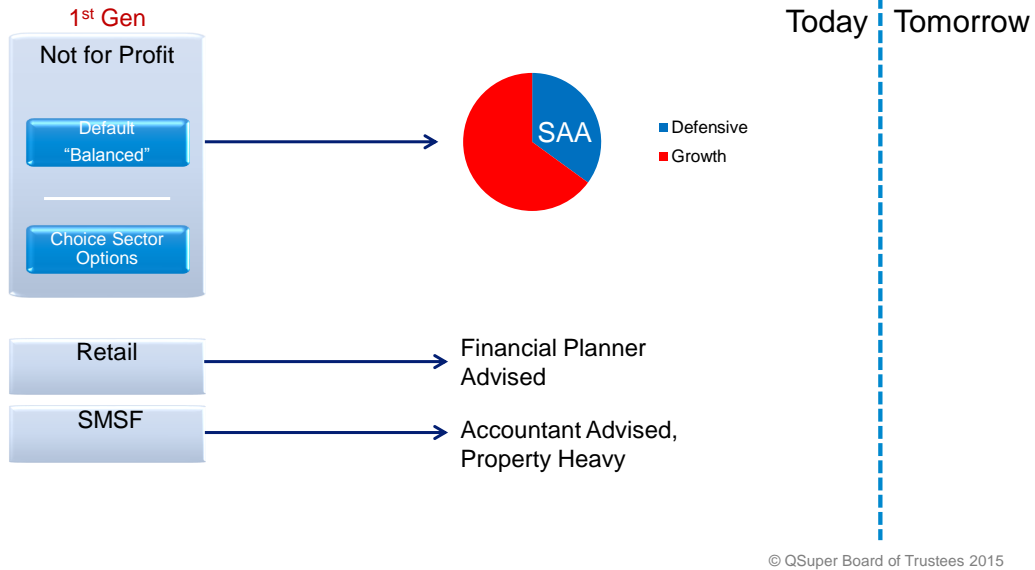
Second super revolution



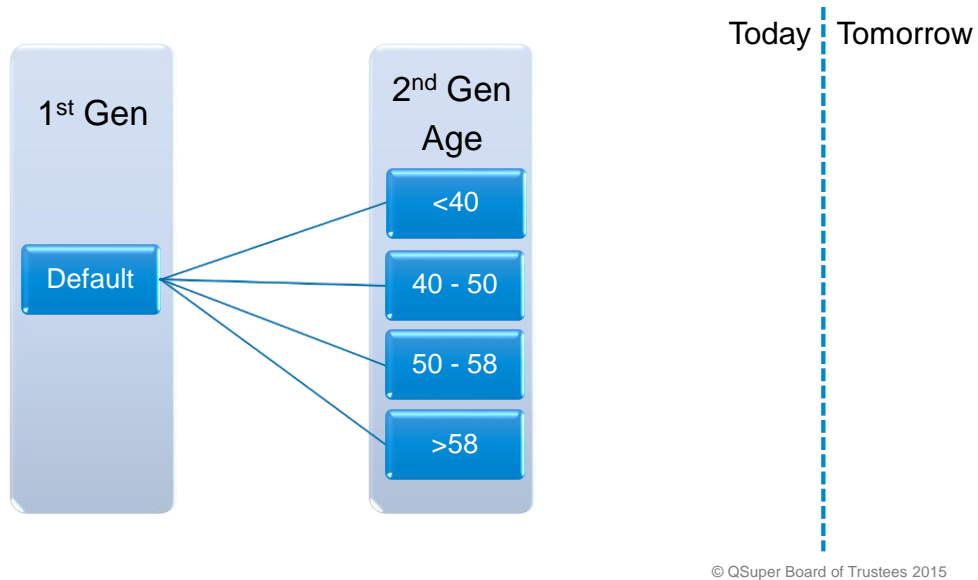
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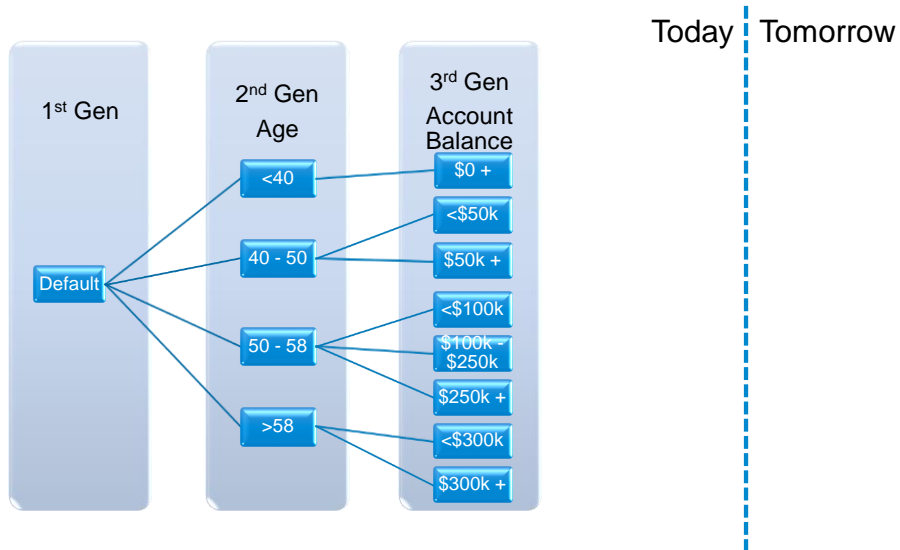
Evolution of Default DC – Australia



Evolution of Default DC – Lifecycle and Target Date Funds



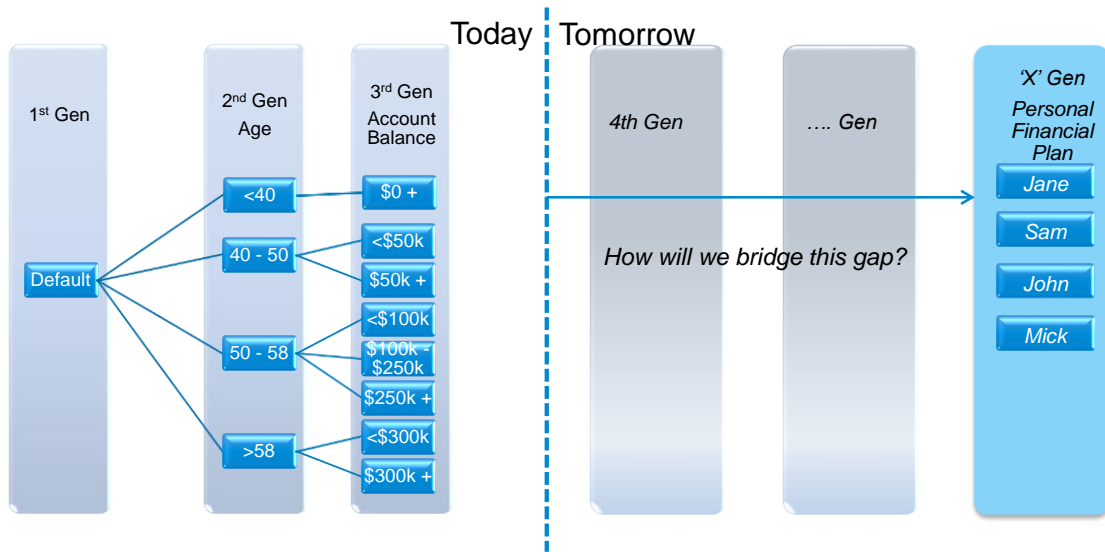
Evolution of Default DC – QSuper Lifetime



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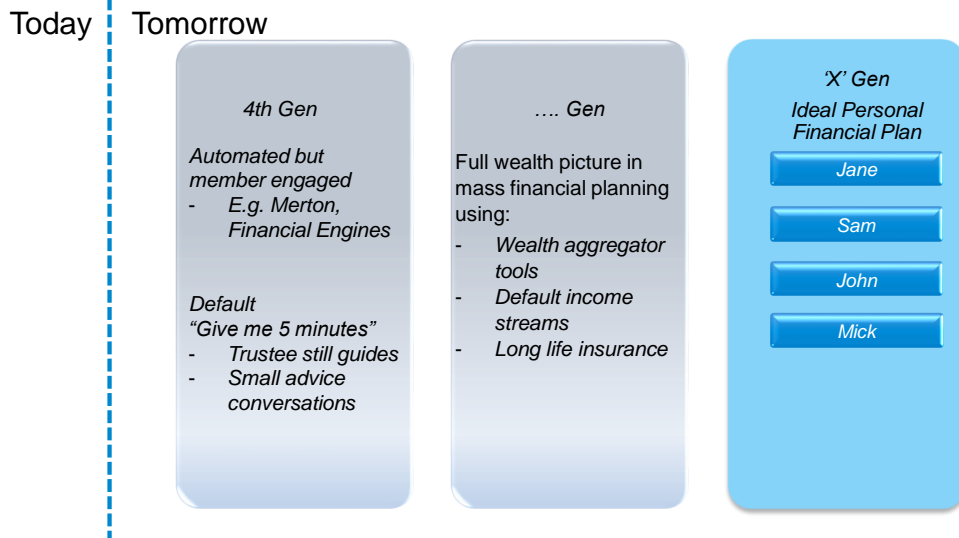
The Evolution of Default DC – The Future?



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The Future of Default DC

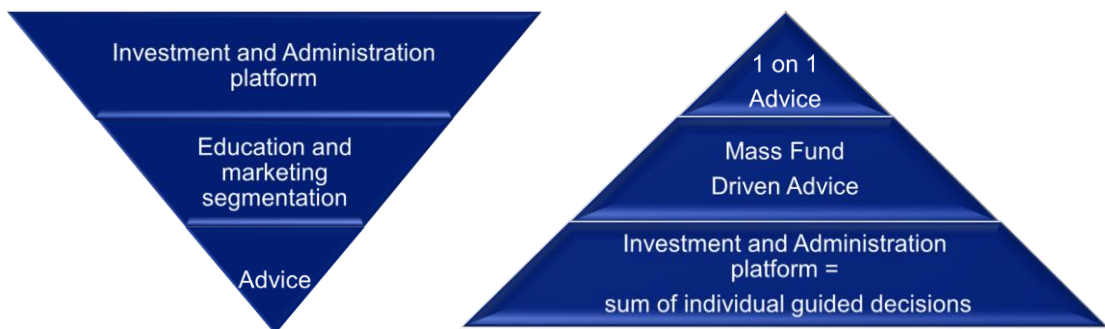


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"When" not "if"

- In 10 years time, would we ignore what we know about your members?
- Funds will become advice engines; even to default members
- This will invert current business plans



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The GFC changed everything

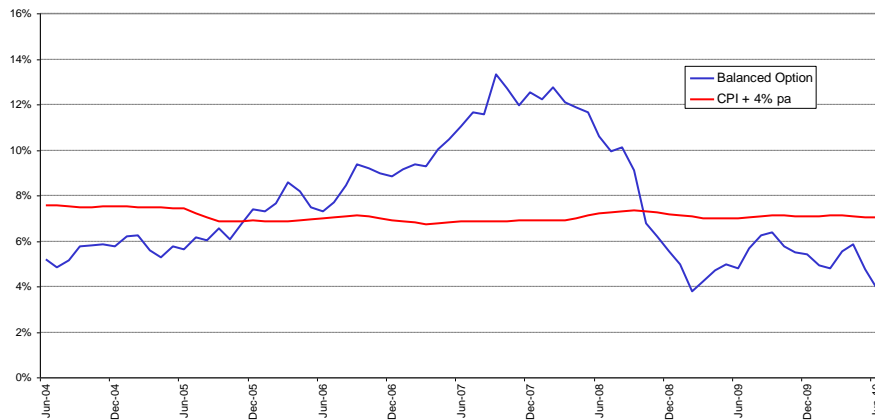


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Absolute return objective

**Rolling 5 Year Returns
Balanced Option Vs CPI + 4%**

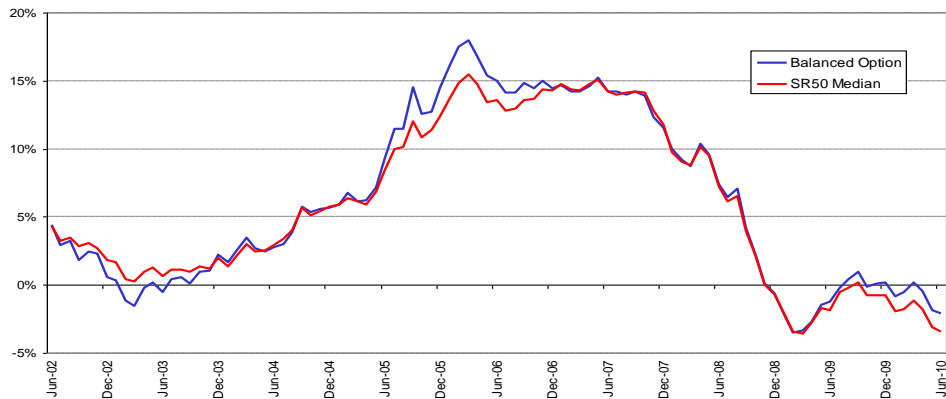


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Peer relative return objective

**Rolling 3 Year Returns
Balanced Option Vs SR50 Median**

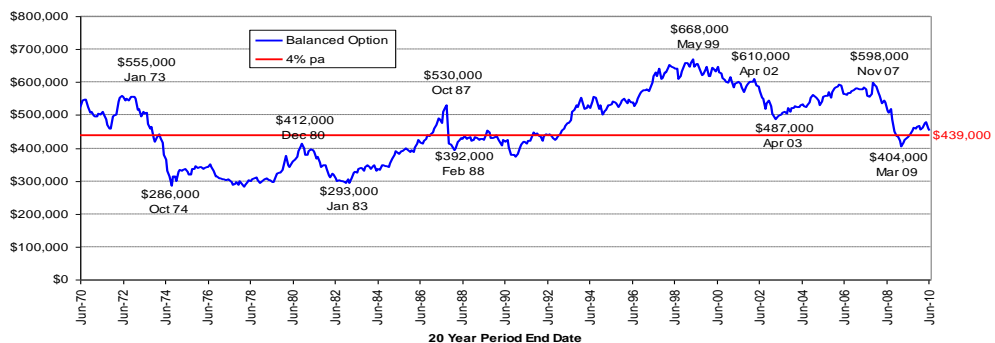


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Actual member outcomes

**Future Values of Members Investing for 20 Years
Balanced Option Real Return (17.75% cont) Vs 4% pa**



Assumptions
 - Initial investment of median 40 y.o. member balance
 - Monthly contributions of 17.75% of median 40 y.o. salary
 - Investment returns based on a proxy Balanced return to June 1991
 - Investment returns based on Balanced unit price growth from July 1991 to June 2010



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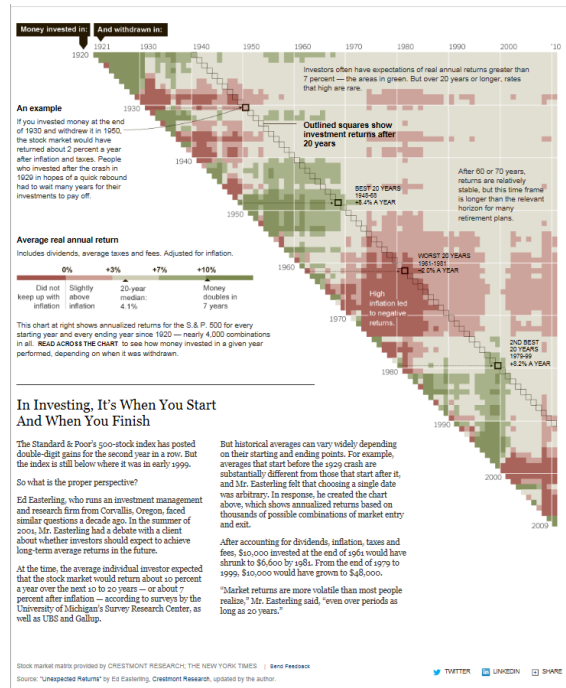
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Sequence of returns matters

Source: New York Times 01/02/11:

“In Investing, It’s When You Start and When You Finish”

- Expectations are often >7% (green)
- Rare for periods 20 years +



A rationale for change

Who sets investment strategy and bears investment risk ?

1. Defined Benefit members:
 - employer sponsor sets strategy and bears risk
2. Accumulation members:
 - Choice: members set strategy and bear risk
 - **Default:** Trustee sets strategy; members bear risk
3. Pension members:
 - Choice: member sets strategy and bears risk
 - Default: Trustee sets strategy; members bear risk



GFC assessment

Post GFC, QSuper re-evaluated the environment:

- Lower GDP (growth) and inflation expectations, lower return environment
- Balance of risks changed – need for ‘new tools’

Strategy changes implemented for a “better one-size-fits-all” default:

- Removal of peer objective
- Move towards “risk balanced”
- Expansion of non-market cap equity
- Restatement of investment objectives
- Structural AE/IE adjustment



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The path QSuper is following

Goal: exercise fiduciary authority to accumulate assets and transition to retirement income across member lifecycle.

Eventual aspiration is to set strategy for each individual, but we will begin by . . .

- Segmenting default Accumulation members into meaningful cohorts
- Developing investment strategy for each cohort using asset-liability management (ALM) principles
- Managing strategies dynamically as cohorts and risks change



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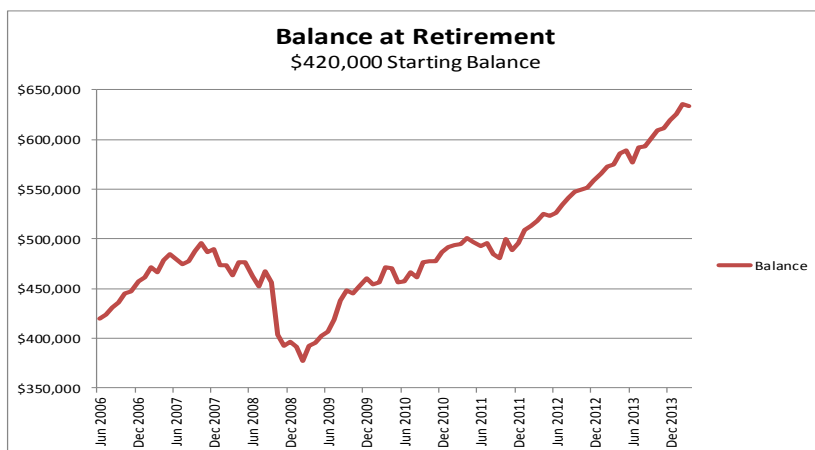
Monitoring Outcomes



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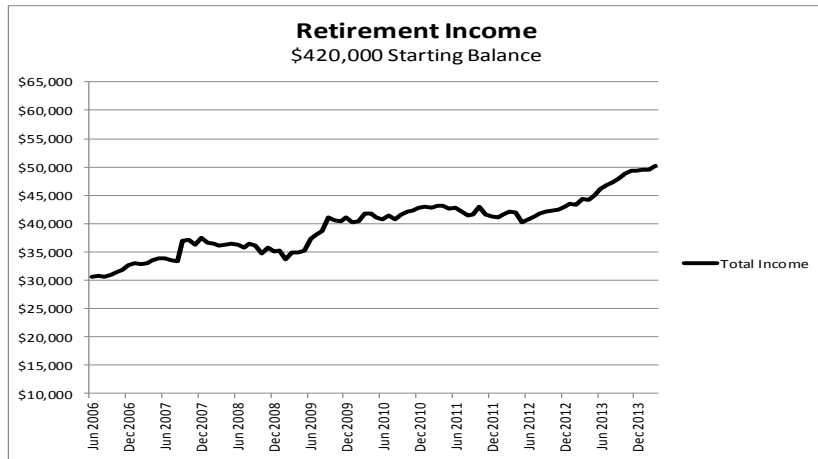
Monitoring retirement balances



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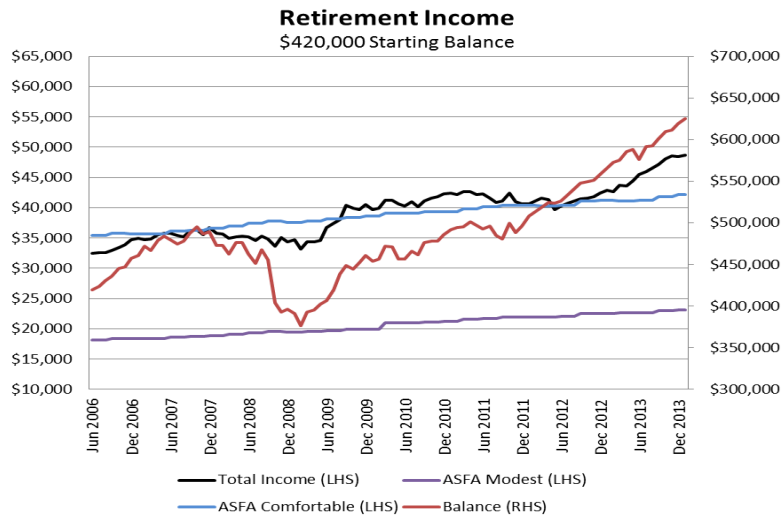
Monitoring retirement income



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Monitoring retirement outcomes



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Data analysis and cohorting members



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Segmenting cohorts of default members

Use age as a starting point. Age is a good proxy for:

- Investment horizons
- Member risk tolerance around adequacy vs. certainty

But it is imperative to also include other factors to determine funded status:

- Account balance, salary, contribution rate
- Variable retirement dates (later)

Make assumptions regarding unknown data

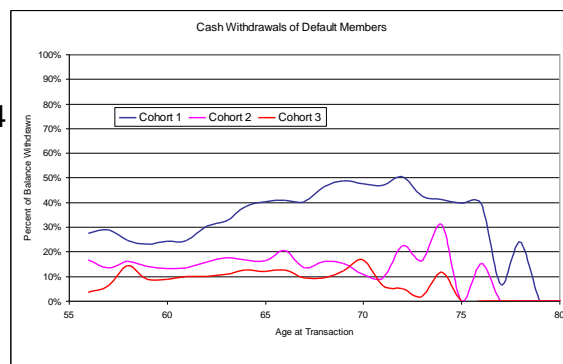


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Data analysis – behaviours in retirement

- 15% cash withdrawals at retirement
- Retirement at age 63
- Transfer to pension account at age 64
- Preference for phased withdrawals from accumulation accounts
- Actual withdrawals plus estimate Age Pension roughly equal annual ASFA Comfortable income level of \$40,000



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Financial planner interviews

- Based on interviews with 16,389 members since 1996 (for households)
- Majority of members own their own home
- Most members have material assets outside of super in addition to that
- Average desired retirement age is 62

	Desired Retirement Age				
	1m and greater	500k to 1m	300k to 500k	100k to 300k	less than 100k
Count	321	2,450	1,675	2,851	881
Average	62	61	62	63	63



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Desired income levels not linear to account balance

NO RENTAL PROPERTY									
	Total Superannuation Assets	Assets - Liabilities (not incl Super and House)	Desired Income Now	Desired Income in Retirement	Home	Bank Accounts	Shares	Term Deposits	
Super Assets: < 1m (N = 290)									
Count	290	290	43	43	279	265	165	78	
Average	\$ 1,264,142	\$ 536,778	\$ 48,609	\$ 41,605	\$ 678,962	\$ 86,170	\$ 139,495	\$ 138,747	
Median	\$ 1,154,198	\$ 356,682	\$ 43,225	\$ 44,000	\$ 600,000	\$ 38,000	\$ 50,000	\$ 98,500	
Super Assets: 500k - 1m (N = 2503)									
Count	2503	2503	230	230	2398	2170	1141	565	
Average	\$ 674,363	\$ 333,306	\$ 41,270	\$ 34,864	\$ 553,330	\$ 54,986	\$ 70,606	\$ 83,536	
Median	\$ 647,502	\$ 223,337	\$ 38,980	\$ 36,000	\$ 500,000	\$ 20,000	\$ 18,000	\$ 48,000	
Super Assets: 300k - 500k (N = 2160)									
Count	2160	2160	172	172	2026	1892	875	496	
Average	\$ 393,641	\$ 271,520	\$ 40,850	\$ 31,119	\$ 528,007	\$ 47,655	\$ 48,111	\$ 77,742	
Median	\$ 390,825	\$ 175,000	\$ 39,000	\$ 31,500	\$ 480,000	\$ 16,175	\$ 14,300	\$ 41,793	
Super Assets: 100k - 300k (N = 2741)									
Count	2741	2741	176	176	2466	2369	970	566	
Average	\$ 196,732	\$ 241,526	\$ 34,511	\$ 25,835	\$ 487,286	\$ 43,323	\$ 42,869	\$ 79,451	
Median	\$ 195,159	\$ 157,270	\$ 34,763	\$ 30,000	\$ 445,000	\$ 13,500	\$ 10,680	\$ 34,310	
Super Assets: < 100k (N = 952)									
Count	952	952	42	42	768	809	271	168	
Average	\$ 55,191	\$ 263,073	\$ 40,052	\$ 24,795	\$ 477,879	\$ 61,858	\$ 46,589	\$ 92,592	
Median	\$ 58,307	\$ 159,522	\$ 35,988	\$ 30,000	\$ 420,000	\$ 11,470	\$ 10,000	\$ 40,000	

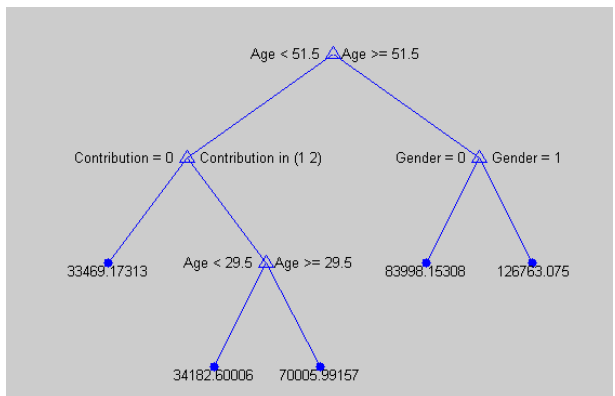
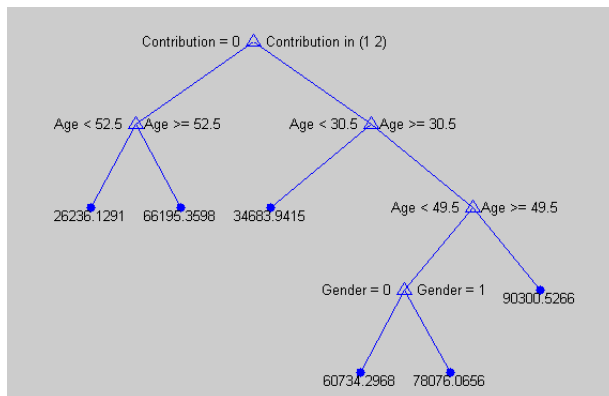


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Establish homogeneous cohorts with reasonably narrow distributions

Sample CART analysis:



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Cohorting the total membership

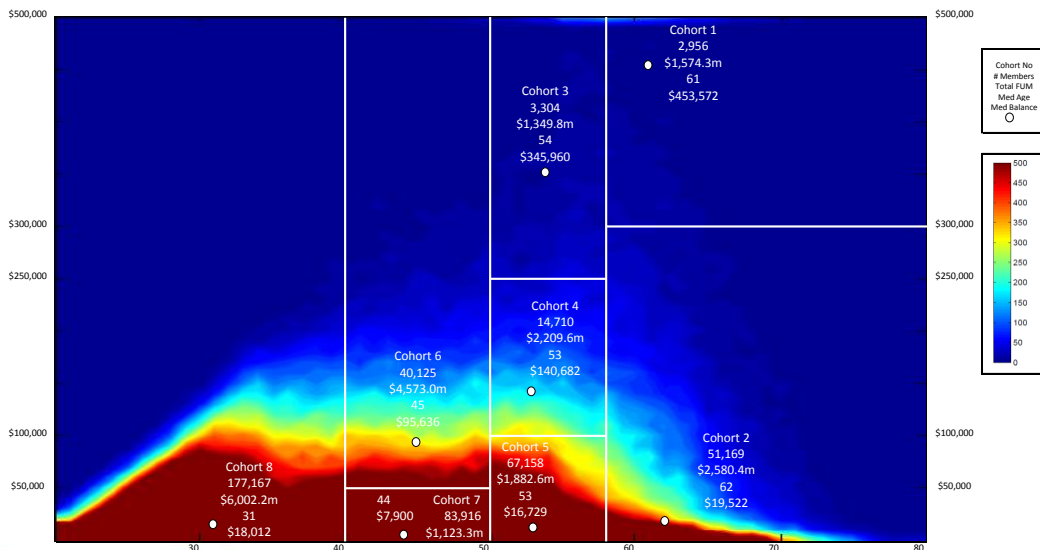
- Three phases to implementation
- Administration considerations
- Portfolio size limitations
- Member communication and engagement strategies
- CART analysis
- Basic lifecycle principles
- Subjective and qualitative overlay



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Membership data and cohort structure



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ALM Process and Methodology



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Re-defining risk

- The target lifetime cash flow creates a liability for the member (cohort)
- Aim to achieve the amount required to provide the income objective
- **Risk:**

Historically	variance of annual returns
Now	variance around objective (income)
- We will measure that as a probability and expected size of “shortfall”
- Focus on downside measures because members are more concerned with having less than overshooting target.
- We can estimate this regularly and tell members where they stand.
- This is similar to the concept of managing the “surplus” in DB fund.



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Investment Structure (ALM tenets)

Strategies will be constructed from a mix of:

1. A liability hedging (risk - free) asset combining two elements:
 - An interest rate hedge (duration equivalent to term to retirement)
 - An inflation hedge
2. Risky assets pool producing a solid risk premium (common to all cohorts)

The % mix between the two will designate the cohort strategy risk level

This is standard asset/liability management methodology

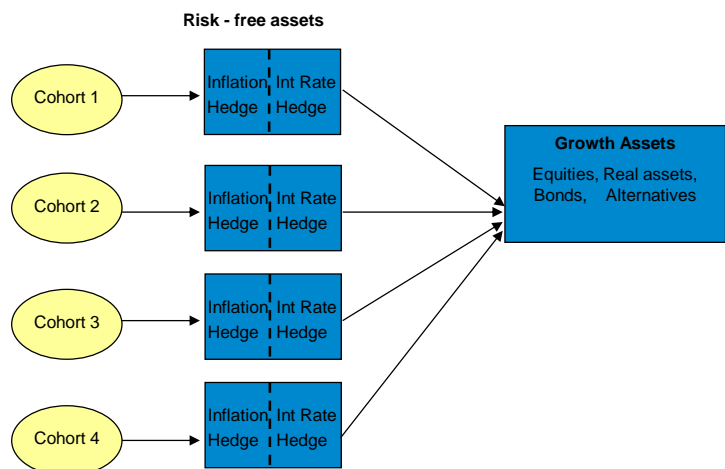


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Implementation Structure

- Hedging asset pool represents risk free asset for a cohort
- If future contributions accrued at risk free rate are sufficient to meet the objective, we could invest 100% in the risk free asset as a baseline strategy



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ALM Process

- Set an investment objective
- Identify a cohort's assets and liabilities (on average)
- Stochastic projection of retirement outcomes (income and balance)
- Calculate base case outcome using "risk-free" rate
- Project various growth and risk hedge ratios
- Scenario, stress and sensitivity testing
- Consider asset only metrics (e.g. probability of negative return)
- Review regularly and manage over full lifecycle of the cohort

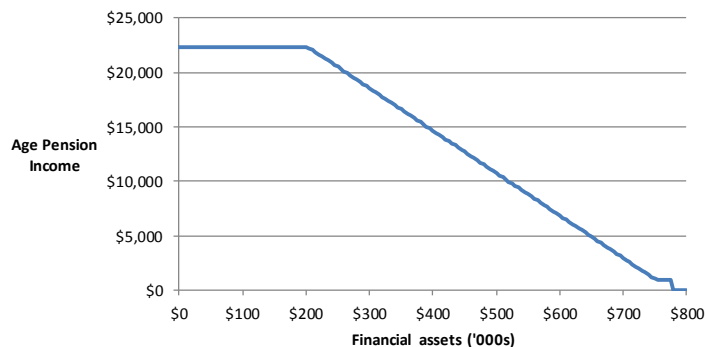


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Key factor: estimate social security benefits

- Allowing for estimate means tested Age Pension entitlements



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ALM Decision Framework

Consider alternative strategies using different risk measures and metrics:

- Minimum expected total retirement income (97.5% confidence)
- Downside vs. target in unfavourable scenarios (stress testing)
- Relative to expected downside, the additional expected median benefit
- Corporate risk measures
- Behavioural finance and member expectation considerations
- Only introduce investment risk to the extent that it adds value



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Unfavourable scenarios (stress testing)

- Initial modeling contained stress tests for 5 year short term scenarios:
 - Japan style scenario extending for 5 years
 - Major risky asset shock (-12% followed by 0% for 4 years)
 - Severe unexpected inflation (drawn from Bridgewater Risk Tool)
- Extended modeling requires stress tests for longer periods (10, 20, 35 years)
- Worst equity returns are used as proxy for the growth asset outcomes
- Worst bond returns are used as a proxy for the risk-free asset pool



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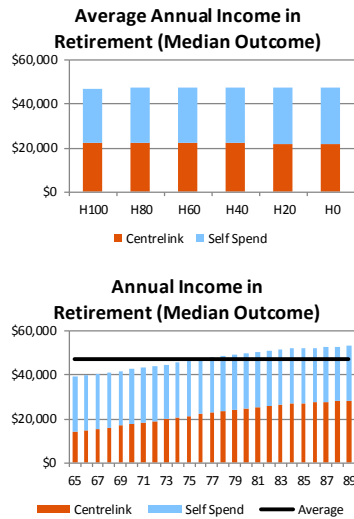
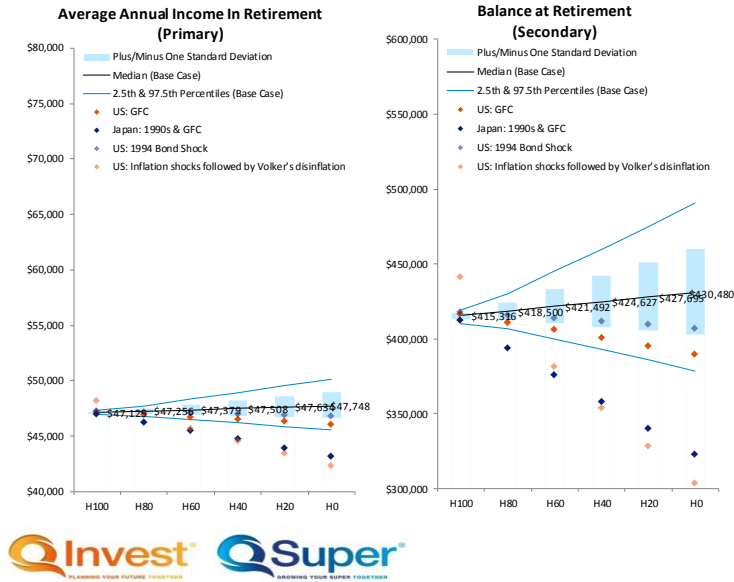
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Actual sequence of historic returns used for stress testing

<u>Duration</u>	<u>Equities</u>	<u>Bonds</u>
35 years	Japan: 1990's and GFC	US: 1994 Bonds shock
20 years	Japan: 1990's and GFC	US: Inflation shocks followed by Volker's disinflation
10 years	US: GFC	US: Inflation shocks followed by Volker's disinflation

Sample Model Outputs

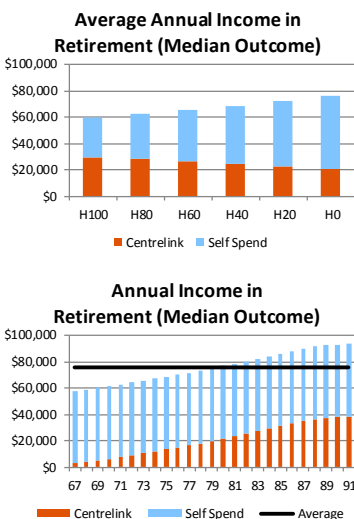
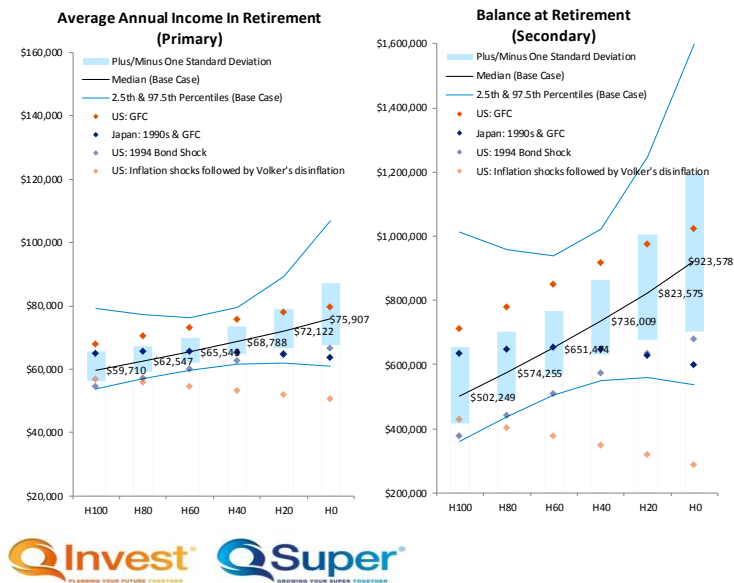
Sustain 2: Older, high balance members



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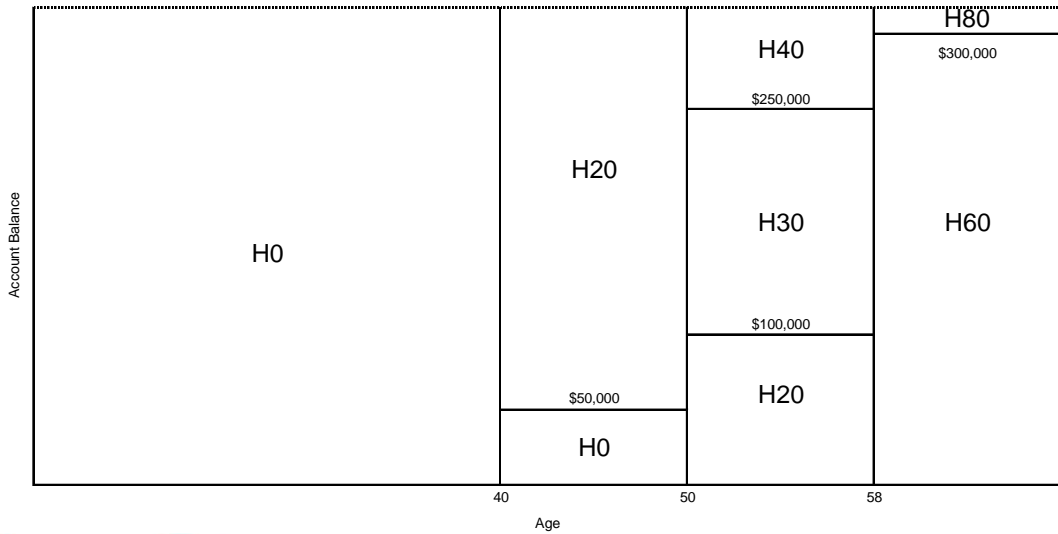
Outlook: Younger members



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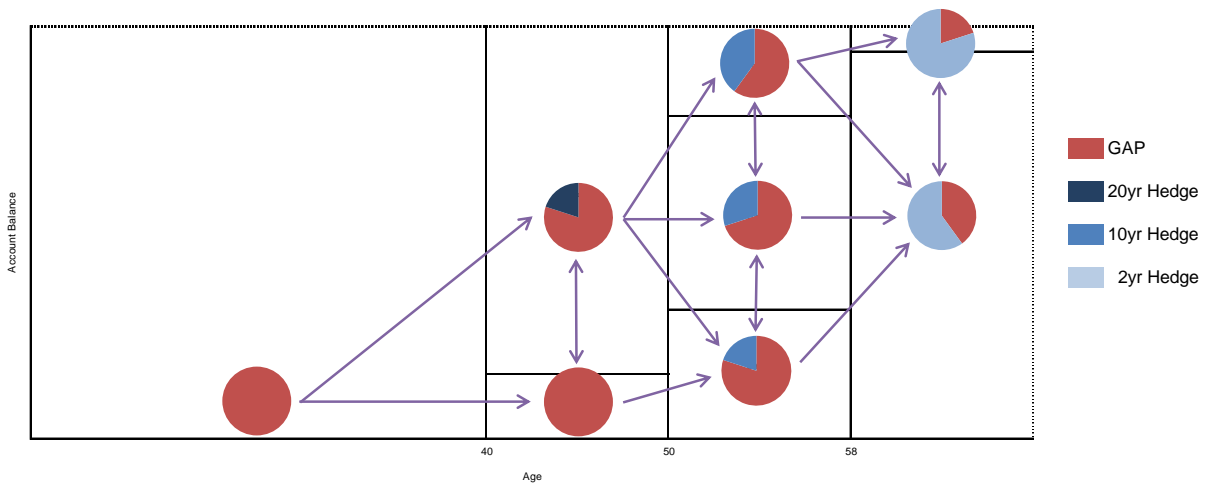
Summary of strategies



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Stylised illustration



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General strategy considerations

Investment risk will reduce as age increases:

- Members have shorter horizons to smooth cycles in investment markets
- Asset values increase so effective financial risk increases
- Sequence of returns risk is very high at and around retirement

Investment risk will reduce as account balance increases:

- The impact of investment risk on final retirement incomes is amplified
- Age Pension impacts on retirement income diminish - retirement incomes are more volatile as account balances increase



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But this is not a glidepath!

We manage risks dynamically as they emerge

The system is still maturing

Demographics and the environment change continuously

We monitor and adapt objectives and strategies continuously



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An Overview of QSuper Lifetime



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QSuper Lifetime product philosophy

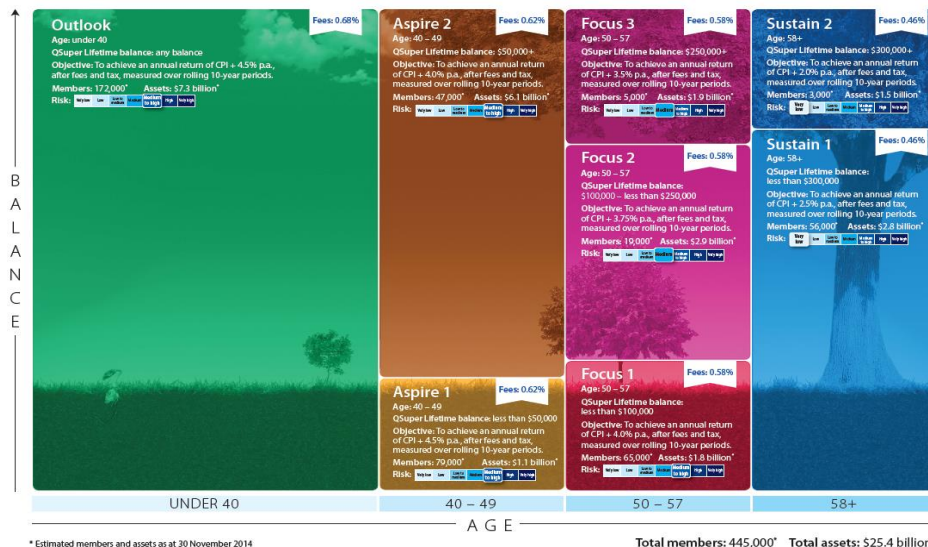
- Desire to move from delivering uncertain lump sum accumulation benefits to more certain targeted retirement income with mass personalisation
- Move to a personalised tailored structure to better meet individual needs
- QSuper's previous default option, Balanced, was a one-size-fits all approach
- *Lifetime* uses an Asset Liability Model to match investment strategies to member liabilities (targeted income streams in retirement)
- Attempt to balance certainty of outcomes against adequacy of outcomes
- Lifecycle investment strategies can take into account the member's age, balance, Age Pension entitlements and current economic conditions



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Product Disclosure Statement (PDS) details



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QSuper Lifetime statistics

- Started 16 December 2013 with 439,761 members and \$22.4 billion
- Currently (30 April 2015) has 449,844 members and \$27.4 billion
- Less than 3% of members have switched to another investment option
- 66% of QSuper accumulation assets are held in Lifetime
- 96% of Lifetime members have their total balance in Lifetime
- Based on APRA statistics, Lifetime is the 4th largest MySuper product
- Awarded an **Asian Investor award for Institutional Excellence in Australia/New Zealand** and a **5 Heron Quality Star** rating for 2015



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Members and assets in QSuper Lifetime

Balance			Focus 3 \$2.0 billion 4,800 members	Sustain 2 \$1.3 billion 2,700 members
			Focus 2 \$3.1 billion 18,000 members	Sustain 1 \$2.9 billion 54,000 members
			Focus 1 \$2.0 billion 64,000 members	
	Outlook \$8.2 billion 179,000 members	Aspire 2 \$6.6 billion 47,000 members		
		Aspire 1 \$1.3 billion 80,000 members		
	Under 40	40 - 49	50 - 58	58+

AGE

Figures at 30 April 2015



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Considering assets and liabilities



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Retirement assets

What assets do members have to fund their retirement income?

- The Age Pension
- Current superannuation account balance
- Investment returns on the current account balance
- Future contributions
- Investment returns on future contributions



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Retirement liabilities

How much would it cost to provide an adequate retirement income?

- Starting with ASFA Comfortable income level at retirement
- Regular withdrawals from an account based pension
- Invested in long term balanced portfolio
- Estimate retirement period and life expectancy of 25 years

The value of the “GOAL” is about \$600,000 in today’s dollars

This is similar to how an ALM process values its “LIABILITIES”



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A young QSuper member

From a section of the Outlook cohort in QSuper Lifetime:

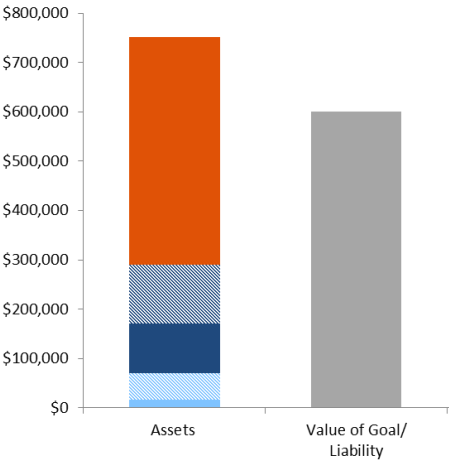
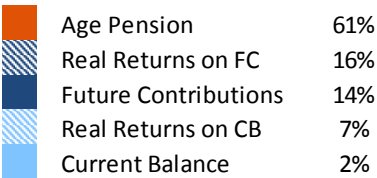
- Average age : 29.8
- Median current account balance : \$17,134
- Median salary : \$34,249
- Contribution rate : 9.5% (SG rate)
- Number of members : 20,309



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DC Funding Level



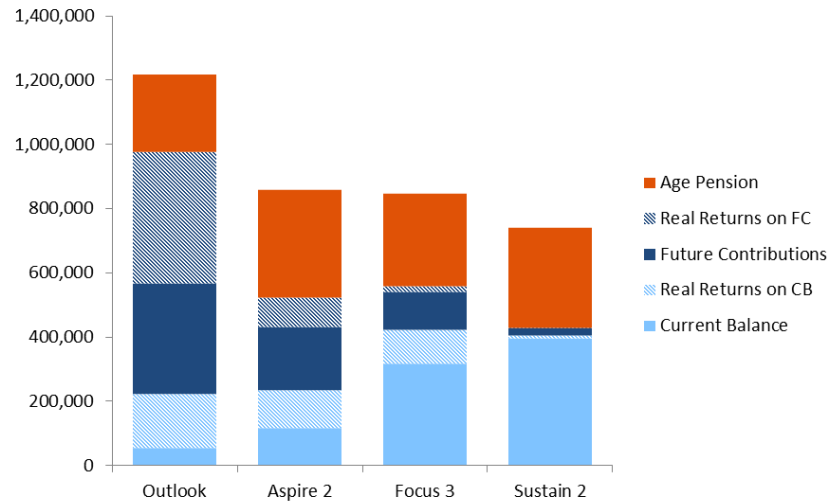
125% Funding level



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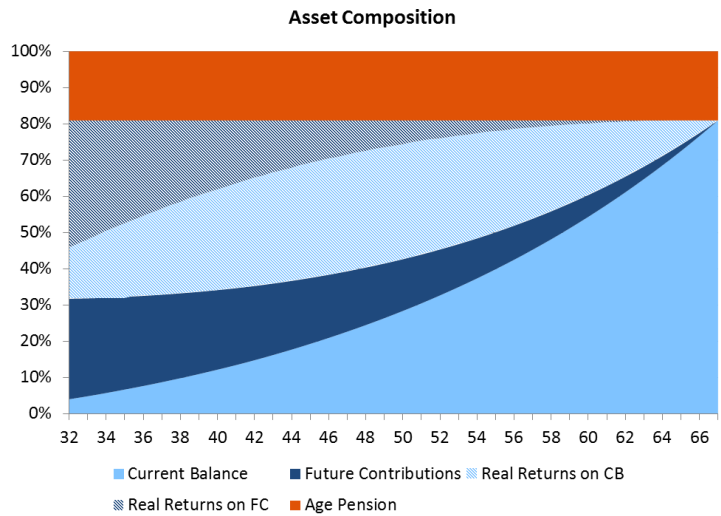
Retirement assets are very different for different member groups



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Development of asset components for young members



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Risks that impact on retirement outcomes are different

<u>Assets</u>	<u>Value of Goal/Liability</u>	<u>Both</u>
Investment returns	Consumption levels	Inflation
Contribution rates	Life expectancy	Long term real rates
Interest rates		Retirement age
		Policy changes



Performance monitoring and attribution



Performance monitoring

Tier 1: Cohort evaluation against adequacy goal (medians)

- Actual vs. expected experience
- Change in future expectations

Tier 2: Growth asset pool and cohorts on an asset-only basis

- Traditional CPI+, volatility, drawdown, fees benchmarks

Tier 3: Risk-free asset pool against hedging objectives

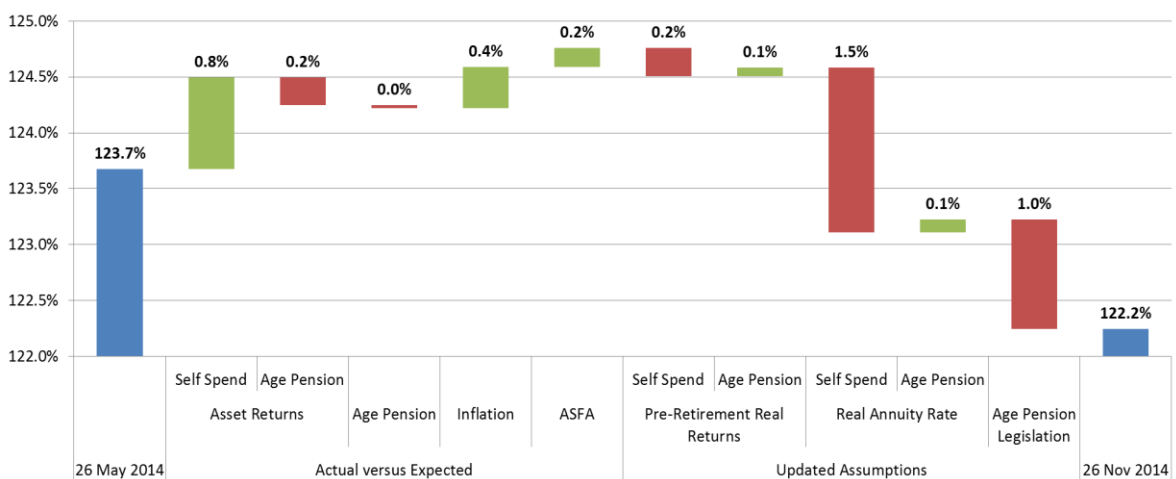
- Not fully funded – still in development



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Attribution analysis of funding level



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Conclusion



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Potential changes to the current strategy

QSuper Lifetime is the first step in an ongoing process to improve the retirement outcomes for default members

- Continuous improvement of process and methodology
- Increasing sophistication of modelling
- Dynamic management of strategies and objectives
- Review cohort structure – more granular grouping
- Use other factors like gender and contribution rate
- Members in the post-retirement phase is a key focus
- Understanding the risks and how these impact differently in cohorts
- Unitising asset pool to create scalability



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Conclusion

- Material change to the way we manage default accumulation monies
- Initially based on two factors: age and account balance
- No perfect solution but we start here and improve over time
- Remain flexible (e.g. to incorporate regulatory changes)
- Limited number of initial cohorts allows us to test decision making process and make administrative adjustments
- ALM methodology has been used in DB fund since 2006



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Questions and discussion



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ALM Investment Principles

1. ALM represents the process of managing a group of members' assets to meet our best estimate of the members' liabilities.
2. Invest "to" not "through" retirement.
3. Define risk as not achieving the retirement income objective.
4. Analyse the level of risk appropriate to the investments of each cohort by starting with a risk-free baseline. Add investment risk only to the extent warranted.
5. Construct cohort strategies by combining a unique risk-free asset with a common pool of risky assets.



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ALM Investment Principles

6. Respond dynamically to changing investment environment and cohort characteristics.
7. Default members have asymmetric risk preferences.
8. Assume members have Centrelink entitlements, under current policies, into the foreseeable future.
9. Applying ALM principles to Accumulation default members is innovative. We anticipate an extended period of continuous improvement.
10. Cohort boundaries, investment objectives, investment strategies are set at a group level.



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