Techniques for assessing retirement strategies

Presented by Technical Services Manager Melanie Dunn

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Techniques for assessing retirement strategies

**Agenda**

- Why assessing strategies for retirement is challenging
- Measures of success when comparing strategies in retirement
- Techniques for modelling retirement outcomes
- Case study
Measures of success in retirement

W
HEALTHY
Australia’s retirement system

Saving for retirement

- Prior to retirement spending typically funded from
  - Income from paid work
  - Voluntary savings e.g. earnings on shares and bank accounts, and rent on investment properties

- Success is measured by things like
  - Have enough income to pay for expenses like groceries, school fees, mortgage repayments etc
  - Saving enough to go on holidays or buy a new car
  - Maximising returns and minimising tax to build wealth for the future

- Compulsory superannuation savings defer some of today’s income to be used to pay an income in retirement
Understanding retirement goals and risks

The challenge of assessing retirement strategies

- At retirement everything changes
  - No or little income from paid work coming in
  - Three pillars for funding retirement income: compulsory super, voluntary savings, Age Pension
- Retiree is responsible for working out how to use the three pillars
- In working out a plan for retirement need to understand three things:
  1. How much will retirement lifestyle cost?
  2. What does a successful retirement look like?
  3. What are the risks to achieving that successful retirement?
- Nearly always includes competing objectives
  - Trade-offs and prioritisation important conversations
How much will retirement cost?

Measures of success in retirement

- Do you know how much you spend on different types of expenditure each year? Many don’t!
- Do a budget for retirement costs:
  - Non-negotiables: power and water bills, rent/mortgage, medicines, groceries
  - Lifestyle expenses: dining out, private insurance, holidays, memberships
- ASFA Retirement Standard March 2020 for 65 year old retirees

<table>
<thead>
<tr>
<th></th>
<th>Modest lifestyle (p.a.)</th>
<th>Comfortable lifestyle (p.a.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>$28,220</td>
<td>$44,183</td>
</tr>
<tr>
<td>Couple</td>
<td>$40,719</td>
<td>$62,435</td>
</tr>
</tbody>
</table>

- Full Age Pension is around $24,500 for a single, and for couples is around $36,500
  - Age pension alone may not provide enough, many retirees will not want to live solely on Age Pension
### Translating goals to success measures

#### Measures of success in retirement

<table>
<thead>
<tr>
<th>Comments a retiree might say when asked what a successful retirement looks like to them</th>
<th>Potential success measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can always afford non-negotiable expenses no matter how long I live, how costs of living change, or how share market performs</td>
<td>Guaranteed can pay non-negotiable expenses for life</td>
</tr>
<tr>
<td>I can afford my desired lifestyle for as long as possible, and spend a little more from time to time to enjoy retirement</td>
<td>Maximises spending to life expectancy with high confidence</td>
</tr>
<tr>
<td>I can help my children out if needed or pay for additional expenses without burdening my family</td>
<td>Flexibility to access savings for one-off expenses</td>
</tr>
<tr>
<td>I will get the maximum support I can from the Age Pension to help make my own savings last longer</td>
<td>Maximises Age Pension outcomes</td>
</tr>
<tr>
<td>I can leave some savings to my children when I pass away</td>
<td>Provides an estate value when pass away</td>
</tr>
</tbody>
</table>

Some of these objectives compete with one another, so will be important that analysis allows for comparison of outcomes and trade-offs
Australia’s Age Pension is one of the most complex government pensions in the world

Risk = uncertainty
- Future outcomes are not ‘risky’ if we know about them and can plan with certainty, even if they are bad
- Unfortunately most future outcomes are uncertain and therefore extremely difficult to plan for
- Main focus on market risk, inflation risk, longevity risk
- Success measures to focus on ‘likelihood’ of achieving goals for retirement
Techniques for modelling risk
Assessing retirement strategies

Techniques for modelling risk

- Utilise actuarial techniques to assist retirees in managing risk
  - No model is going to exactly predict the future
  - Need robust and holistic models to assess retirement for informed decision making
- Real world is not static and future outcomes are unknown
  - Traditional deterministic models which use constant assumptions don’t allow for risk
- Trade off:
  - Easy to develop and can provide simple illustrations
  - Make informed decisions about risk and handle complexity
Market and inflation risk

Techniques for modelling risk

- Sequence of returns and inflation experienced can have a big impact on the outcome
- Consider a person retiring aged 65 in 2009 with $450,000 invested in a balanced asset mix\(^1\) and they desired a retirement income of $45,000 p.a. that will increase annually with price inflation

Illustrate retirement using actual returns and inflation\(^2\)

- Poor returns at start of retirement bigger impact than later on
- Cost of sequencing risk hidden using fixed assumptions

<table>
<thead>
<tr>
<th>Year</th>
<th>Real return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average historic 20yrs (1989-2008)</td>
<td>6.4%</td>
</tr>
<tr>
<td>2009</td>
<td>-13.3%</td>
</tr>
<tr>
<td>2010</td>
<td>8.1%</td>
</tr>
<tr>
<td>2011</td>
<td>3.5%</td>
</tr>
<tr>
<td>2012</td>
<td>4.0%</td>
</tr>
<tr>
<td>2013</td>
<td>10.1%</td>
</tr>
<tr>
<td>2014</td>
<td>6.2%</td>
</tr>
<tr>
<td>2015</td>
<td>6.9%</td>
</tr>
<tr>
<td>2016</td>
<td>7.9%</td>
</tr>
<tr>
<td>2017</td>
<td>0.3%</td>
</tr>
<tr>
<td>2018</td>
<td>5.7%</td>
</tr>
<tr>
<td>2019</td>
<td>8.7%</td>
</tr>
<tr>
<td>Average (2009-2019)</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

\(^1\) Balanced asset mix 25% Aus shares, 25% Aus bonds, 25% Aus property and 25% Cash
\(^2\) Vanguard Index Chart 2019 returns and RBA historic annual inflation rates, years ended 30 June
Longevity risk

Techniques for modelling risk

- Interesting statistics from the 2015-17 life tables
  - Since the 2010-12 tables mortality rates have fallen at almost all ages (lifespans continue improving)
  - Female mortality continues to be less than male mortality at all but the oldest ages
  - In 3 years 2015 to 2017, 5,509 people in Australia died aged 100 or over - around 80% were female

- How long you will live – one of the greatest uncertainties faced by retirees

<table>
<thead>
<tr>
<th>Gender</th>
<th>Life expectancy at birth</th>
<th>Life expectancy at age 67</th>
<th>Life expectancy at age 67 with improvements</th>
<th>Age around 25% of will survive to</th>
<th>Age around 10% will survive to</th>
<th>Couple life expectancy at age 67 with improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>81</td>
<td>18.2 (past age 85)</td>
<td>20.4 (past age 87)</td>
<td>93</td>
<td>98</td>
<td>26.2 years (past age 93)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>With 25% to age 97 and 10% to age 100</td>
</tr>
<tr>
<td>Female</td>
<td>85</td>
<td>20.7 (past age 87)</td>
<td>22.5 (past age 89)</td>
<td>95</td>
<td>99</td>
<td></td>
</tr>
</tbody>
</table>

Not useful for retirees as they have already survived to retirement age. Does not allow for future improvements - the age my grandparents passed away is not the age I expect to live to! Each cohort is living longer than the last. An appropriate measure of life expectancy for retirement. Remember this is the 'average' - around 53% of retirees will live past this age. Think about what risk willing to accept that money won’t last as long as you do... can look at likelihood will survive to different ages. When looking at couples consider age to which expect last person to survive to...
Stochastic modeling

Techniques for modelling risk

- A stochastic model involves the statistical analysis of the range of possible retirement outcomes
  - Can model complex interactions such as using the three pillars to fund income in retirement
  - Considers correlations and interactions between factors over time, allows for realistic variation in returns
  - Can be tailored to an individual’s retirement inputs and objectives
  - Can use thousands of simulations to stress test likelihood of achieving measures of success

- | CPI | Yr1 | Yr2 | Yr3 | Yr4 | Yr5 | Yr6 | ... |
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sim1</td>
<td>1.70%</td>
<td>3.60%</td>
<td>1.80%</td>
<td>4.70%</td>
<td>0.50%</td>
<td>4.80%</td>
<td>3.70%</td>
</tr>
<tr>
<td>Sim2</td>
<td>-0.70%</td>
<td>-1.60%</td>
<td>1.50%</td>
<td>5.80%</td>
<td>5.20%</td>
<td>1.20%</td>
<td></td>
</tr>
</tbody>
</table>

- | Asset Class A |
  | Sim1 | 19.94% | 10.84% | 16.35% | -12.43% | -1.99% | 0.93% | -8.70% |
  | Sim2 | 12.43% | -12.43% | 1.99% | 0.93% | -8.70% |

- | Asset Class B |
  | Sim1 | 2.04% | 3.39% | 0.67% | 2.61% | 3.56% | 1.26% | 7.53% |
  | Sim2 | 3.56% | 6.97% | 1.92% | 3.67% | 5.74% | 8.84% | 0.98% |
  | Sim3 | -0.59% | 2.12% | 6.39% | 2.58% | 3.58% | 4.29% | 4.57% |

- | Sim4 | 4.71% | 6.97% | 1.92% | 3.67% | 5.74% | 8.84% | 0.98% |
  | Sim5 | 4.79% | 3.25% | 5.81% | 1.00% | 0.86% | 1.55% | 4.81% |
  | Sim6 | 2.89% | 0.29% | 3.57% | 0.19% | 2.61% | 1.08% | 4.96% |
Case study of assessing retirement
Christine aged 67 with $450,000

Case study of assessing retirement

- Single retiree homeowner with $400,000 in retirement savings, $50,000 in cash outside super, and $20,000 in personal assets
- She has non-negotiable expenses of $28,220 p.a. that she wants to ensure can pay for life, and would like an ASFA comfortable lifestyle of $44,183 for as long as possible in retirement
- Decides to investigate two retirement strategies based on asset mix of 60% growth and 40% defensive:
  - An account-based pension
  - An account-based pension + an inflation linked lifetime pension\(^1\) paying around $4,000 p.a. to secure non-negotiable expenses when combined with Age Pension

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1. Modelled using pricing at 10 July 2020 for a Challenger Guaranteed Annuity (Liquid Lifetime) flexible income immediate payments, non-reversionary, CPI indexed payments
Methodology:
- Test each retirement strategy against success measures by analysing across 2,000 simulations of retirement using returns and inflation from the Willis Towers Watson stochastic asset model and allowing for future Age Pension entitlements

Success measures:
- Guaranteed can pay non-negotiable expenses of $28,220 (increasing annually with inflation) for life
- Highest confidence can afford $44,183 to life expectancy
- Flexibility to access savings for one-off expenses
- Maximises Age Pension outcomes
- Provides an estate value when pass away so can leave some money to her Son

Case study of assessing retirement
Christine aged 67 with $450,000

Assumptions: Life expectancy based on ALT 2015-17 with 25yr improvement factors, rounded up to nearest whole age. Return assumptions utilising 2,000 simulations over 40 years of Willis Towers Watson asset class data, also assume $30,000 personal assets and $50,000 cash outside super, 0.5% asset based fee plus 0.7% growth and 0.3% defensive investment fee. ABP only: superannuation asset mix at retirement of 60% growth and 40% defensive asset mix, ABP + Lifetime pension: superannuation asset mix at retirement of 60% ABP growth, 18% ABP defensive, 22% Lifetime pension. Age Pension based on rates and thresholds at 1 July 2020 assumed to index with CPI, no allowance for tax, assume spending sourced from Age Pension, lifetime pension (if applicable), minimum ABP drawings, and income on cash, then additional drawings from super then cash once ABP has expired.
Christine aged 67 with $450,000 spending $44,183 p.a.

Case study of assessing retirement

- Deterministic forecast of each strategy over 40 years (results in today’s dollars)

ABP only

<table>
<thead>
<tr>
<th>Year</th>
<th>Income</th>
<th>ABP only</th>
</tr>
</thead>
<tbody>
<tr>
<td>67</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>$48,000</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>$46,000</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>$28,000</td>
<td></td>
</tr>
</tbody>
</table>

ABP + Lifetime pension

<table>
<thead>
<tr>
<th>Year</th>
<th>Income</th>
<th>ABP + Lifetime pension</th>
</tr>
</thead>
<tbody>
<tr>
<td>67</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>$28,000</td>
<td></td>
</tr>
</tbody>
</table>

1. Return assumptions average over 40 years of Willis Towers Watson asset class data of 6.2% growth, 3.0% defensive, cash return 3.4% and 2.0% CPI.
Christine aged 67 with $450,000 spending $44,183 p.a.

Case study of assessing retirement

- Stochastic forecast of each strategy over 40 years – median outcomes

ABP only

ABP + Lifetime pension

Once allow for risk, income at the median lasts around 4-5 years less than estimated using fixed assumptions.

1. Return assumptions utilising 2,000 simulations over 40 years of Willis Towers Watson growth, defensive, cash and CPI asset class data
Christine aged 67 with $450,000 spending $44,183 p.a.

Case study of assessing retirement

- Stochastic forecast of each strategy over 40 years – median outcomes

1. Return assumptions utilising 2,000 simulations over 40 years of Willis Towers Watson growth, defensive, cash and CPI asset class data
Christine aged 67 with $450,000 spending $44,183 p.a.

Case study of assessing retirement

- Stochastic forecast of each strategy over 40 years – median outcomes

1. Return assumptions utilising 2,000 simulations over 40 years of Willis Towers Watson growth, defensive, cash and CPI asset class data

Once ABP runs out
- In ABP only strategy fall back onto Age Pension (around $24,500) for life
- In ABP + Lifetime pension fall back onto non-negotiable expenses ($28,220) for life
Christine aged 67 with $450,000 spending $44,183 p.a.

Case study of assessing retirement

- Stochastic forecast of each strategy over 40 years – estate values

Assumptions:
- Life expectancy based on ALT 2015-17 with 25yr improvement factors, rounded up to nearest whole age
- Return assumptions utilising 2,000 simulations over 40 years of Willis Towers Watson growth, defensive, cash and CPI asset class data, also assume $20,000 personal assets and $50,000 cash outside super, 0.5% asset based fee plus 0.7% growth and 0.3% defensive investment fee. ABP only: superannuation asset mix at retirement of 60% growth and 40% defensive asset mix, ABP + Lifetime pension: superannuation asset mix at retirement of 60% ABP growth, 18% ABP defensive, 22% Lifetime pension.
- Age Pension based on rates and thresholds at 1 July 2020 assumed to index with CPI, no allowance for tax, assume spending sourced from Age Pension, lifetime pension (if applicable), minimum ABP drawings, and income on cash, then additional drawings from super then cash once ABP has expired
Christine aged 67 with $450,000 spending $44,183 p.a.

Case study of assessing retirement

<table>
<thead>
<tr>
<th>Success measure</th>
<th>Flexibility</th>
<th>Highest confidence can afford desired income</th>
<th>Guarantee non-negotiable expenses for life</th>
<th>Maximises Age Pension</th>
<th>Provides an estate value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario</td>
<td>Lifetime pension allocation</td>
<td>Chance receive $44,183 to LE¹</td>
<td>Chance receive $44,183 to LE+3</td>
<td>Chance receive $28,220 essentials to LE</td>
<td>Chance receive $28,220 essentials to LE + 3</td>
</tr>
<tr>
<td>ABP only strategy</td>
<td>0%</td>
<td>26%</td>
<td>11%</td>
<td>34%</td>
<td>15%</td>
</tr>
<tr>
<td>ABP + Lifetime pension strategy</td>
<td>22%</td>
<td>33%</td>
<td>18%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

- Analyse results of 2,000 simulations against success criteria
- Make informed decisions about trade-offs and possible outcomes of a strategy over retirement

1. LE = life expectancy based on AGA 2015-17 with 25yr improvement factors rounded up to nearest whole age. For a 67 year old female this is 23 years.
Conclusions

Techniques for assessing risk in retirement

- Actuarial modelling techniques allow a retiree and adviser to understand range of possible outcomes in light of risk
- Constant fixed assumptions are not borne out in practice and can hide the cost of volatility in retirement
- Considering range of possible outcomes for market, inflation and longevity risk means can identify a strategy that provides confidence will achieve goals
- No model is perfect, but some types of modelling are more realistic and help us make decisions better than others
  - Based on the fixed assumption modelling Christine might have believed she could afford $44,183 p.a. for life expectancy, and there is a 53% chance she’ll live longer than that!
  - We can help determine what she can spend so has high confidence (say 80%) can afford to life expectancy (will only fall short in the worst 20% of market outcomes), and what strategy will provide very high confidence (near 100%) that non-negotiable expenses can be paid for life no matter how long she lives