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Speakers:

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Stream 7: Modelling Retirement Outcomes for all Australians

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Withdrawal capacity in the face of expected and unexpected health and aged-care expenses during retirement

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Progress

Stream 7 "Modelling Retirement Outcomes for All Australians"

<u>Study #1</u>

- Michael E. Drew, Pieter Stoltz, Adam N. Walk, and Jason M. West, 2014, Retirement Adequacy through Higher Contributions: Is This the Only Way? *Journal of Retirement*, Spring, Vol. 1, No. 4: pp. 57-74

<u>Study #2</u>

- Michael E. Drew, Adam N. Walk, and Jason M. West, 2014, Withdrawal capacity in the face of expected and unexpected health and aged-care expenses during retirement, *Working Paper*.

Outline

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Withdrawal capacity in the face of expected and unexpected health and aged-care expenses during retirement

Drew, Walk & West (2014)

INTRODUCTION

Introduction (1)

- The typical individual lifecycles comprise a period of employment followed by a period of retirement
- Key preferences individuals take into account:
  1. Ability to smooth consumption across different possible states of nature within any given time period (**asset diversification**)
  2. Ability to smooth consumption across different time periods (**temporal diversification**)
  3. The **tension** between current versus future consumption necessarily means that saving for retirement and other costs involves the sacrifice of certain consumption today in exchange for uncertain consumption in the future

- However **future liabilities** for both age-related health treatment and aged-care facilities are seldom identified by retirees as forming an essential cash flow need later in life (Quine and Carter, 2006)

Introduction (2)

- This study examines the impact of anticipating the costs associated with age-related health treatment and aged-care services during the retirement phase on:
  1. Income level
  2. Income stability
  3. Longevity risk
- We simulate asset return data using historical bootstrap simulation to derive an optimal withdrawal income during retirement for a range of confidence levels
  - » This allows us to test the sensitivity of income sustainability in relation to the retirement horizon, the magnitude and timing of health and aged-care costs, unexpected longevity and the interplay between risk aversion and asset allocation during retirement
  - » We derive a series of ruin probability profiles that quantify the impact of both the timing and magnitude of health and aged-care costs on the safe withdrawal rate for a typical retirement portfolio

Introduction (3)

- Our analysis considers investors who either anticipate future health/aged-care costs or who fail to anticipate such future costs.
- The results establish a number of important outcomes related to the probability of investors outliving their retirement portfolio:

1. The greatest risk to income sustainability occurs when unexpected health costs translate into greater longevity
   » Paradoxically, this means that high costs associated with health treatment may result in a longer life however without a commensurate adjustment in asset allocation towards assets with a greater risk-return profile, it also risks premature wealth depletion. This is particularly true for risk-averse investors who bias their asset allocation towards low risk assets
2. The safe withdrawal rate is highly sensitive to the timing of health costs and moderately sensitive to later-life aged care costs
3. In a set of broad circumstances, the risk of premature wealth depletion can be mitigated through a type of dynamic lifecycle (DLC) strategy during the retirement phase

Withdrawal capacity in the face of expected and unexpected health and aged-care expenses during retirement

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BACKGROUND

Background

- In the paper we present an overview of the total number, the housing situation and the health situation of retirees in a Australia to better understand the magnitude of cost profile for later-in-life liabilities
- The need for liability-driven and goals-based investing has emerged for retirees to address all of their retirement needs, not only as a form of financial security at an individual level, but also as a form of prudent social policy
  - » A goals-based approach focuses on funding personal financial goals and requirements rather than simply achieving higher investment returns relative to the market

Withdrawal capacity in the face of expected and unexpected health and aged-care expenses during retirement

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METHODOLOGY

Model worker
Constant inflation-adjusted withdrawals

Methodology

- The success of a retirement portfolio in the presence of asset price volatility and liability uncertainty is a complicated problem in which the objective function cannot be evaluated precisely
- When confronted with such issues, historical bootstrap simulation is widely accepted as a means of estimating the objective function by randomly generating values for uncertain outcomes from a known distribution of input variables
  - » Model worker
  - » Constant inflation adjusted withdrawals (stochastic optimisation)

Model worker (1)

- We illustrate the impact of later in life health and aged-care costs using the simple case of a typical female employee aged 50 who has made contributions to her pension plan throughout her working life which amounts to a modest $250,000 in superannuation
  - » In this context ‘modest’ refers to the absolute dollar value of the portfolio for a worker that has contributed for their entire working life
  - » Compared to current actual female account balances, $250,000 is in fact quite high
  - » For more on the case for gender-sensitive superannuation plan design, see Basu and Drew (2009)

Model worker (2)

- She faces asset-return risk both during the accumulation phase **and** the retirement phase
- This affects the value of her superannuation fund, given past and future contributions
  - » We have specifically chosen a female investor because it underlines a key problem in retirement planning for many individuals; relatively low wealth coupled with a longer life expectancy.
- We examine two aspects of her capacity to cater for health costs and aged-care costs; anticipated or expected cost occurrence and unanticipated or unexpected cost occurrence
- We have chosen to work with annual returns in real terms

Model worker (3)

- **Key inputs for the representative investor:**
  - Her initial age is 50
  - Retirement age is 65
  - Investment horizon is to the age of 95
  - Initial investment is $250,000
  - Initial salary of $70,000
  - Wage inflation is 2% pa
  - Price inflation 2.5% pa
  - Contribution rate 9.5% pa
  - Tax 15%
  - Health/aged-care costs of $80,000

- **Why health/aged-care costs of $80,000?**
  - We chose the high-care level of health/aged-care costs of $80,000 (based on Grant Thornton research) to represent a significant health issue affecting the investor from which portfolio recovery will be highly dependent on risk appetite
  - This level represents a cost impost of around **12% of her median portfolio value** (for a balanced asset allocation) at the date of retirement

Model worker (4)

Salary = $70,000
Contribution rate = 9.5%
Wage inflation = 2% p.a.
Year 1 Contribution = $6,650

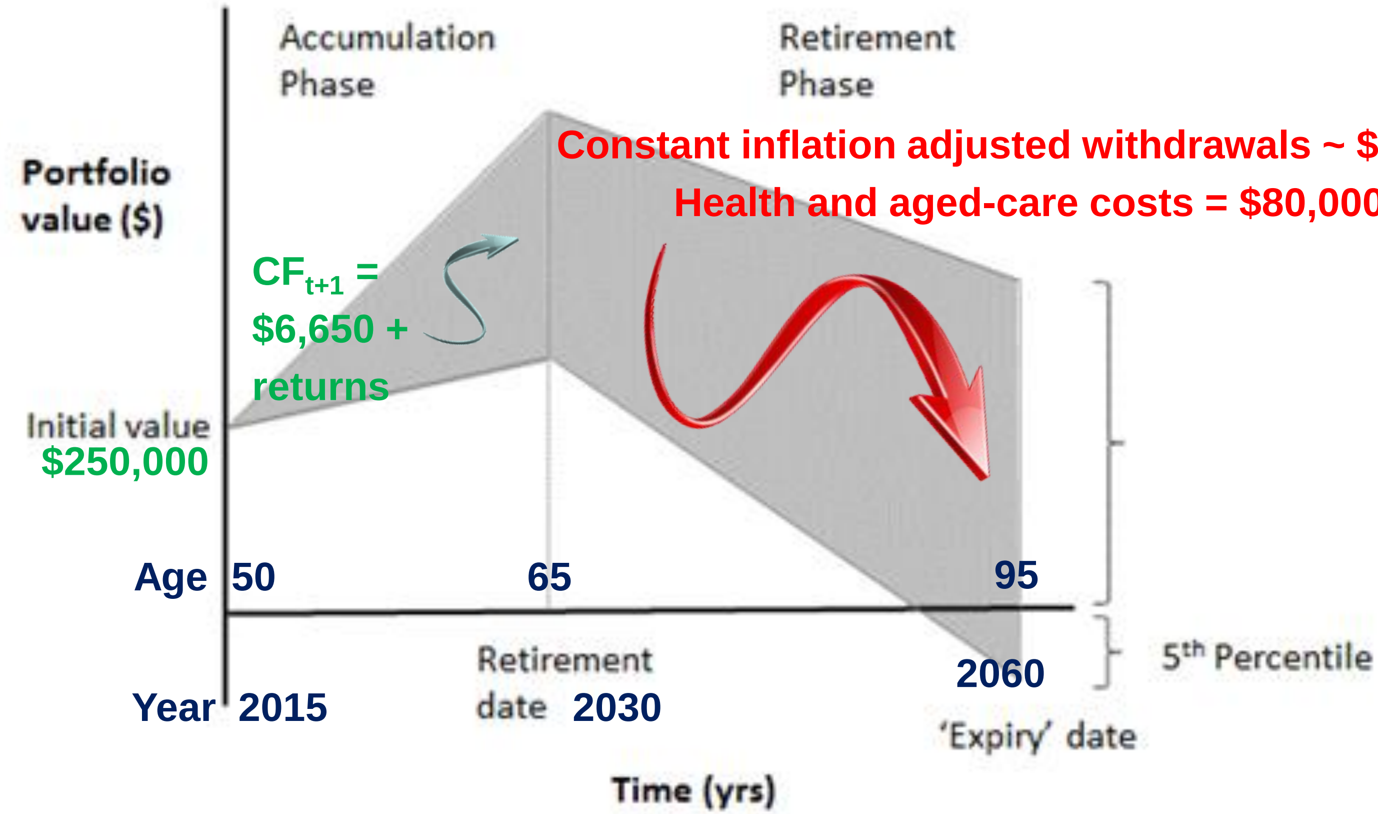

Figure 1: Simulation process for investor estimating a fixed withdrawal rate leading to terminal wealth depleting to zero at the 5th percentile.

Constant inflation adjusted withdrawals (1)

- The model assumes that the retiree begins retirement with an initial withdrawal from their portfolio and the post-withdrawal portfolio remainder is invested in stocks, bonds and cash
  - » The portfolio earns an inflation-adjusted rate of return, weighted initially by a constant asset allocation, until the next annual withdrawal
- A discrete time representation of the portfolio rate of return is:

$$r_t^i = \sum_{j=1}^{n} w_{t,j} r_{t,j}^i, \quad (1)$$

- where:
  - » r_t^i is the weighted average portfolio return for simulation *i* at time *t*
  - » $w_{t,j}$ is the portfolio proportion assigned to asset class *j* at time *t*
  - » $r_{t,j}^i$ is the annual inflation-adjusted return for asset *j* at time *t* for simulation *i*

Constant inflation adjusted withdrawals (2)

- Ongoing withdrawals from the portfolio remain the same (in inflation-adjusted dollars), and the value of the portfolio is derived as:

$$V_t^i = \left[V_{t-1}^i - MV_0\right]\left(1 + r_t^i\right), \quad (2)$$

- where:
  - » *V* represents the value of the portfolio and *M* is the constant withdrawal fraction amount

Constant inflation adjusted withdrawals (3)

We need to use stochastic optimisation in the model to identify the optimal withdrawal rate for a set of asset allocations and a known investment horizon that minimises the probability of portfolio ruin

We use the stochastic optimisation process for three cases:

1. Optimal withdrawal rates in the **absence** of health and aged-care liabilities
2. Optimal withdrawal rates in the presence of **expected** health and aged-care liabilities
3. Optimal withdrawal rates after the occurrence of **unexpected** health and aged-care liabilities

Constant inflation adjusted withdrawals (4)

- Prior to retirement we incorporate annual cash flows into the accumulation account up to the nominated date of retirement as well as initial portfolio conditions
- The portfolio value V_t at time *t* is defined as:

$$V_t = (V_{t-1} + CF_{t-1})(1 + X_t) - LS_\tau + 1_E(SSP_{\tau<T}); \;\; t, \tau < T, \qquad (3)$$

- Where:
  - » CF_t is the after-tax cash inflow (positive) or outflow (negative)
  - » X_t is the weighted average portfolio return $w_n' r_n$ at time *t*
  - » LS_τ is any lump sum payment withdrawn at retirement date τ
  - » $1_E(SSP_{t>\tau})$ is an indicator function where 1_E is equal to one if the investor qualifies for social security payments (*SSP*) during retirement $t > \tau$ and zero if the investor does not qualify for such payments
  - » Both the retirement date τ and the withdrawal dates *t* are assumed to be less than the terminal date *T* for all payments as selected by the investor
  - » The value V_t of the portfolio at *t=0* is set to the initial portfolio value of the investor

Constant inflation adjusted withdrawals (5)

- In contrast with deterministic approaches to retirement planning, where both the investment horizon and the investment return are assumed to be **known with certainty**, in this analysis we represent the **variables as stochastic**
- We derive the stochastic present value at either the date of retirement (which assumes a deterministic terminal portfolio value) or at any point before retirement as:

$$\widehat{PV} = \sum_{i=1}^{\tilde{T}} \prod_{j=1}^{i} \left(1 + \tilde{r}_j\right)^{-1}, \qquad (4)$$

- Where:
  - » $\tilde{T}$ is the random time of death (in years) and $\tilde{r}_j$ is the random investment return in year *j*
  - » As $\tilde{T} \rightarrow \infty$ the stochastic PV simply reduces to the infinitely-lived endowment (Milevsky, 2006)
  - » The frequency of the above measure can be reduced to quarters or months as required without loss of generality

Constant inflation adjusted withdrawals (6)

- The simulation process in this model assumes $\tilde{T}$ is fixed and is estimated by the investor
  - » This greatly simplifies the simulation and optimisation process
- The asset values and projections are simulated 10,000 times and the key percentiles at each time *t* are estimated
  - » A range of percentiles are extracted from the simulated terminal values (at time *T*) for the investor's portfolio and then used as the future value to iterate backwards to retirement date τ
  - » To conduct the search we use a simple generalised reduced gradient search algorithm (Lasdon et al. 1978) to solve for the annual withdrawal over the withdrawal period ($\tau \rightarrow T$), also simulated 10,000x to achieve convergence
- The algorithm needs input function values as well as the Jacobian, which we do not assume to be constant for our nonlinear model
  - » We approximate the Jacobian using finite differences re-evaluated at the commencement of each major iteration (i.e. the major percentile terminal values)

Constant inflation adjusted withdrawals (7)

- The investor has the choice to alter the risk of the portfolio (through asset allocation)
  - » For this model we assume three asset classes (stocks, bonds and cash) and across five broad sets of asset allocations that represent relative levels of risk aversion
  - » The weightings for each category are provided in Table 1:

Risk	Stocks	Bonds	Cash
Very high	90%	10%	0%
Moderate	50%	40%	10%
Balanced	40%	40%	20%
Conservative	30%	40%	30%
Very low	10%	30%	60%

Table 1: Asset class weights for 10 levels of risk aversion.

- A simulation of 10,000 iterations generates a single probability of ruin for a given portfolio allocation, age at retirement, stochastic inflation-adjusted portfolio return, deterministic occurrence of death and a fixed stochastically-optimised withdrawal rate

Constant inflation adjusted withdrawals (8)

- Each set of simulations is conducted to derive the impact on withdrawal rates and the probability of ruin for the three cases:
  - » Optimal withdrawal rates in the **absence** of health and aged-care liabilities
  - » Optimal withdrawal rates in the presence of **expected** health and aged-care liabilities
  - » Optimal withdrawal rates after the occurrence of **unexpected** health and aged-care liabilities
- To solve for the optimal withdrawal rate we use the complex method of constrained optimization first proposed by Box (1965) and then improved by Guin (1968)
  - » This approach is capable of optimising a complex objective function with few constraints on the optimisation function itself while also avoiding the need to explicitly compute the derivatives of the function itself
  - » Stout and Mitchell (2006) and Stout (2008) have used a similar algorithm

Constant inflation adjusted withdrawals (9)

- The stochastic optimisation process aims to select a constant withdrawal rate through the retirement phase that yields an expected terminal wealth of zero at the 5% confidence level coinciding with the investor's 'expiry' date (death or other nominated future date)
- The Box Method iteratively searches possible input values for withdrawal amounts to reduce the simulated probability of ruin at a 5% confidence level, to find a global minimum solution (if one exists)
- The optimal withdrawal values are then used in a second set of simulations to estimate the probability of portfolio ruin

Constant inflation adjusted withdrawals (10)

- Ultimately the model is able to answer the basic question:
  - **At what level can an investor set their retirement income expectations and expenditure levels?**
- This motivates the investor to focus on the almost certain income level which we set to a confidence level of 5%, and avoids setting the objective function to simple maximise wealth at the date of retirement and then hoping the portfolio value is sufficient so that the investor does not outlast their portfolio
- Indeed, the intention of goals-based investing is to match the time-weighted value of assets and liabilities that cater for cash flows through an investor’s working life as well as through retirement

Constant inflation adjusted withdrawals (11)

- This optimisation methodology can be more simply demonstrated using a diagram

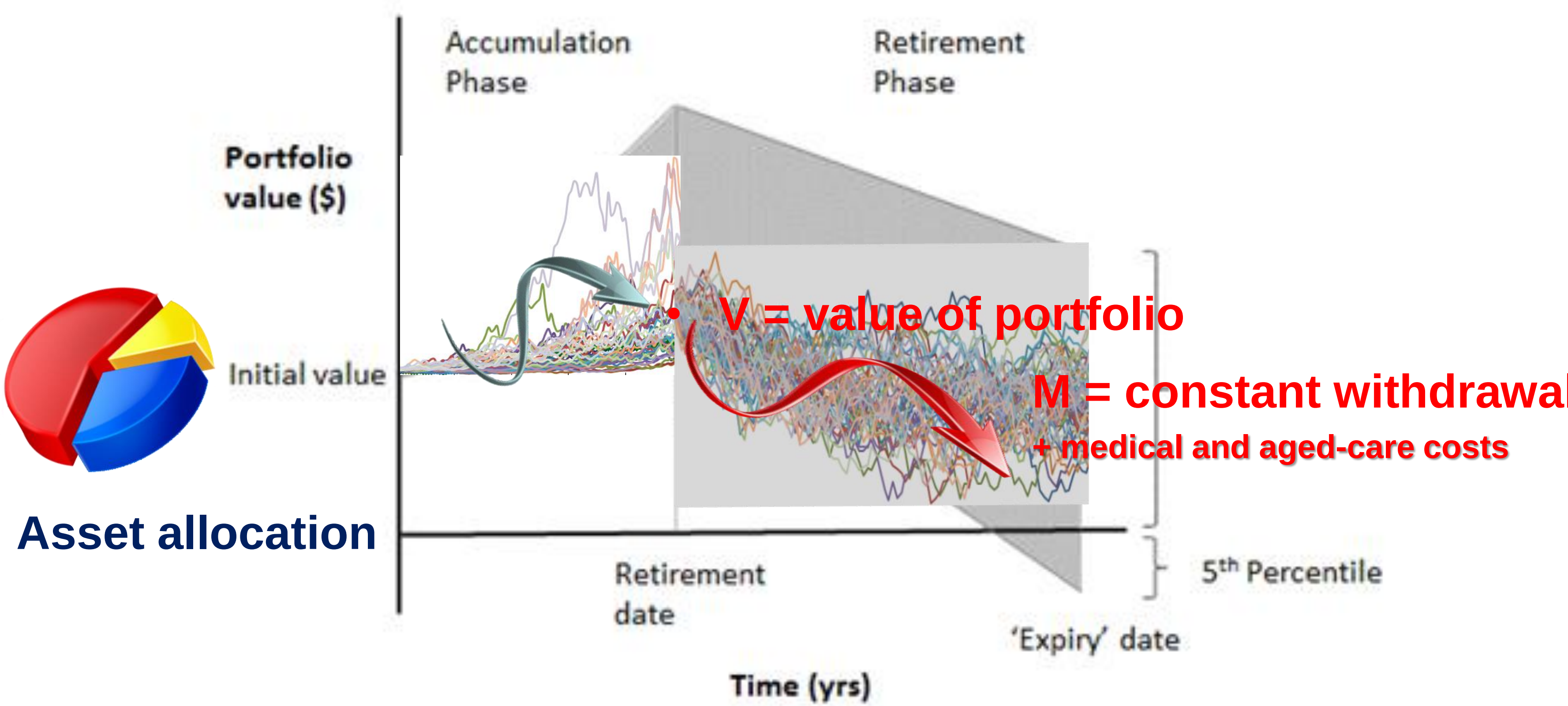

Figure 1: Simulation process for investor estimating a fixed withdrawal rate leading to terminal wealth depleting to zero at the 5^{th} percentile.

Withdrawal capacity in the face of expected and unexpected health and aged-care expenses during retirement

Drew, Walk & West (2014)

DATA AND CALIBRATION

Constant Inflation Adjusted Withdrawals (11)

- Asset class return data for the historical block bootstrap model were obtained from Global Financial Data (GFD)
  - » We collated and synchronised the data to derive a series of annual returns from October 1882 to December 2013

	Australian equities	Australian bonds	Australian cash
Mean	12.12%	5.88%	4.20%
Stand Dev	13.03%	7.86%	1.00%
Skew	-0.24	0.17	0.51
Kurt	4.17	4.14	3.27
JB-Stat	312	278	222
P-value	0.00	0.00	0.00

Table 2: Summary statistics for annual return series (linear) of Australian stocks, foreign stocks, Australian bonds and Australian bills, October 1882 – December 2013.

  - » Long-term assets exhibit mean reversion, there is a positive long-run equity risk premium, most assets exhibit leptokurtosis

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RESULTS

Anticipated health and aged-care costs
Unanticipated health and aged-care costs
Dynamic lifecycle approach to recover from unanticipated costs

Anticipated health and aged-care costs (1)

- The objective function of the model is to maximise the annual withdrawal of income subject to the constraint that the probability of ruin is minimised over the expected life of the investor
  - » In the case where investors anticipate some form of cost requirement to finance health and/or aged care costs at some point during their retirement, investors will naturally ease back on their withdrawals so that there are sufficient funds in their portfolio to both pay the discrete cost and fund the remainder of their retirement
- Therefore the **objective function** we employ here takes into consideration the need for an investor to withstand a single **$80,000** discrete payment at some point during retirement

Anticipated health and aged-care costs (2)

- Table 3 provides the **optimal withdrawal rates** computed as the 5th percentile of the median (expected) portfolio value at the date of retirement with anticipated health and/or aged-care costs of $80,000 due at any point, for three life expectancies

An investor who is relatively healthy and expects to live to **90 years of age** with retirement savings invested in a **balanced portfolio**, and expecting to pay **a liability of $80,000 at any point during retirement**, will **optimally withdraw 4.28%** of their portfolio value at the date of retirement each year - this equates to **$24,751 p.a.**

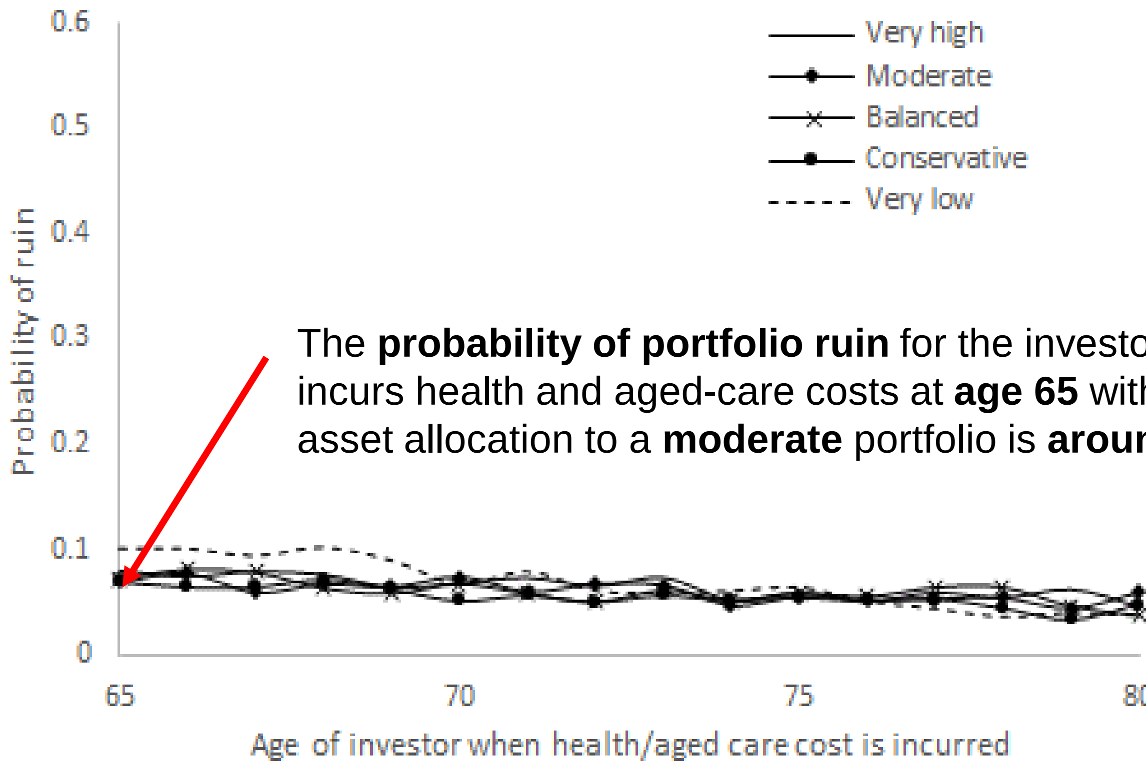
Anticipated health and aged-care costs (3)

Life expectancy	Portfolio	Withdrawal rate	Withdrawal $	% of unexpected withdrawals
80	Very high	3.83%	36,250	92.66%
	Moderate	5.16%	32,430	83.96%
	Balanced	5.05%	32,423	86.82%
	Conservative	5.00%	29,887	82.44%
	Very low	5.04%	27,501	94.36%
90	Very high	2.92%	27,639	90.71%
	Moderate	4.16%	27,501	92.63%
	Balanced	4.28%	24,751	89.56%
	Conservative	3.68%	21,015	80.12%
	Very low	3.43%	18,750	94.89%
100	Very high	2.90%	22,778	82.41%
	Moderate	3.50%	22,901	84.09%
	Balanced	3.15%	21,821	80.88%
	Conservative	3.14%	18,750	88.11%
	Very low	2.63%	14,376	86.80%

Table 3: 5th percentile annual optimal withdrawal rates for each of the five asset allocation portfolios when anticipating health / aged-care costs assuming a given life expectancy.

Anticipated health and aged-care costs (4)

- Figure 2 depicts the probability of ruin profiles for our investor who incurs $80,000 in health and/or aged-care costs at a given point during retirement, and lives to the age of 80. These estimates were obtained for a range of five asset allocations – very high, moderate, balanced, conservative and very low



The **probability of portfolio ruin** for the investor who incurs health and aged-care costs at **age 65** with a constant asset allocation to a **moderate** portfolio is **around 7%**

Anticipated health and aged-care costs (5)

- If we use the **ASFA Retirement Standard Modest** lifestyle for a **single** person of **$23,363 p.a.** expecting to **live to 90 years of age** we observe the probability of ruin profiles in Figure 5

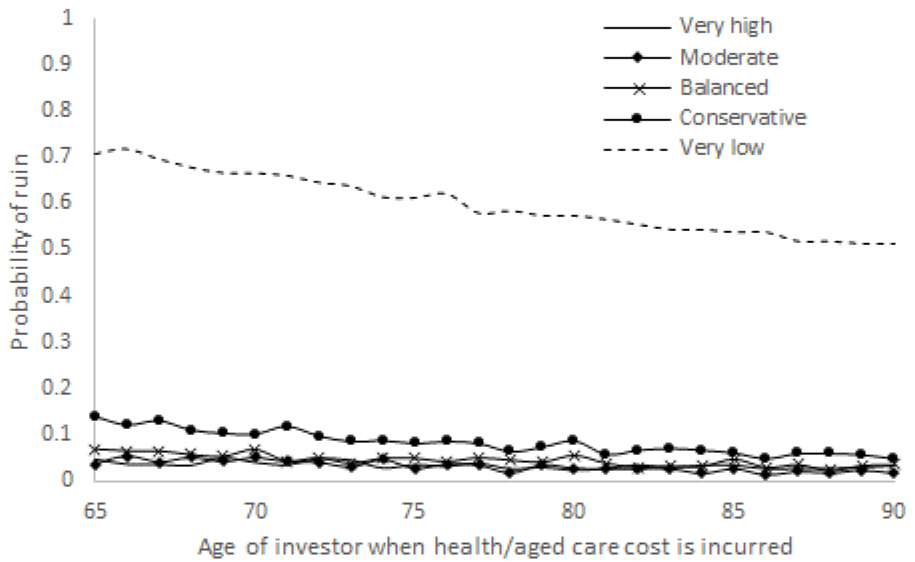


Figure 5: Probability of ruin for an optimised withdrawal rate for a range of asset allocations with known health and aged-care costs incurred at each age. Investor initial age 50, retirement age 65, investment horizon age 90, initial investment of $250,000, salary $70,000, wage inflation 2%, price inflation 2.5%, pension contribution rate 9.5%, tax 15% and health/aged-care costs of $80,000. Withdrawal rate of $23,363 pa used (ASFA Retirement Standard Modest lifestyle for a single person).

Anticipated health and aged-care costs (6)

- Similarly if we use the **ASFA Retirement Standard Modest** lifestyle for a **couple** of **$33,664 p.a.** expecting to **live to 90 years of age** we observe the probability of ruin profiles in Figure 6

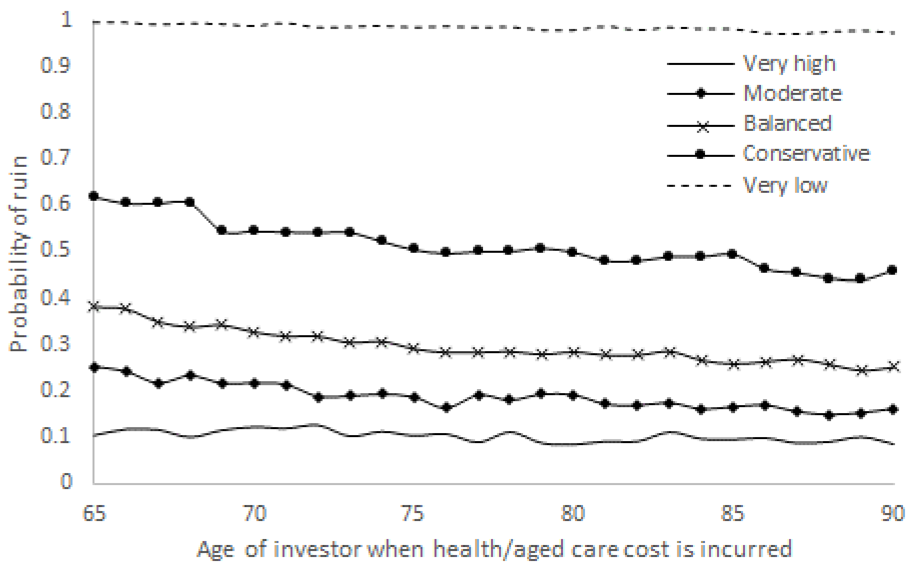


Figure 6: Probability of ruin for an optimised withdrawal rate for a range of asset allocations with known health and aged-care costs incurred at each age. Investor initial age 50, retirement age 65, investment horizon age 90, initial investment of $250,000, salary $70,000, wage inflation 2%, price inflation 2.5%, pension contribution rate 9.5%, tax 15% and health/aged-care costs of $80,000. Withdrawal rate of $33,664 pa used (ASFA Retirement Standard Modest lifestyle for a couple).

Anticipated health and aged-care costs (7)

- At a marginally higher withdrawal rate, investors incurring significant health and/or aged-care costs will experience a potentially higher probability of ruin early during the retirement phase if assets are too conservatively invested
- But what if these health and aged-care costs were **unanticipated**?

Unanticipated health and aged-care costs (1)

- We now consider the same analysis but instead, we do it for an investor who **fails to anticipate any form of health or age-care costs** to occur during their retirement
  - In this case the investor optimises their withdrawal rate based on an expected retirement horizon without any consideration made for discrete adverse portfolio events
  - Subsequent to the event however, the investor then needs to re-optimise their withdrawal rate based on the same expected retirement horizon
  - We then calculate the probability of ruin for this investor over the same five asset allocations as in the anticipated cost case study above
  - The **only difference** is that the investor **does not adjust their optimal withdrawal rate** to account for the possible occurrence of an $80,000 cost for health and aged-care costs at some stage during retirement.

An investor who is relatively healthy and expects to live to **90 years of age** with retirement savings invested in a **balanced** portfolio, and **does not expect to pay any health/aged-care costs during retirement**, will optimally withdraw around **4.36%** of their portfolio value at the date of retirement each year. This equates to around **$27,637** pa (exceeds the ASFA Modest single person of $23,363 pa)

Unanticipated health and aged-care costs (2)

Life expectancy	Portfolio	Withdrawal rate	Withdrawal $
80	Very high	4.13%	39,121
	Moderate	5.75%	38,626
	Balanced	5.89%	37,344
	Conservative	6.19%	36,251
	Very low	6.24%	29,145
90	Very high	3.22%	30,470
	Moderate	4.20%	29,688
	Balanced	4.36%	27,637
	Conservative	4.70%	26,230
	Very low	4.23%	19,759
100	Very high	2.90%	27,640
	Moderate	3.89%	27,234
	Balanced	4.34%	26,981
	Conservative	3.64%	21,280
	Very low	3.55%	16,563

Table 4: 5^{th} percentile annual optimal withdrawal rates for each of the five asset allocation portfolios without anticipating health / aged-care costs assuming a given life expectancy.

Unanticipated health and aged-care costs (3)

- Relative to the ruin profiles in **Figure 2 of less than 10%,** the **probability of ruin** for an investor with an investment horizon to **80 years of age dramatically increases** for each of the five asset allocation strategies - the probability of ruin is higher for portfolio allocations that are weighted towards bonds and cash

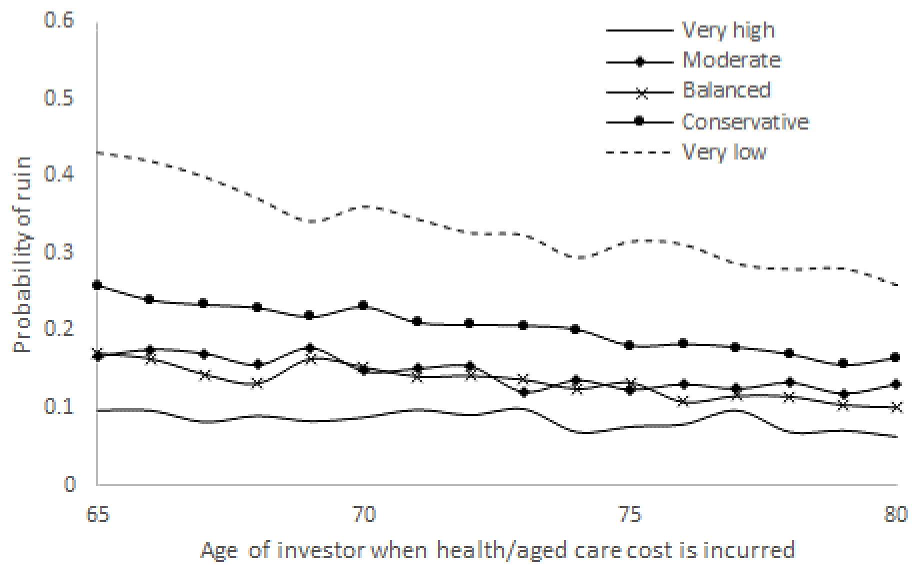


Figure 7: Probability of ruin for an optimised withdrawal rate for a range of asset allocations with unanticipated health and aged-care costs incurred at each age. Investor initial age 50, retirement age 65, investment horizon age 80, initial investment of $250,000, salary $70,000, wage inflation 2%, price inflation 2.5%, pension contribution rate 9.5%, tax 15% and health/aged-care costs of $80,000 incurred at each age. The probability of ruin represents the probability of depleting the retirement portfolio given an unexpected health/aged-care cost liability of $80,000 incurred at a particular year and the investor continues to live until 80 years of age. Optimal withdrawal rates for each asset allocation (based on risk tolerance) are used.

Unanticipated health and aged-care costs (3)

- The conundrum …
  - » A significant decline in the portfolio value after incurring an unexpected health or aged-care cost liability increases the probability of ruin when the portfolio is heavily weighted towards low risk assets
  - » At the other extreme of the asset allocation continuum however, beyond a certain point where the portfolio is allowed to recover, the probability of ruin for higher-risk portfolio strategies plateaus or declines
- Lower risk strategies
  - » The lower risk strategies that are weighted towards bonds and cash do not have sufficient time for the portfolio to recover after an unexpected liability, with the investor drawing a modest income
  - » Lower-risk investment strategies will inevitably lead to a higher probability of ruin for longer investment horizons
- Higher risk strategies
  - » So a higher risk investment strategy through the decumulation phase appears to dominate the optimal investment approach for investors who incur a significant health or aged-care cost liability at some point during retirement, particularly when examining the investment behaviour over long time horizons

Unanticipated health and aged-care costs (4)

- For investors with a higher chance of survival beyond their life expectancy however who have a low tolerance to risk, are there a **mixture of strategies** that can cater for their need to experience lower volatility while simultaneously reducing the probability of ruin?
- Could an approach modelled on the **dynamic lifecycle investment** philosophy that obtains best of both worlds may be possible?

Dynamic lifecycle approach to recover from unanticipated costs (1)

- It is fair to say that a great number of investors will fail to fully anticipate significant age-related health and/or aged-care costs during their retirement, and as such will optimise their spending pattern to align with their portfolio level and life expectancy
  - » However as social policy reform shifts the responsibilities for age-related costs to individuals, it is clear that the State will soon be unable to make up the entire difference for such costs
  - » To account for the cost gap confronting an investor who fails to anticipate any form of health or age-care costs during retirement, **a key question is whether some form of dynamic asset allocation strategy during both the accumulation and retirement phases can remedy the investor's portfolio depletion** to sufficiently recover withdrawal rates to the same value as if the health and aged-care costs were in fact anticipated
- Dynamic asset allocation strategies have been shown to minimise the effects of sequencing risk during the accumulation phase
  - » Basu, Byrne and Drew (2011), Pfau and Kitces (2013) and Ang, Chen and Sundaresan (2013)

Dynamic lifecycle approach to recover from unanticipated costs (2)

- We construct three ‘drawdown dynamic lifecycle strategy’ (DDLC) strategies

	Age 50 through 75	Age 75 through 85	Age 85 and beyond
	Below target portfolio	**2nd partition above target portfolio**	**3rd partition above target portfolio**
DDLC 1	100% Growth 0% Defensive	60% Growth 40% Defensive	40% Growth 60% Defensive
DDLC 2	100% Growth 0% Defensive	80% Growth 20% Defensive	20% Growth 80% Defensive
DDLC 3	100% Growth 0% Defensive	50% Growth 50% Defensive	20% Growth 80% Defensive

Table 5: Drawdown Dynamic Lifecycle (DDLC) strategy definitions.

Unlike other common asset allocation strategies, the **DLC strategy uses performance feedback** to control the asset allocation at any point in time

Dynamic lifecycle approach to recover from unanticipated costs (3)

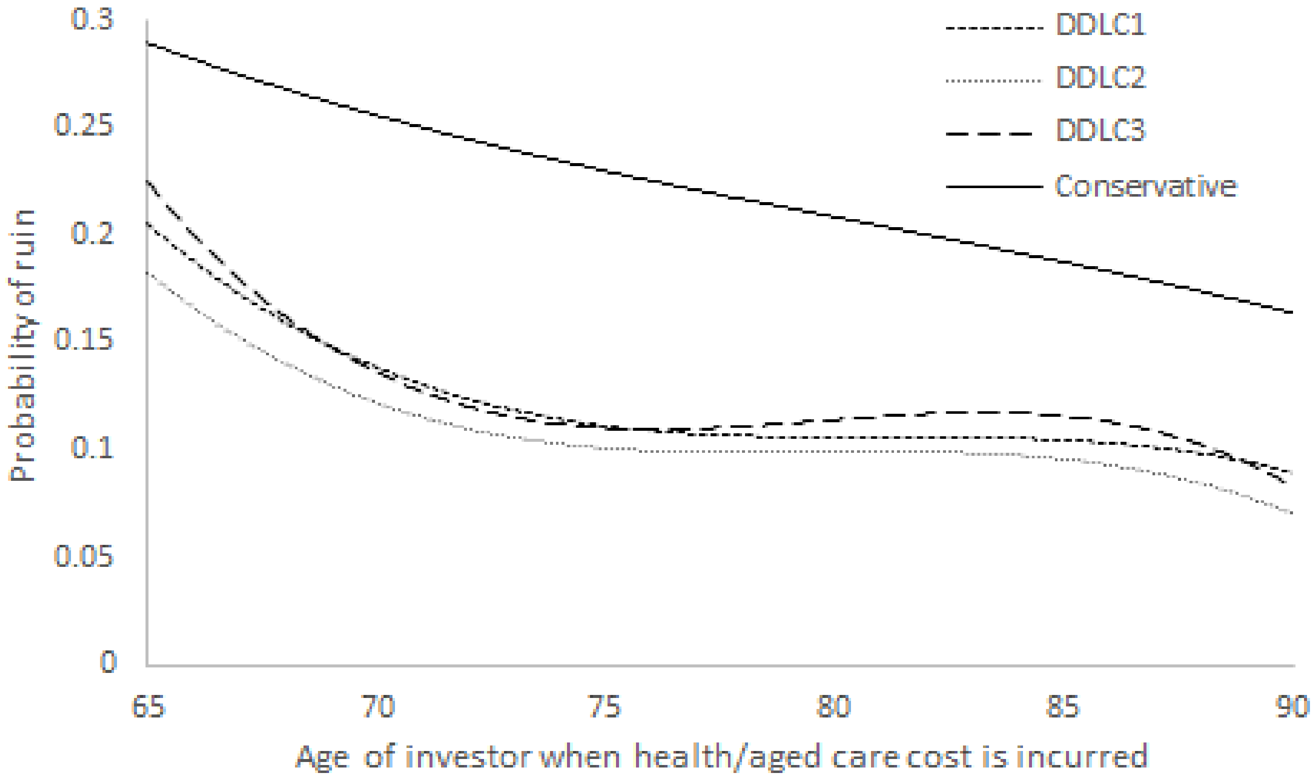


Figure 10: Probability of ruin for an optimised withdrawal rate for a range of Drawdown Dynamic Lifecycle (DDLC) asset allocations with unanticipated health and aged-care costs incurred at each age. Investor initial age 50, retirement age 65, investment horizon **age 90**, initial investment of $250,000, salary $70,000, wage inflation 2%, price inflation 2.5%, pension contribution rate 9.5%, tax 15% and health/aged-care costs of $80,000. Optimal withdrawal rate for an investor initially allocated to a 'conservative' portfolio is used

Withdrawal capacity in the face of expected and unexpected health and aged-care expenses during retirement

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DISCUSSION

Incorporating the aged pension
Lump sum withdrawals at the date of retirement
Sensitivity of results to initial investment portfolio value
Accessing housing stock wealth

Discussion (1)

- Incorporating the age pension
  - » A great number of retail investors will continue to rely on the age pension to supplement retirement income
  - » This is included in our calculations where income and asset means tests are met
  - » The age pension however is implicitly incorporated into the model via the *SSP* variable in Equation (3)
- Lump sum withdrawals at the date of retirement
  - » The model allows for lump sum withdrawals on the date of retirement which provides greater flexibility for investors to gauge the implications of extinguishing mortgages and other loans that will deplete monthly earnings
  - » The lump sum withdrawal is assumed to be tax exempt

Discussion (2)

- **Sensitivity of results to initial investment portfolio value**
  - Clearly the probability of ruin is sensitive to the initial portfolio values used for the simulation
  - For instance, to demonstrate the degree of sensitivity, if we use the ASFA Retirement Standard Modest lifestyle for a couple of $33,664 p.a. with an initial portfolio balance that is twice the amount used in our initial model ($500,000) we observe the updated probability of ruin fall dramatically
- **Accessing housing stock wealth**
  - The provision of funding through retirement may be augmented by accessing housing wealth
  - Retirees can monetise their residential home in a number of ways
  - The results for the probability of ruin do not explicitly include the option to access residential housing wealth and so our predictive results provided above may be more conservative than what is observed

Withdrawal capacity in the face of expected and unexpected health and aged-care expenses during retirement

Drew, Walk & West (2014)

CONCLUSION

Conclusion (1)

- We think the stochastic optimisation / dynamic goal-oriented investment methodology has a number of attractive features:
  - » The model is extremely flexible and can accommodate almost any set of assumptions or features relating to existing types of pension arrangements - practical potential
  - » The methodology allows us to develop sensitivity and 'what if?' experiments by changing key assumptions and observing how these changes affect our results – trade-offs
  - » The model is naturally extended beyond the accumulation phase (the period up to retirement) to deal with the distribution (or post-retirement) phase – through model

Conclusion (2)

- We examined the probability of ruin for a range of investment strategies for investors who face expected and unexpected health and aged-care costs during retirement
  - » Broadly, investors who anticipate health and aged-care costs suffer lower probability of ruin over the retirement horizon compared with investors who fail to account for such liabilities
  - » However investors who fail to anticipate health and aged-care costs may be able to avoid ruin and indeed outperform a static investment strategy, if they adopt a form of drawdown dynamic lifecycle (DDLC) investment strategy
  - » This naturally requires a higher risk tolerance than they may be able to bear, but it may also be the only way to avoid ruin

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