CAPITAL MARKETS

REPORT

CFA Institute Research & Policy Center

The Future of the 60/40 Allocation: Modelling the Performance of the 60/40 Portfolio in Retirement

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Executive Summary

The traditional 60/40 portfolio, favoured for its simplicity and balance, allocates 60% of portfolio assets to equities for higher returns and 40% to fixed-income securities, such as government bonds, for stability and risk mitigation. This strategy leverages the low correlation between stocks and bonds for diversification benefits, limiting downside risk and making the portfolio more resilient during stock market downturns. It is popular among investors for its straightforward approach to achieving a balanced allocation between growth and defensive assets.

In our first report of this two-part series (Pham, Cui, and Ruthbah 2025), we explored the historical performance of the 60/40 strategy. In this second report, we thoroughly examine the 60/40 strategy's ability to sustain retirees through their postworking years, with a focus on the diverse economic environments of Australia and the United States. Using advanced Monte Carlo simulations, we dissect the performance of this traditionally recommended portfolio, consisting of 60% equities and 40% bonds, over 25 years of retirement. Our nuanced analysis considers varying lifestyles, from modest to comfortable; different initial retirement account balances; the influence of gender on retirement outcomes; and the critical impact of market volatility on retirement savings longevity.

Our findings reveal that the 60/40 portfolio's effectiveness is not universally guaranteed and varies significantly based on several factors. Key among these is the size of the retiree's initial savings, with larger balances markedly improving the portfolio's ability to support desired living standards over the long term. The ambition for a comfortable lifestyle emerges as a challenging goal, often leading to depletion of funds while they are still needed, underscoring the need for substantial initial investments or additional income sources.

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The investigation highlights noticeable disparities in retirement investment portfolio sustainability between male and female retirees, pointing to the need for retirement planning strategies that specifically address gender-related financial gaps. Furthermore, our research emphasises the significant impact of sequence-of-returns risk, particularly the detrimental effect of experiencing negative market returns during the early years of retirement on the longevity of retirement savings. This finding underscores the importance of strategic withdrawal planning and portfolio management to mitigate such risks.

In response to these insights, this report calls for a paradigm shift towards more flexible and nuanced retirement planning, with a specific focus on the following:

- Personalised and dynamic retirement planning: Adopting strategies that consider individual circumstances—including initial savings size, desired lifestyle, and gender-related financial gaps—and engaging in regular portfolio reviews and adjustments
- Flexible withdrawal strategies and proactive risk management: Implementing withdrawal methods that adapt to changing market conditions and personal financial needs, while mitigating sequence-of-returns risk through strategic portfolio management
- Comprehensive planning and enhanced financial literacy: Integrating additional financial resources, government benefits, and tax considerations into retirement planning, as well as improving financial literacy among retirees regarding the complexities of retirement income planning

In conclusion, although the 60/40 portfolio may serve as a solid foundation for retirement planning, its success is contingent on careful consideration of individual circumstances, market dynamics, and the proactive management of investment risks. This report calls for a paradigm shift towards more flexible and nuanced retirement planning, ensuring financial security and quality of life for retirees in the face of uncertain economic futures.

Introduction

In the pursuit of securing financial stability during retirement, the 60/40 portfolio has emerged as a conventional wisdom benchmark for balancing investment risk and return. Consisting of 60% equities and 40% bonds, this model has been lauded for its potential to offer a blend of growth and income investments—theoretically ideal for retirees seeking to sustain their living standards without depleting their life savings.

Our investigation delves into the practical efficacy of this investment strategy in Australia and the United States, scrutinising its viability amidst fluctuating market conditions and diverse retirement income policies. This report embarks on a rigorous analytical journey, using Monte Carlo simulations to forecast the performance of the 60/40 portfolio across various scenarios, contemplating both modest and comfortable living standards over a 25-year retirement horizon.

We explore the dynamics of retirement income under different withdrawal strategies, considering the influence of initial savings balances, gender disparities, and the critical timing of market returns. Our goal is to unravel the complexities surrounding retirement planning, providing insights that challenge traditional narratives and that encourage a more nuanced approach to securing financial longevity in retirement.

Through a detailed comparative analysis, we aim to illuminate the paths that can lead to a financially secure retirement, questioning whether the revered 60/40 portfolio stands as a universal solution or if its effectiveness is contingent on a multitude of factors, including the retiree's starting balance and desired lifestyle and the unpredictable nature of market volatility.

Retirement Income Policy Landscape: A Shifting Paradigm

In recent years, many countries around the world have been transitioning from traditional earnings-related or defined benefit (DB) pension systems to defined contribution (DC) systems. Although the main motivation to move towards a DC system is to reduce the burden on public pension expenditures (Pham, Ruthbah, and Cui 2023), the transition introduces challenges. If not carefully designed and supported by appropriate government policies, this continued progression could lead to greater retirement insecurity for many individuals.

The structure of a pension system profoundly affects individuals' experiences during their careers and in retirement. Broadly, retirement income has two phases: the accumulation phase, when individuals save during their working years, and the decumulation phase, when retirees draw down their savings to finance their retirement. Because more countries have introduced defined

contribution plans, understanding how these phases impact retirement security becomes increasingly important, particularly in the decumulation phase.

In most countries, retirement income is typically founded on multiple pillars, including the government age pension, the occupational and personal schemes, and other assets outside the pension system. State pensions are typically designed to provide either an earnings-related benefit or a minimum pension to cover basic living expenses. This system often forms a lifelong provision, ensuring that individuals receive income throughout retirement based on their contributions during their working life.

The occupational pension pillar varies from country to country, and it can be either mandatory or voluntary and either publicly or privately managed. In the past, many occupational systems operated with DB plans, whereby retirees could count on a formula-based retirement income, usually tied to their last earnings and length of contributions. In contrast, defined contribution plans, which have increasingly replaced DB plans, offer no guaranteed benefit in decumulation. Instead, the amount available to fund retirement depends on the value accumulated during the individual's working years, making the outcome highly dependent on various factors.

A review of several large pension systems worldwide reveals that many have either significantly shifted towards a DC model or introduced DC elements alongside traditional pensions.[1] In Asia, for instance, although many systems still rely heavily on earnings-related state pensions, supplemental pension schemes with DC characteristics have become increasingly common.

For example, China introduced voluntary private pension arrangements in 2022, while India operates its DC-based Employees' Provident Fund scheme and offers supplementary employer-managed pension schemes, largely DC in nature. Indonesia's private-sector workers are covered by a mix of DB/DC plans. Japan, South Korea, and Thailand have all implemented voluntary or statutory DC private pension schemes.

The European markets reflect a similar trend. Although many pension systems are still dominated by earnings-related schemes (such as in Finland, France, Germany, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland), DC schemes in various forms have been steadily growing across the region. For example, Denmark has implemented a fully funded DC scheme that provides lifelong pensions, in addition to mandatory occupational DC schemes. Sweden has established mandatory DC pension schemes as part of its national system. France, Ireland, Poland, Italy, and Spain have supplemented their systems with voluntary DC occupational pension schemes and personal pension plans for additional retirement income.

[1]The description of the systems is based on the Mercer CFA Institute Global Pension Index 2024 (Mercer 2024).

A similar shift towards DC pension systems appears in other regions. Australia's mandatory and voluntary occupational pensions have largely transitioned to privately managed DC systems, and DB schemes are being phased out. New Zealand operates the KiwiSaver DC retirement scheme. In Canada, DC schemes are gaining popularity over DB plans in voluntary occupational pension schemes, supplementing the country's earnings-related state pensions. Chile has established a mandatory, privately managed DC system, while the United Kingdom has introduced new voluntary occupational corporate and individual pension plans, although coverage remains relatively low.

In the United States, the retirement income system consists of a social security program linked to lifetime earnings, a means-tested top-up benefit, and voluntary private pensions, which can be either occupational or personal. Similar to other countries, the United States has also shifted substantially towards a DC environment.

This growing prevalence of DC schemes globally reflects a broader trend of shifting responsibility for retirement savings from governments and employers to individuals. That trend reinforces the importance of sound financial planning and investment strategies.

Note that financial uncertainty for retirees is generally lower when DC schemes serve as a supplement to the primary pension system, rather than being the main source of retirement income. Additionally, many DC schemes are privately managed. Poor investment decisions, market fluctuations, and investment risks can all lead to greater financial uncertainty for retirees.

The DC system shifts much of the responsibility for retirement planning onto individuals, increasing uncertainty because financial security depends on such factors as career contributions; investment performance; other income sources, such as government pensions; and the balance between years spent saving and years spent in retirement. Fearing they may outlive their savings, some individuals delay retirement or return to work. The lack of a standardised approach to managing retirement savings across systems further complicates this dynamic.

This shift emphasises the importance of individuals understanding DC systems. Crafting strong, long-term investment strategies during both the accumulation and decumulation phases is crucial.

In this report, we conduct a simulation analysis focusing on Australia and the United States—two markets that have significantly transitioned towards DC systems. Our analysis aims to assess the level of financial uncertainty and insecurity retirees face during the decumulation phase, specifically when adopting a moderate-risk investment strategy (commonly known as the 60/40 portfolio) for their retirement savings. This study will help to better understand the potential outcomes and challenges associated with this approach in DC environments.

Australia

In Australia, the core component of the retirement system is the Superannuation Guarantee ("super" for short), a compulsory program for retirement savings. During a person's career, employers are required to deposit a portion of that individual's salary into a super fund, known as the Super Guarantee. Additionally, individuals can opt to contribute further to their super fund. The contributions are invested in various assets, aiming to yield returns and increase in value over the years.

The specific investment choices vary based on which super fund the individual selects. Whether individuals can withdraw amounts from their super fund depends on their age, year of birth, and work status.

Generally, an individual is permitted to access the super fund when one of the following conditions is met:[2]

- The individual is at least 65 years of age, whether or not they have retired.
- The individual has reached their preservation age[3] and has started a transition to a retirement income stream while continuing to work.
- The individual has reached their preservation age and has permanently retired.

When one of the foregoing conditions is met, the individual can withdraw their super savings as a lump sum, as an income stream (paid at least annually), or as a combination of both.[4] A common income stream is the account-based pension, wherein the individual decides the size and frequency of their payments and how they want their remaining retirement savings invested through their fund. After the individual reaches 60 years of age, these income payments are not taxed. For individuals with an account-based pension income stream, the government requires that they withdraw a minimum amount from their balance each year.

In addition to superannuation drawdowns, retirees may be eligible to receive government payments in the form of the Age Pension.[5] For those who meet the Age Pension eligibility requirements, this payment provides another level of income support during retirement. In addition to meeting the residency rules, the individual must meet the Age Pension age condition and satisfy the income and assets tests.

[2]For more details, see the preservation age section on the Australian government's super withdrawal options web page: www.ato.gov.au/individuals-and-families/super-for-individuals-and-families/super/withdrawing-and-using-your-super/super-withdrawal-options#Preservationage.

[3]A person's preservation age ranges from 55 to 60 years old, depending on their date of birth.

[4]See Moneysmart's account-based pensions webpage: https://moneysmart.gov.au/retirement-income/account-based-pensions.

[5]See Services Australia's "Who Can Get It" webpage: www.servicesaustralia.gov.au/who-can-get-age-pension?context=22526.

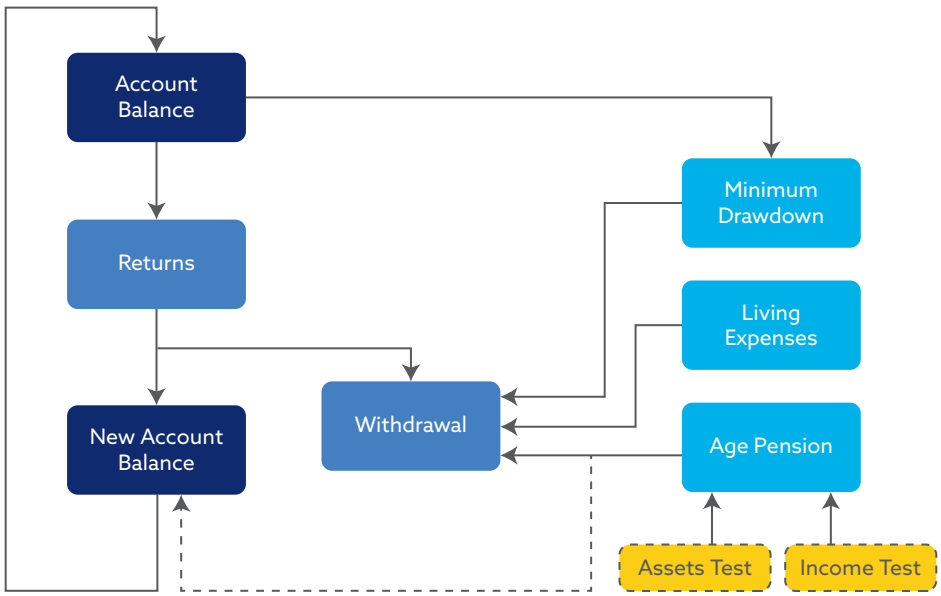
The amount of Age Pension for which an individual is eligible is determined by the income and assets tests. Both tests reduce the maximum amount of pension, and the lower result from the two tests is the amount that the individual actually receives.

The flow chart in **Exhibit 1** delineates the cyclical and interdependent dynamics that govern the balance of a retirement account. At the core of this system is the pension account balance, which is subject to fluctuations based on the returns generated from its underlying investments. These returns, however, are periodically offset by withdrawals made to cover living expenses. Consequently, the remaining account balance becomes a new baseline for future returns and withdrawals, establishing a recurring annual financial cycle.

The account balance, together with other nonsuper assets, and its resulting payments are further scrutinised through yearly assets and income tests, a regulatory mechanism to evaluate eligibility for government assistance, such as the Age Pension. The deemed income policy extrapolates potential income from the retiree's financial assets, affecting the outcome of the income test, which ultimately determines the level of Age Pension benefits granted. The Age Pension then interplays with the retiree's financial ecosystem, potentially mitigating the need for further withdrawals and thereby preserving the retirement account balance.

In Australia, according to the most recent Household, Income and Labour Dynamics in Australia survey report (Wilkins, Botha, Lass, and Peyton 2024), superannuation savings are the next most significant asset after the home, which is not counted in the assets test for the Age Pension.

Exhibit 1. Flow Chart of the Retirement Account Balance for Australian Retirees



Therefore, our model considers only superannuation assets in the assets test, assuming that other nonsuper assets and income from other sources for retirees are negligible.

United States

In the United States, a variety of pension savings mechanisms provide for individuals' retirement income. For our model, we consider the individual's starting retirement account balance to be the total sum of money across all their retirement plans and accounts.

A common and popular retirement savings plan is the 401(k), which is sponsored by employers. The employer places a percentage of the employee's income into this plan, and the employee may make contributions of their own as well. The employee then chooses how their balance is invested. The two types of 401(k) plans—traditional and Roth—differ in how the contributions are taxed.

An individual retirement account (IRA) is a fundamental retirement savings plan, primarily used by self-employed individuals, although it is also available to those with employer-sponsored plans. Those with a 401(k) can also open and contribute to an IRA, but they may face limits on how much money can be contributed. There are different types of IRAs, such as traditional and Roth, and each has different rules regarding eligibility, taxation, and withdrawals.

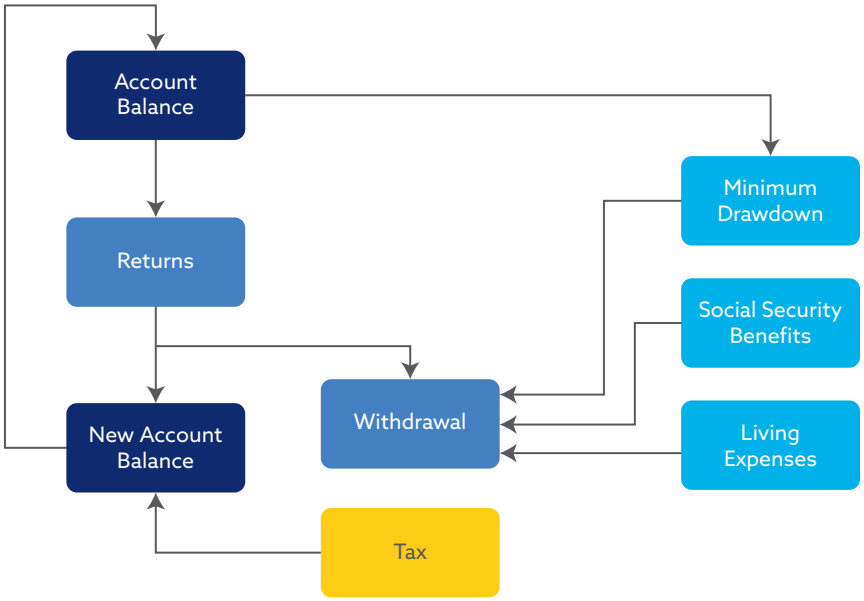
Withdrawals from 401(k) plans and IRAs in retirement are subject to minimum drawdown requirements, depending on the retiree's age. The withdrawals must begin once the individual reaches 72 years of age (or 73, if they turn 72 after 31 December 2022).

An individual also receives monthly Social Security benefits or government payments if they have retired or reduced their number of working hours. In addition, an individual who has reached the Social Security retirement age can elect to receive monthly benefits before retiring.

In the United States, taxation occurs on both the amounts withdrawn each year from the individual's retirement accounts and the Social Security payments. First, the individual's combined income is calculated, according to guidelines issued by the US Social Security Administration. As of February 2025, combined income consists of 50% of the Social Security benefits plus the amount withdrawn from the portfolio. The taxable income is then calculated with the relevant upper and lower threshold values. Lastly, the tax is calculated from the taxable income, based on a progressive tax rate system.

As the flow chart in **Exhibit 2** illustrates, the retiree's account starts with the initial account balance, which is changed by investment returns. The retiree makes withdrawals from this balance while also receiving Social

Exhibit 2. Flow Chart of the Retirement Account Balance for US Retirees



Security benefits. Both withdrawals and benefits are subject to tax. The retiree then has to cover living expenses, which could be financed by the post-tax withdrawals and benefits. After these expenses are accounted for, the remaining amount represents the new account balance, which will serve as the starting point for the next year, continuing the cycle.

Simulation Model Configuration

The following section outlines the key components involved in setting up the model.

Australia

Retiree Profile

This model assumes that the individual in question is single, retires in 2022 at the age of 67, and lives to age 92, resulting in a 25-year retirement. Immediately upon retirement, the individual invests the balance of their superannuation fund into a domestic 60/40 portfolio, which we consider to be the individual's sole financial asset. The Age Pension eligibility and payment amount are decided by the outcome of the income and assets test. In the decumulation phase, the individual's income from the Age Pension and their super withdrawals are not taxed.

Next, we discuss the specific model configurations.

Initial Super Balance

The initial portfolio balances for a retiree at the age of 67 are taken from the following starting superannuation values, reported by the Australian Tax Office (2020–2021):[6]

	Median Balance	Mean Balance
Men	AUD213,986	AUD453,075
Women	AUD201,233	AUD403,038

60/40 Portfolio Return Assumptions

Numerous approaches can be used to evaluate the performance of a 60/40 portfolio in the realm of retirement planning. These include deterministic modelling, historical simulations, and Monte Carlo simulations (Pfau 2017).

Deterministic modelling is the most straightforward of these methods. It involves creating retirement plans based on fixed rates of return, determined by the historical average returns of different asset classes. The primary advantage of this approach is its simplicity and clarity in outcome projection. It falls short in accounting for market volatility and risk sequencing, however, often leading to overly optimistic retirement plans (Pfau 2017).

Historical simulations take a step further, incorporating actual market fluctuations into the analysis. This method studies financial outcomes using rolling periods from historical market data. Because it is grounded in empirical data, historical simulation offers a more realistic perspective than deterministic models. The notable limitation here is its reliance on past market behaviours to predict future trends, which may be unreliable in changing market landscapes (Pfau 2017).

Lastly, Monte Carlo simulations represent a more sophisticated approach and are used extensively in modern financial planning software. This method generates random sequences of market returns to test the robustness of financial plans under a variety of market conditions. Its strength lies in its ability to model a broad range of potential market scenarios, recognising the inherent randomness in market returns. Monte Carlo simulation mirrors the unpredictable and ever-changing nature of financial markets and is therefore more realistic than using a deterministic approach. The probabilistic nature of this repeated random sampling method allows us to explore a vast array of potential outcomes. Despite that they are computationally intensive and highly sensitive to initial input assumptions, Monte Carlo simulations still stand out as the most comprehensive method to project the future performance of a 60/40

[6]https://www.ato.gov.au/about-ato/research-and-statistics/in-detail/taxation-statistics/taxation-statistics-previous-editions/taxation-statistics-2020-21/statistics/individuals-statistics?anchor=IndividualsStatistics#Chart12Individuals.

portfolio and assess retirement strategies against a diverse array of market conditions (Pfau 2017).

In our analysis, therefore, we use the Monte Carlo method, executing 10,000 simulation paths to generate a distribution of future portfolio performance outcomes. These simulations are underpinned by random samples drawn from a bivariate normal distribution. This specific distribution is meticulously calibrated to mirror both the historical and forward-looking parameters associated with equity and bond returns, including their respective standard deviations and correlations.

This methodology is particularly effective in simulating the intertwined dynamics of equity and bond markets. In practical financial contexts, the returns from equities and bonds often exhibit a degree of correlation, which can significantly impact portfolio performance (Lombardi and Sushko 2023). By using a bivariate normal distribution, we can accurately account for this correlation, effectively capturing the unique and joint behaviours of these two diverse asset classes, each characterised by its own mean returns and variance patterns. This comprehensive approach allows for a more nuanced and realistic simulation of portfolio outcomes, providing valuable insights into potential future performance under varying market conditions.

The future equity and bond returns are simulated based on the mean, volatility, and correlations of the equity and bond return series.

$$\left(R_{FE_i}, R_{FB_i}\right)^T \sim \mathcal{N}(\boldsymbol{\mu}, \boldsymbol{\Sigma}).$$

$$\boldsymbol{\mu} = [\text{mean}(R_E), \text{mean}(R_B)]^T.$$

$$\boldsymbol{\Sigma} = \begin{bmatrix} STD^2(R_E) & STD(R_E)STD(R_B)\text{corr}(R_E, R_B) \\ STD(R_E)STD(R_B)\text{corr}(R_E, R_B) & STD^2(R_B) \end{bmatrix}.$$

Then, the forecast portfolio return is

$$R_{FP_i} = 0.6R_{FE_i} + 0.4R_{FB_i}.$$

The primary dataset used to obtain the historical returns is the Dimson–Marsh–Staunton (DMS) Global Investment Returns Database, sourced from Morningstar Direct. The return series, spanning 122 years from 1901 to 2022, are available in local currency and US dollars. For this analysis, we focus on the real equity series and real bonds return series.

The mean, standard deviation, and correlation of the 25-year rolling real returns of Australian equity and bonds based on the DMS series (i.e., from

1901 to 2022) are in the inputs for the simulated future returns, as shown in the following table:

Australia	Equity	Bonds
25-Year rolling mean	6.69%	2.09%
Standard deviation	17.42%	13.36%
Correlation	0.3420	

The standard investment industry disclaimer, "Past performance is no guarantee of future results," highlights the importance of not relying solely on historical data to predict future returns. Consequently, we also employ a forward-looking approach, using the forecasted returns from the Monash Centre for Financial Studies (MCFS) Capital Market Assumptions (CMAs) (refer to Appendix A). For our simulation of market returns, we use these forecasted returns for the initial 10 years. For the subsequent years (Year 11 to Year 25), we use the DMS historical returns as inputs for the simulation because we assume that in the long run, asset returns eventually revert to their long-term mean or average level.

The forecasted real returns, standard deviation, and correlation for the next 10 years of Australian equity and bonds based on the MCFS CMAs are used as the inputs for the simulated returns of Year 1 to Year 10, as shown in the following table:

Australia	Equity	Bonds
Forecasted returns	5.59%	1.23%
Standard deviation	13.49%	7.32%
Correlation	0.508	

Simulation Periods

Life expectancy data for Australia in 2021 indicate that Australian men aged 65 are expected to live an additional 20.3 years, while women can expect to live another 23 years (Australian Institute of Health and Welfare 2024). In the United States, the corresponding figures are 17 years for men and 19.7 years for women (Xu, Murphy, Kochanek, and Arias 2022). To standardise our analysis and ensure comprehensive coverage of life expectancies, we assume a uniform maximum postretirement lifespan of 25 years for individuals from both countries. This model assumption well represents the retirement time and projected lifespan in retirement for most baby boomers.[7]

[7]Baby boomers (generation 2) were born from 1955 to 1964. For this generation, the first year to reach the Age Pension age in Australia or the Social Security age in the United States was 2022.

Age Pension

The individual is also eligible to receive Age Pension upon retirement. The income and assets tests are used to determine the amount of Age Pension the individual receives. According to the Social Security Guide issued by the Australian Government (2024), the annual full pension amount as of September 2022 was AUD24,356.80 and the income and assets test can reduce this amount; the lower amount is the actual Age Pension received by the individual. For the income test, since the individual does not receive formal income, their income is deemed from their portfolio balance (Australian Government 2025).

Assets test

The value of the individual's assets, their homeownership status, and their relationship status are all considered in this test. In our model, we assume that the individual is a homeowner and single and their sole asset is their superannuation balance (or investment portfolio).

AT_i is the amount of Age Pension in year i after adjusting for assets, and AB_i is the individual's account balance at the start of year i. For every AUD1,000 exceeding the threshold of AUD280,000, the full Age Pension amount is reduced by AUD78. If the portfolio's value is higher than AUD622,250, then the individual does not receive any Age Pension.[8]

Income test

The individual's income from all sources, as well as their partner's income, is assessed. This includes savings, shares, and superannuation. To determine income from financial assets (such as superannuation), deeming rules are applied. In our model, we assume that the individual's only income source is the deemed income from their superannuation balance.

IT_i is the amount of Age Pension in year i after adjusting for deemed income, and DI_i is the individual's deemed income in year i. During the reference year of 2022, the thresholds for deemed income were established at 0.25% for the initial AUD56,400 of the account balance, with 2.25% applied to any remaining balance. The income test reduces the full Age Pension amount of AUD24,356.80 by AUD0.50 for every AUD1 of deemed income exceeding AUD4,940. If the deemed income amount exceeds AUD58,318, then the individual does not receive any Age Pension.[9]

[8]See pp. 46–48 in Services Australia (2022).

[9]https://guides.dss.gov.au/social-security-guide.

$$IT_i = \begin{cases} 24{,}356.80 & \text{if } DI_i \le 4{,}940 \\ 24{,}356.80 - (DI_i - 4{,}940)\cdot 0.5 & \text{if } 4{,}940 \le DI_i \le 58{,}318 \\ 0 & \text{if } DI_i > 58{,}318 \end{cases}$$

$$DI_i = \left(56{,}400 \cdot \frac{0.25}{100}\right) + \left((AB_i - 56{,}400)\cdot \frac{2.25}{100}\right).$$

The actual amount of Age Pension received in in year i, denoted by P_i, is given by

$$P_i = \min(AT_i, IT_i).$$

Minimum Drawdown

The retiree must also withdraw a certain percentage from their fund each year, depending on their age. The minimum amount to be withdrawn is given by $AB_i \times D_i$. The drawdown percentages (D_i) are as follows:[10]

Age	65–74	75–79	80–84	85–89	90–94
Rate	5%	6%	7%	9%	11%

The objective of the drawdown rates set by the government is to ensure that superannuation balances are used primarily to provide retirement income and that the amount of money left over upon death is not inappropriately high.

Living Standards

We model both scenarios in which it is assumed that the retiree can live either modestly or comfortably, as defined by the Association of Superannuation Funds of Australia (ASFA). A modest lifestyle is described as "better than Age Pension but still only able to afford basic activities," while a comfortable lifestyle means that the retiree can "be involved in a broad range of leisure and recreational activities and … have a good standard of living through the purchase of such things as household goods; private health insurance; a reasonable car; good clothes; a range of electronic equipment; and domestic, and occasionally international, holiday travel" (ASFA 2013). The 2022 figures are AUD30,582 per year for modest living and AUD44,034 per year for comfortable living and are denoted by L_i.

[10]Industry SuperFunds, www.industrysuper.com/retirement-info/income-streams/drawdown-rates-for-2025/.

Ending Account Balance

The year-end account balance is calculated by $AB_i\left(1+R_{FP_i}\right)$, with R_{FP_i} being the return yielded by the retirement portfolio during the year.

The tests for income and assets are conducted using the initial balance at the start of each year, prior to the generation of returns. Additionally, it is presumed that the calculation for the mandatory annual withdrawal amount is done at the beginning of year *i*, before any returns are produced.[11]

Finally, AB_{i+1} is the account balance at the end of the year and is calculated as follows:

$$AB_{i+1} = \max\left[AB_i\left(1+R_{FP_i}\right) - \max(L_i - P_i, AB_i \times D_i), 0\right].$$

Inflation

We assume that all variables in the model, including returns, living expenses, Age Pension, asset threshold, and deemed income, are adjusted for inflation and expressed in real terms.

United States

Retiree Profile

We apply the same retiree profile for the US model. These assumptions include marital status (single), retirement age (66), and a 25-year life after retirement.

Initial Super Balance

Given the absence of a uniform system similar to Australia's superannuation in the United States, we assume that an individual invests the aggregate amount from all their retirement funds into a domestic portfolio with a 60/40 asset allocation. Unlike the tax-free status in Australia, these savings are subject to taxation in the United States, which we consider in our model.

We obtain the initial portfolio balance data from the Federal Reserve Board's Survey of Consumer Finances.[12] The following are the current retirement accounts of a person who retired in 2022. Regarding the initial portfolio balances, we cannot distinguish between male and female profiles because of data unavailability.

[11]We assume that the actual withdrawals take place at the end of the year, following the generation of returns.

[12]www.federalreserve.gov/econres/scf/dataviz/scf/table/#series:Retirement_Accounts;demographic:occat1;population:all;units:mean;range:1989,2022.

Median Balance	Mean Balance
USD170,000	USD513,200

60/40 Portfolio Return Assumptions

The historical mean, standard deviation, and correlation of the 25-year rolling real returns of US equity and bonds used for the simulated future returns are based on the DMS series, from 1901 to 2022, as shown in the following table:

United States	Equity	Bonds
25-Year rolling mean	6.60%	2.12%
Standard deviation	19.93%	10.78%
Correlation	0.1909	

We then use the forecasted real returns, standard deviation, and correlation for the next 10 years of US equity and bonds based on the MCFS CMAs as the inputs for the simulated future returns of Year 1 to Year 10, as shown in the following table:

United States	Equity	Bonds
Forecasted returns	3.11%	2.62%
Standard deviation	14.73%	5.31%
Correlation	0.606	

Social Security Benefit

The retiree can also receive Social Security payments each year, which are similar to Age Pension in Australia. Because of the complexity in how these benefits are calculated, however, for this study we assume that the retiree receives a fixed amount each year, which we denote as SSB_i. According to the Social Security Administration, the average Social Security income received by men and women 65 years and older is as follows:[13]

Men	Women
USD18,108	USD14,204

[13]https://www.ssa.gov/pressoffice/factsheets/women-alt.pdf.

Minimum Withdrawals

The retiree must also withdraw a certain amount from their fund each year, depending on their age. This amount is calculated by dividing the portfolio's value each year by the corresponding distribution period: $\frac{AB_i}{DP_i}$, where DP_i is the distribution period. The distribution periods for each year are as follows:[14]

Age	72	73	74	75	76	77	78	79	80	81
Distribution period	27.4	26.5	25.5	24.6	23.7	22.9	22.0	21.1	20.2	19.4
Age	82	83	84	85	86	87	88	89	90	91
Distribution period	18.5	17.7	16.8	16.0	15.2	14.4	13.7	12.9	12.2	11.5

Living Standards

Based on the Consumer Expenditure Surveys conducted by the US Bureau of Labor Statistics, the total average annual living expense (L_i) for a US retiree is USD54,975.[15]

Taxation

The Social Security benefits the retiree receives, as well as any amounts withdrawn from the portfolio, are taxed.

First, the individual's combined income (CI_i) is calculated, which consists of 50% of the Social Security benefits plus the amount actually withdrawn from the portfolio:

$$CI_i = 0.5SSB_i + \max\left(L_i - SSB_i, \frac{AB_i}{DP_i}\right),$$

where the actual withdrawal (AW_i) is

$$AW_i = \max\left(L_i - SSB_i, \frac{AB_i}{DP_i}\right).$$

[14]IRS, www.irs.gov/publications/p590b#en_US_2024_publink100089977.

[15]See the breakdown of this expense calculation here: https://fred.stlouisfed.org/release/tables?rid=479&eid=1212789.

The taxable income is then calculated with the relevant upper and lower threshold values:[16]

$$TI_i = \begin{cases} AW_i & \text{if } CI_i \le 25{,}000 \\ \min[0.5(CI_i - 25{,}000), 0.5(19{,}320)] + AW_i & \text{if } 25{,}000 \le CI_i \le 34{,}000 \\ \min[0.5(34{,}000 - 25{,}000) + 0.85(CI_i - 34{,}000), \\ \quad 0.85(19{,}320)] + AW_i & \text{if } CI_i > 34{,}000 \end{cases}$$

Lastly, the tax, T_i, is calculated from the taxable income, based on a progressive tax rate system, with the 2023 values chosen for this model:[17]

Taxable Income	Rate
Income ≤ 11,000	10%
11,000 < Income ≤ 44,725	12%
44,725 < Income ≤ 95,375	22%
95,375 < Income ≤ 182,100	24%
182,100 < Income ≤ 231,250	32%
231,250 < Income ≤ 578,125	35%
Income > 578,125	37%

Note: Income amounts are in US dollars.

Ending Account Balance

Similar to the simulation model for Australia, we assume that the portfolio generates returns at the end of year *i*. The account balance after returns is given by $AB_i\left(1+R_{FP_i}\right)$.

Then, AB_{i+1} is the account balance at the end of the year, which is equivalent to the starting account balance of the following year.[18]

Finally, AB_{i+1} is the account balance at the end of the year and is calculated as follows:

$$AB_{i+1} = \max\left[AB_i\left(1+R_{FP_i}\right) - \max\left(L_i - SSB_i, \frac{AB_i}{DP_i}\right) - T_i, 0\right].$$

[16]For more details, see Social Security Administration (2025).

[17]Tax inflation adjustments are made annually; for details for 2023, see Internal Revenue Service (2022).

[18]We assume that the yearly minimum withdrawal amount is calculated at the start of year *i* before returns are generated. Additionally, the amount of tax is paid from the account balance at the end of the year.

In summary, the specific model configurations are as follows:

	Australia	United States
Portfolio returns	10,000 series of Monte Carlo simulated future returns based on the mean, volatility, and correlations of the historical equity and bond returns	
Initial amount	(1) Median balance Men: AUD213,986 Women: AUD201,233 (2) Mean balance Men: AUD453,075 Women: AUD403,038	(1) Median balance: USD170,000 (2) Mean balance: USD513,200
Withdrawal amount	Minimum pension drawdown	
Withdrawal frequency	Yearly	
Benefits	Age Pension, if applicable Maximum amount: AUD24,356.80	Social Security benefit Men: USD18,108 Women: USD14,204
Living standards	(1) Modest: AUD30,582 (2) Comfortable: AUD44,034	USD54,975
Simulation period in years	25 years	
Inflation	Inflation-adjusted	
Tax	Not taxable	Taxable
Rebalance	Yearly without rebalancing expenses	

Can a 60/40 Portfolio Be Sufficient for Retirement?

Using the Monte Carlo model's framework, we conduct 10,000 simulations that generate a spectrum of potential returns for stocks and bonds over a 25-year retirement period. This extensive simulation exercise aims to evaluate the probability that a portfolio will be able to maintain the withdrawals that a retiree needs in order to fund either a modest or comfortable lifestyle throughout retirement.

Simulation Using Historical Returns

Australia

60/40 retirement portfolio sufficiency: Median and mean starting account balance

Median account balance scenario

According to the simulation, based on a 25-year retirement period (up to the year 2047), men with a median starting balance who live modestly are predicted to end up with the highest median final account balance by 2047, with women

in the same category trailing just behind. Conversely, both men and women who opt for a comfortable lifestyle are forecasted to fully spend their retirement funds, with their median final balance reaching zero. Under the comfortable living scenario, men are projected to deplete their retirement savings by 2034—just 12 years into retirement—while women are projected to do so a year earlier (i.e., in 2033, just 11 years after retiring). **Exhibit 3** illustrates these results.

For the purpose of this study, we define "success rate" as the probability of portfolio survival, meaning the percentage of simulations in which the final balance after 25 years is greater than zero. **Exhibit 4** displays the success rates for the four scenarios when we begin with a median starting balance.

In the case of a modest lifestyle, the success rate is around 95% for both men and women. This percentage means that out of 10,000 simulated return trajectories of the 60/40 retirement investment portfolio, in approximately 9,500 of those cases, a person retiring at 67 can reasonably expect their funds to last until age 92, following the minimum pension withdrawal rules and maintaining a modest lifestyle.

For a comfortable lifestyle, however, success rates for male and female retirees plummet to about 2% during the same 25-year period. This finding indicates that for the majority, especially those who retired in 2022 in Australia with a median starting balance, a 60/40 portfolio might not provide sufficient funds to cover a comfortable lifestyle throughout retirement.

Exhibit 3. Australian Retirees: Median Remaining Account Balances for a Median Starting Balance, Simulated Returns

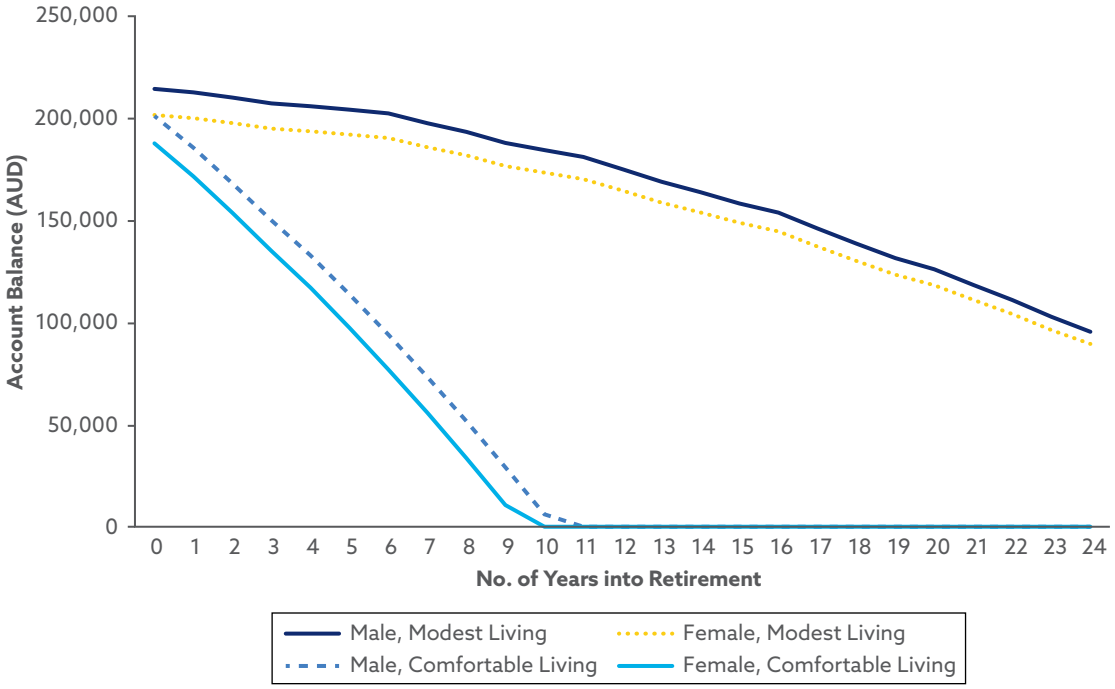
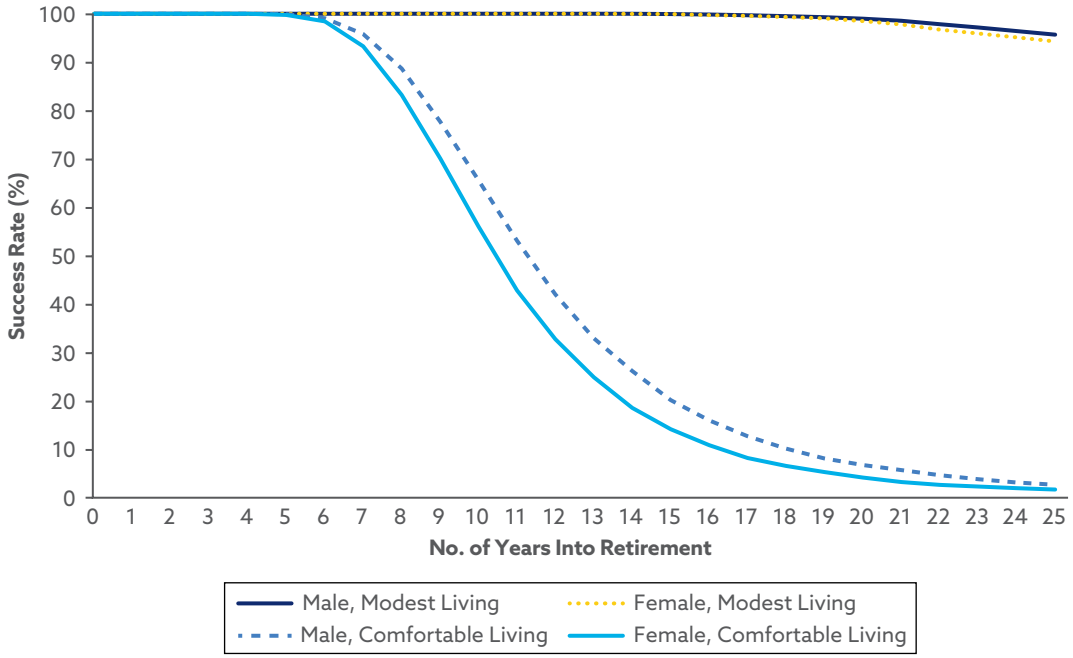


Exhibit 4. Australian Retirees: Success Rates for Median Starting Balance



Mean account balance scenario

As shown in **Exhibit 5**,[19] for a mean starting balance of AUD453,075 for male retirees and AUD403,038 for female retirees—twice the size of the median starting balance—the yearly median remaining account balances graph shows that on average, for modest living, neither male nor female retirees will exhaust their portfolios by the end of retirement. For comfortable living, however, although the male retiree will not exhaust his retirement funds for comfortable living, the female retiree will.

For modest living, as one would expect, the account balances decline more gently, making a modest lifestyle more sustainable in the long term. The 99% success rate, shown in **Exhibit 6**, reflects this dynamic. In contrast, for comfortable living, the account balances for both male and female retirees start to diverge from the higher level sooner and decline more steeply. The funds deplete more rapidly as a result of the higher withdrawal rates needed to fund a comfortable lifestyle.

Under the scenario with a higher starting balance (in this case, the mean), we see a dramatic increase in the effectiveness of the 60/40 portfolio for both male and female retirees living comfortably. A near 100% success rate during the initial half of retirement reflects this portfolio's ability to maintain sufficient funds when expenses are presumably met without excessive withdrawals. As retirement progresses, however, the success rate declines. Despite this

[19]It represents the median remaining account balance.

Exhibit 5. Australian Retirees: Remaining Account Balances for a Mean Starting Balance, Simulated Returns

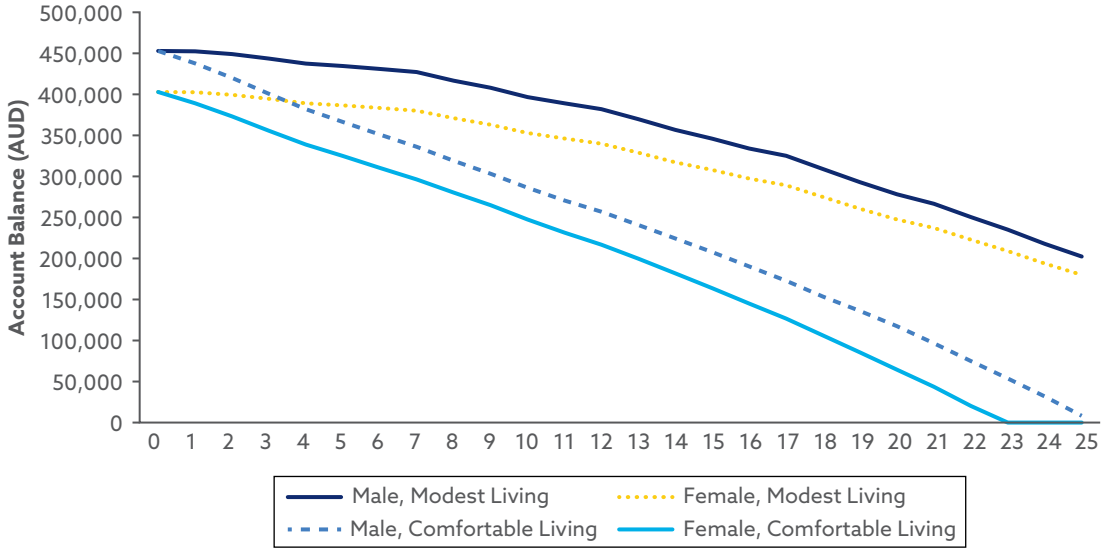
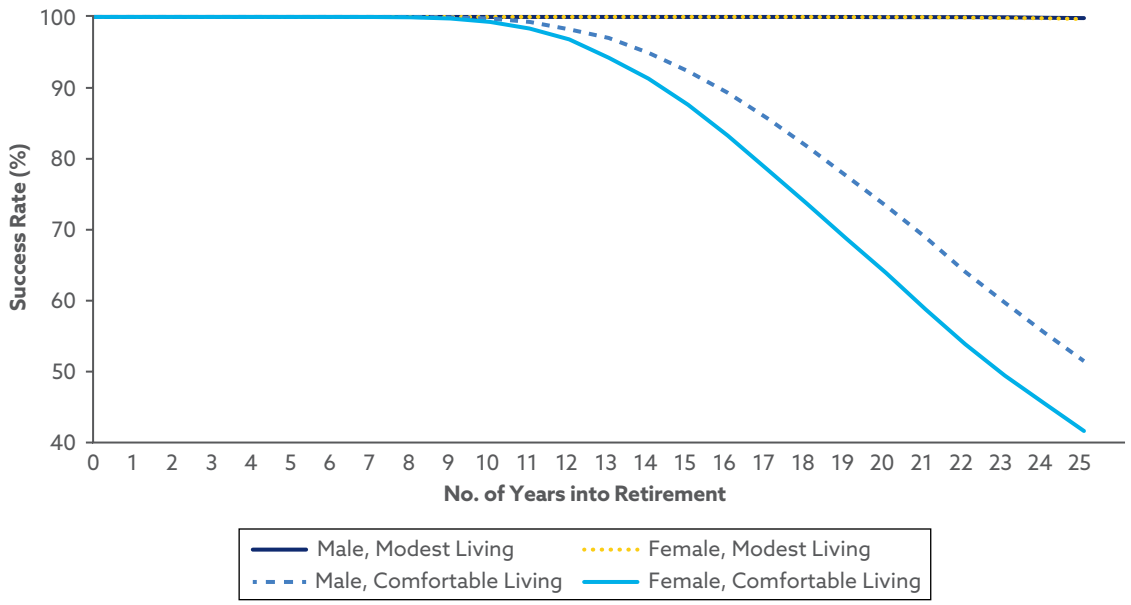


Exhibit 6. Australian Retirees: Success Rates for a Mean Starting Balance



decline, success rates in the final year (approximately 40% for female and 50% for male retirees) indicate that nearly half of the retirement accounts are still projected to have a positive balance after 25 years. This result again underscores that a 60/40 investment strategy might be inadequate for a comfortable retirement, emphasising that the initial account balance is a significant factor in determining the longevity of retirement funds.

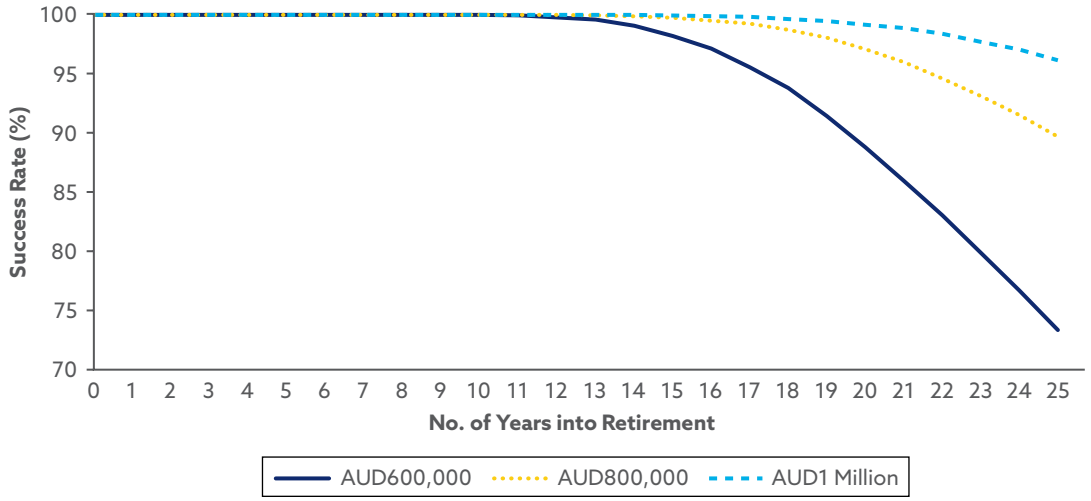
60/40 retirement portfolio sufficiency for retirees with a higher starting balance

Under the modest living standard scenario, retirees who begin with either median or average balances face a minimal risk of exhausting their portfolio within their planned 25-year retirement period. Nonetheless, those aiming for a comfortable lifestyle may find this approach insufficient. We now shift our focus to determining how a starting balance can sustainably fund a comfortable retirement.

Exhibit 7 plots the success rate of a 60/40 portfolio over a 25-year retirement period for a comfortable living standard, differentiated by various starting balances ranging from AUD600,000 to AUD1 million. Initially, all portfolios show nearly perfect success rates, but as time goes on, the AUD600,000 balance experiences a rapid decline, indicating a higher likelihood of funds running out. In contrast, the AUD1 million balance maintains a notably higher success rate (although still less than 100%), suggesting it is much more likely to sustain the retiree's financial needs for the full retirement period.

Highlight 1: A 60/40 portfolio could be sufficient for some Australian retirees, particularly those with modest living expenses and a higher starting balance. For others, however—especially those with higher expenses created by their desire for a comfortable lifestyle—it might be inadequate, necessitating a larger starting balance or an alternative investment strategy.

Exhibit 7. Australian Retirees: Comfortable Lifestyle Success Rates for a Range of Starting Balances



Sequence-of-returns risk

Sequence-of-returns risk can seriously undermine the sustainability of a 60/40 portfolio during retirement, primarily because negative returns that occur earlier during an individual's retirement life can dramatically accelerate depletion of the portfolio's assets. When retirees begin to withdraw funds during a market downturn, they must sell more investments to maintain their standard of living, effectively locking in losses and diminishing the portfolio's capacity for future growth. This dynamic both reduces the portfolio's immediate value and impairs its ability to recover and benefit from later positive returns because of the now-reduced base for compounding. Consequently, the portfolio's longevity is compromised, raising the likelihood that the retiree will outlive their resources.

Modelling how sequence-of-returns risk impacts the 60/40 portfolio is thus a crucial element in determining the sufficiency of this retirement investment approach. In this analysis, we address sequence-of-returns risk by examining a scenario in which a retiree faces the worst return in the very first year of the projected 25-year retirement period.

Exhibits 8 and 9 present success rates for Australian retirees that correspond to different starting portfolio values: median and mean, with and without

Exhibit 8. Australian Retiree Success Rates: Worst Return in the First Year vs. No Adjustments of Sequence-of-Returns Risk—Mean Starting Balance, Modest Living Standard

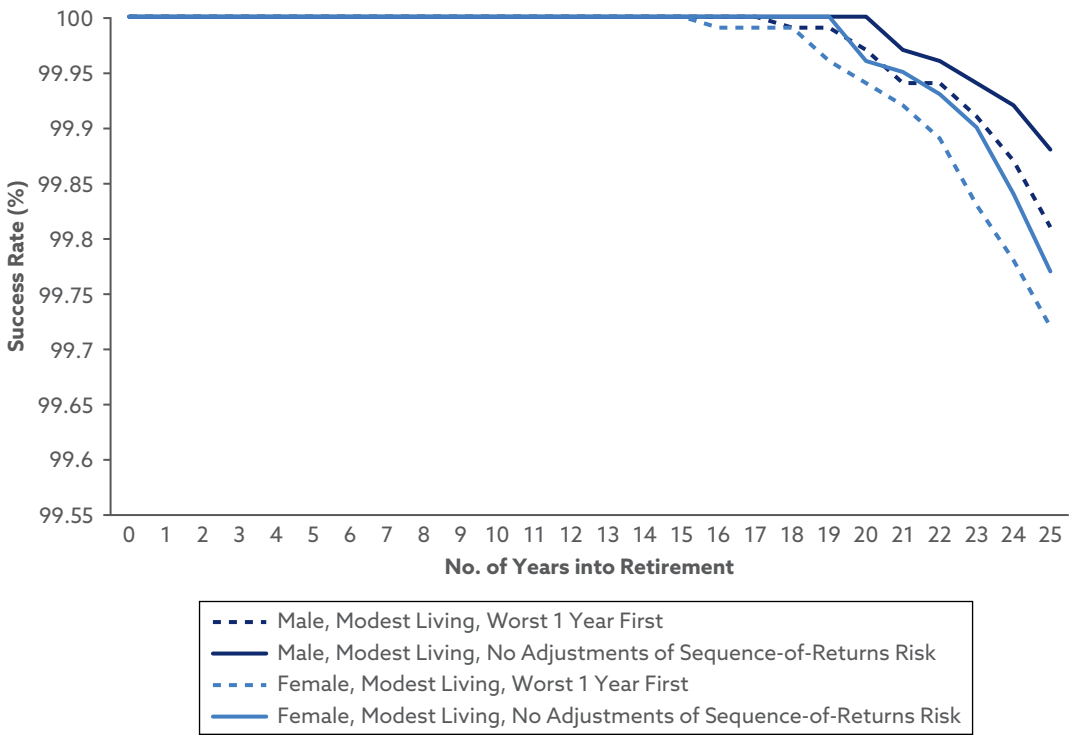
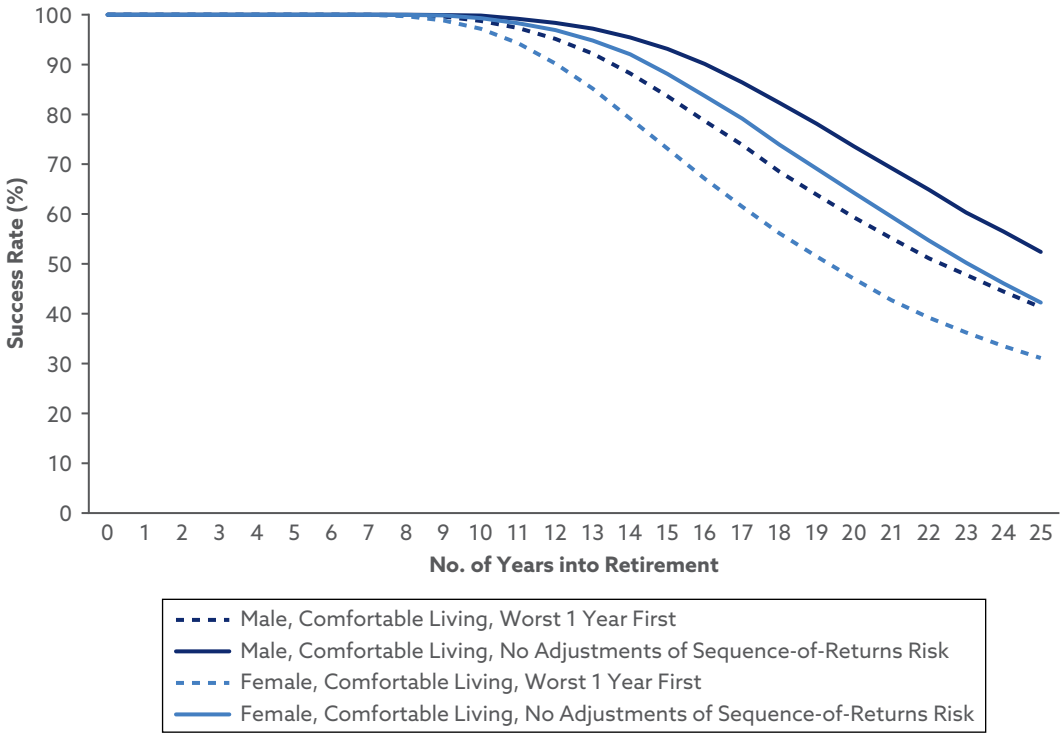


Exhibit 9. Australian Retiree Success Rates: Worst Return in the First Year vs. No Adjustments of Sequence-of-Returns Risk—Mean Starting Balance, Comfortable Living Standard



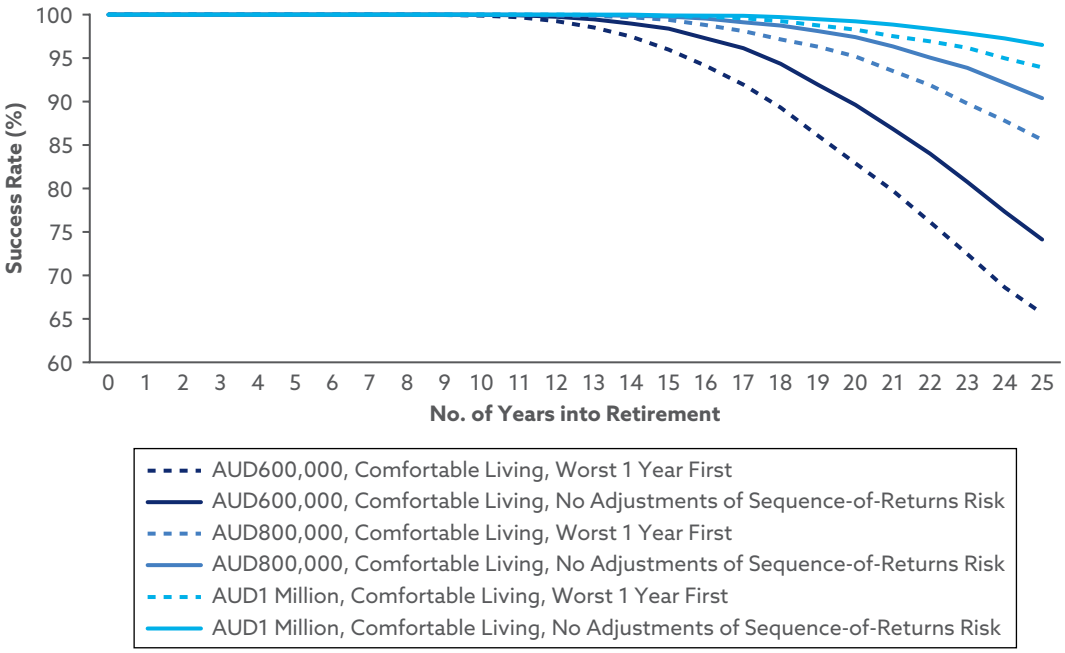
risk sequencing.[20] These graphs indicate that the impact of significant early negative returns on retirement portfolios is visibly detrimental. We can conclude that sequence-of-returns risk substantially impacts the sustainability of retirement portfolios. When the retirement portfolio is not impacted by early negative returns, success rates are higher, indicating a more resilient and sustainable portfolio across the board.

The effect of early negative returns is even more severe for those seeking a comfortable lifestyle, where the success rate drops more quickly and to a lower level compared with those living more modestly. Retirees with a modest living standard still maintain high success rates in the face of sequence-of-returns risk.

Exhibit 10 depicts how sequence-of-returns risk affects the success rate of retirement portfolios aiming for a comfortable living standard across higher starting balances (AUD600,000, AUD800,000, and AUD1 million) over 25 years. Portfolios not impacted by significant negative early returns maintain a higher success rate across all three initial balance levels. A starting balance of AUD600,000 with significant negative early returns shows a rapid decline

[20]The success rates of the retirees with no adjustments of sequence-of-returns risk differ slightly from those in Exhibit 6 because different simulated return series were used. The differences, however, are minimal.

Exhibit 10. Australian Retiree Success Rates: Worst Return in the First Year vs. No Adjustments of Sequence-of-Returns Risk—Various Starting Balances, Comfortable Living Standard



in success rate, dropping below 60% by the 25-year mark, indicating a high risk of fund depletion. Although the AUD800,000 and AUD1 million portfolios display greater resilience, the presence of significant negative early returns still noticeably diminishes their success rates compared with portfolios that did not experience such losses. The AUD1 million portfolio not impacted by significant negative early returns retains a success rate above 90% throughout the 25 years, illustrating its strong potential for enduring financial stability in retirement.

These observations underscore the critical impact of early investment returns on retirement fund sustainability, particularly for those aiming for a comfortable standard of living. They also highlight the importance of having a larger initial retirement balance to buffer against potential volatility in the early years of retirement.

Highlight 2: In Australia, the 60/40 portfolio's ability to sustain retirement expenses is significantly affected by sequence-of-returns risk, particularly for retirees living comfortable lifestyles that require higher withdrawals. Avoiding early negative returns improves the 60/40 portfolio's sustainability but does not eliminate the risk of eventual depletion, especially for those seeking a more comfortable lifestyle. A larger initial retirement balance is beneficial to buffer against potential early investment volatility.

United States

60/40 retirement portfolio sufficiency for retirees with median and mean starting balance

Exhibit 11 illustrates the sustainability of a 60/40 portfolio for both male and female US retirees, comparing median and mean starting account balances over a 25-year retirement period. The projections highlight that both male and female retirees with median starting balances of USD170,000 experience a more rapid decline in their retirement funds than those starting with the mean balance level. This result suggests that a 60/40 portfolio is likely insufficient to sustain a retiree over the entire length of a 25-year retirement period if they start out with only the median amount of savings.

In contrast, the mean starting balances of USD513,200—an elevated figure caused by high-value outliers—show a slower rate of decline, indicating a longer-lasting portfolio for those above the average savings level. On average, women receive less in Social Security benefits than men, and thus this trend is more pronounced over time for men than women, revealing a gender disparity in retirement fund durability. The slope of the overall downward trend in all scenarios points to a potential risk of portfolio depletion, emphasising that a 60/40 portfolio may face sustainability challenges, particularly for individuals with median savings.

Exhibit 11. US Retiree Median Remaining Account Balance: Male vs. Female Retirees, Mean vs. Median Starting Balance, Simulated Returns

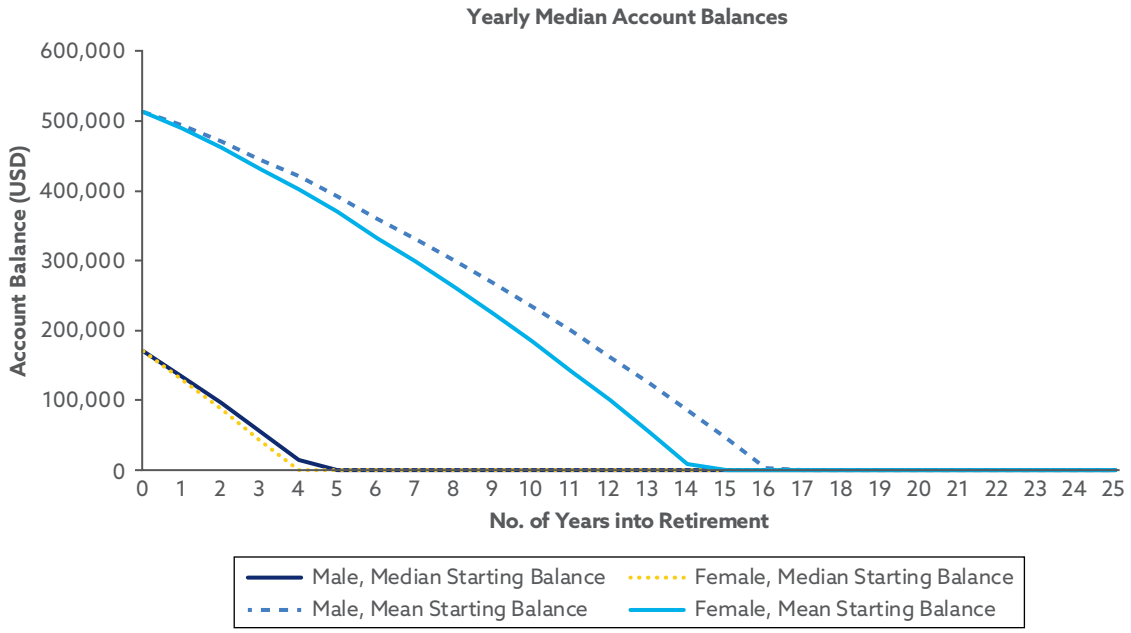


Exhibit 12 displays the success rate for both male and female US retirees with either median or mean starting retirement balances. Note that the success rates for individuals with median starting balances drop sharply in the initial years and continue to decline rapidly, reaching zero well before the 25-year mark. In contrast, those with mean starting balances, which are higher, show a more gradual decline in success rates. It is noteworthy, however, that even these success rates eventually trend towards zero, albeit more slowly.

Highlight 3: A 60/40 portfolio might struggle to provide long-term sustainability for US retirees, particularly those with median starting balances, because their funds become depleted relatively quickly, creating a substantial longevity risk. Even for those with mean starting balance levels, the risk of depletion is significant over a longer horizon.

60/40 retirement portfolio sufficiency for retirees with a higher starting balance

Exhibit 13 compares success rate trajectories for male and female US retirees across a spectrum of starting balances, from USD600,000 to USD1 million, over a 25-year retirement period. Given that women typically receive less in Social Security benefits, it appears that although both genders face a decline in success rates over time, female retirees typically experience more-accelerated

Exhibit 12. US Retiree Success Rates: Male vs. Female Retirees, Mean vs. Median Starting Balance

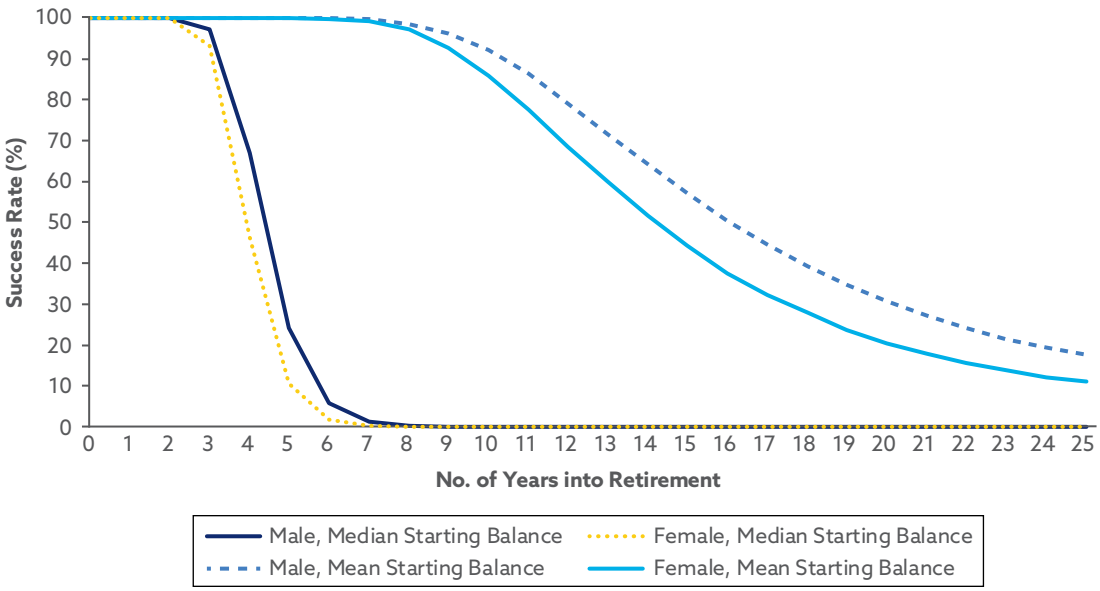
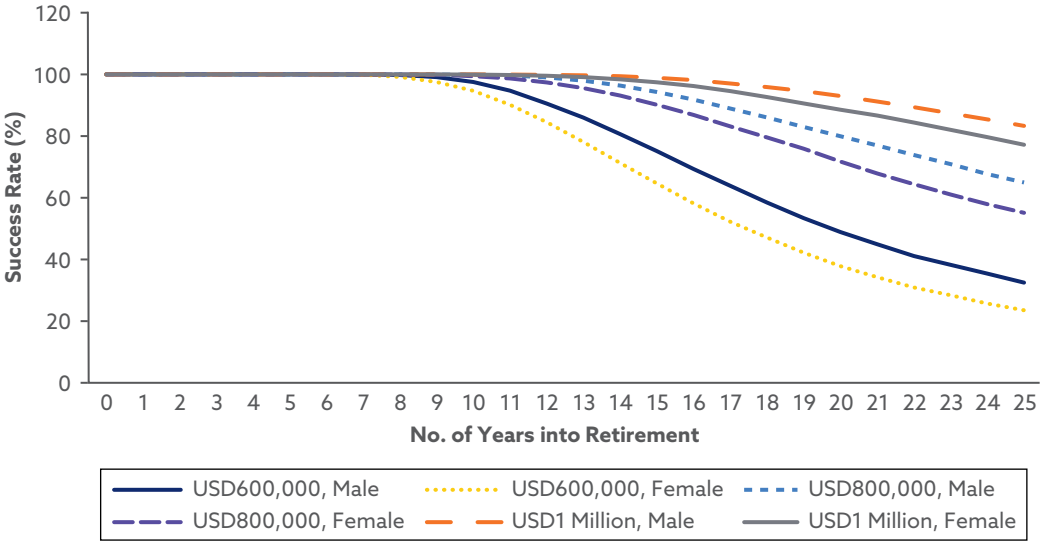


Exhibit 13. US Retiree Success Rates: Male vs. Female Retirees with a Range of Starting Balances



depletion of their retirement funds. Although the portfolio demonstrates an initial resilience, the success rate for even the largest starting balances eventually declines. The decline is much more significant, however, for the USD600,000 starting balance than for the USD1 million starting balance. In each scenario, female retirees have a lower success rate than their male counterparts.

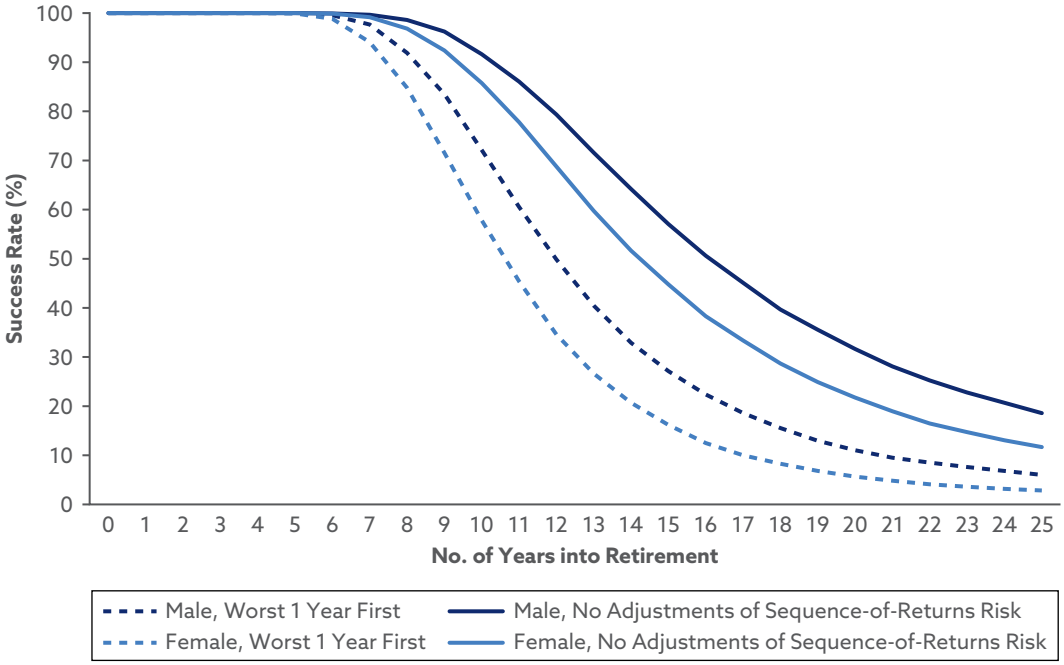
Highlight 4: A one-size-fits-all approach, such as the traditional 60/40 strategy, might not be adequate for everyone. Although higher initial balances offer a better chance of sustaining retirement expenses, they are not a guaranteed safeguard against the risk of fund depletion.

These trends illustrate the importance of considering initial savings, gender disparities, and the need for realistic expectations when planning for retirement based on a 60/40 investment strategy in the United States.

Sequence-of-returns risk

Exhibit 14 illustrates the success rates for male and female retirees in the United States who encounter the worst return in their first year of retirement, and it compares these trends with those whose portfolios did not face this sequence-of-returns risk. The occurrence of a first-year worst return indeed depleted the portfolios many years earlier.

Exhibit 14. US Retiree Success Rates: Worst Return in the First Year vs. No Adjustments of Sequence-of-Returns Risk—Mean Starting Balance



Exhibits 15 and 16 illustrate the impacts of sequence-of-returns risk on female and male retirees in the United States across different higher starting balances of USD600,000, USD800,000, and USD1 million over 25 years.

It becomes clear that avoiding early negative returns can significantly improve the sustainability of retirement savings. The impact of negative early returns is less severe (but still notable) for higher starting balances. Although the success rates for those with larger initial balances have a smaller initial drop—indicating that a bigger financial cushion can provide some resilience against early investment losses—a substantial decrease arises at the end of the retirement horizon. The female and male retirees' USD1 million portfolios without significant early losses display robust performance, maintaining success rates above 85% and 90%, respectively. It is evident, however, that even portfolios starting with USD1 million are also affected by negative early returns.

Highlight 5: The findings suggest that, in light of the potential adverse impact of significant negative returns in the early years of retirement, the classic 60/40 portfolio may not be as foolproof for retirement planning as once thought.

Exhibit 15. US Female Retiree Success Rates: Worst Return in the First Year vs. No Adjustments of Sequence-of-Returns Risk—Various Starting Balances

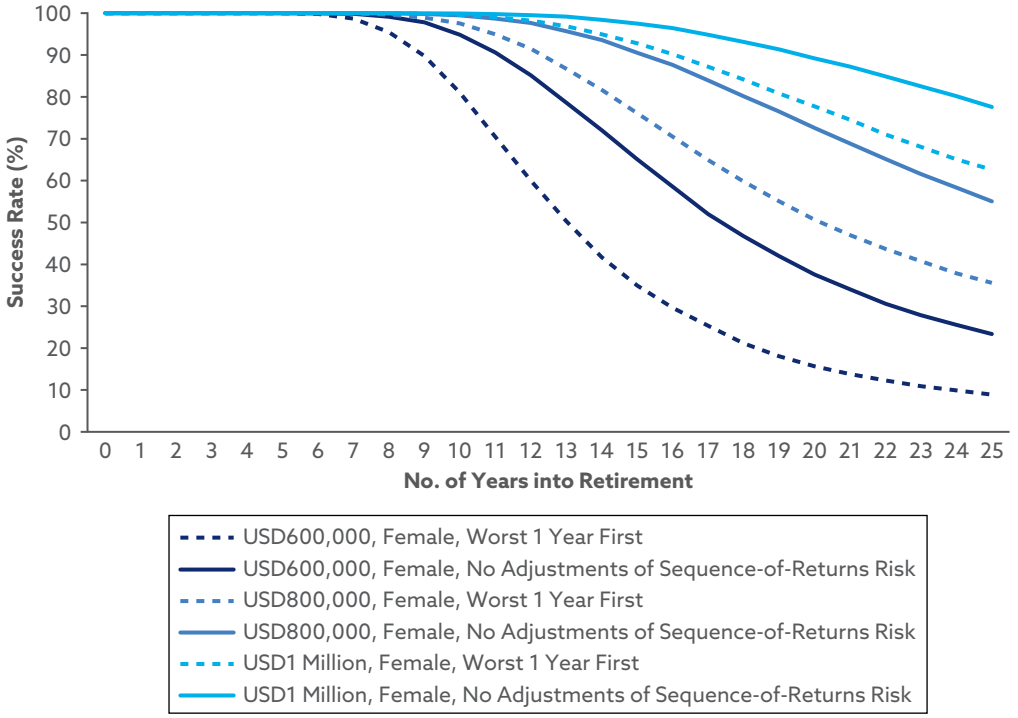
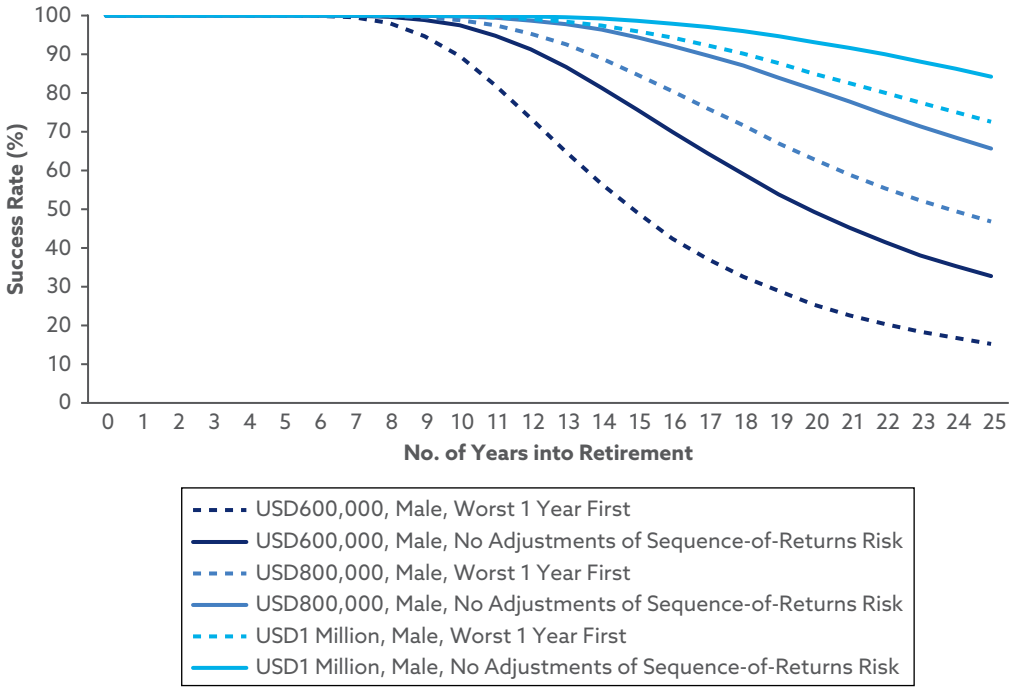


Exhibit 16. US Male Retiree Success Rates: Worst Return in the First Year vs. No Adjustments of Sequence-of-Returns Risk—Various Starting Balances



Simulation Using Forecasted Returns

Australia

Considering that forecasted returns fall short of the historical average from the DMS data, the projected success rates to live comfortably shown in **Exhibit 17** are less optimistic compared with those in Exhibit 6, which are based on historical returns. Therefore, it might be advisable for retirees to adopt a more conservative approach to their withdrawal strategies in light of these more modest future return expectations.

Exhibit 18 demonstrates that Australian male and female retirees who encounter substantial negative returns early on in retirement face a notably lower success rate over a 25-year period.

United States

Exhibit 19 depicts the success rates for US male and female retirees who have starting balances with a 60/40 asset allocation over a 25-year retirement period, based on forecasted returns. The graph clearly shows a decline in success rates over time for both genders, with the rates eventually converging as the years progress. This illustration confirms that a 60/40 portfolio might struggle to provide long-term sustainability for retirees in the United States, on average.

Exhibit 17. Australian Retiree Success Rates: Modest vs. Comfortable Lifestyles—Mean Starting Balance, Forecasted Returns

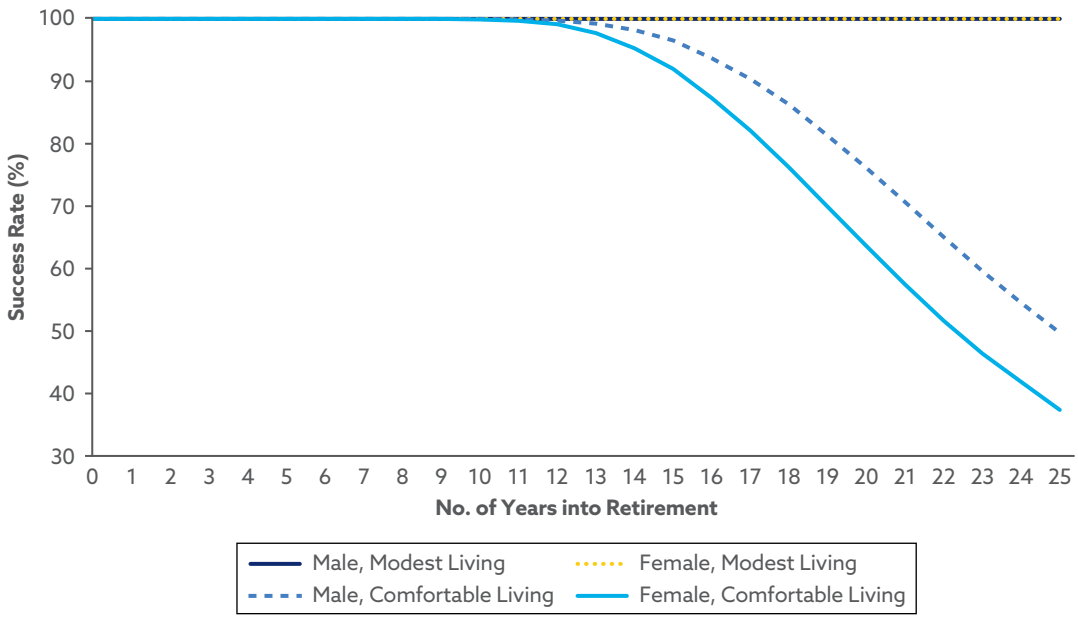


Exhibit 18. Australian Retiree Success Rates: Worst Returns in the First Year vs. No Adjustments of Sequence-of-Returns Risk—Mean Starting Balance, Forecasted Returns

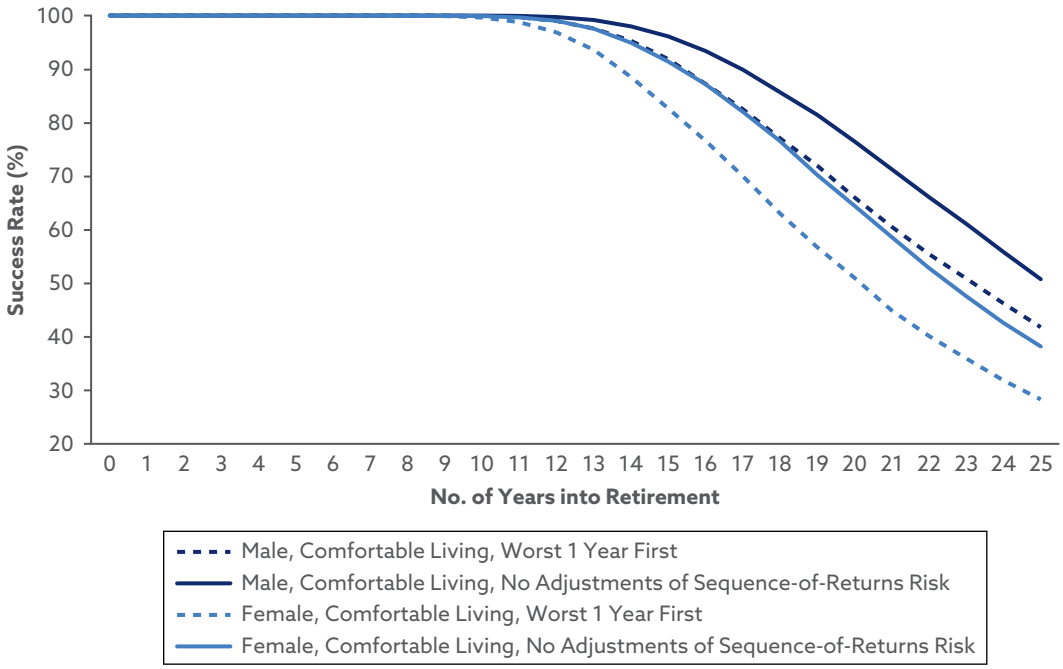


Exhibit 19. US Retiree Success Rates: Male vs. Female Retirees—Mean Starting Balance, Forecasted Returns

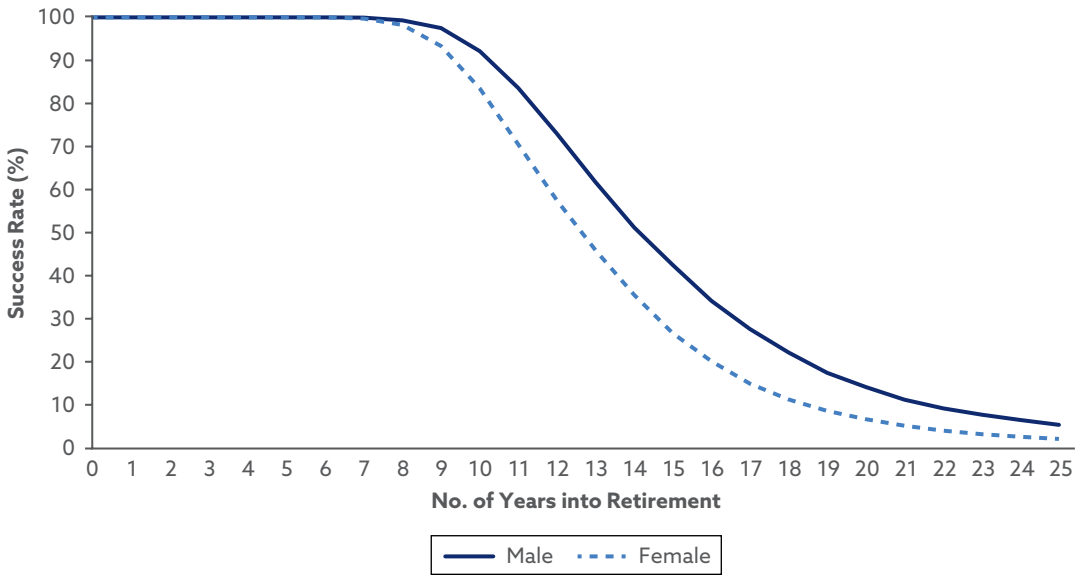


Exhibit 20. US Retiree Success Rates: Worst Returns in the First Year vs. No Adjustments of Sequence-of-Returns Risk—Mean Starting Balance, Forecasted Returns

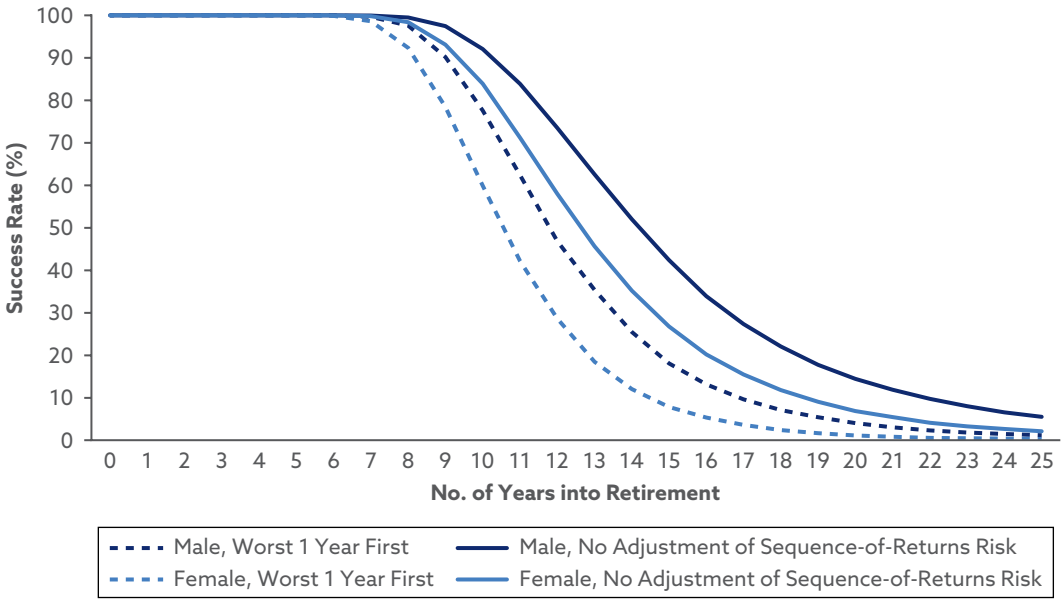


Exhibit 20 sheds light on the pivotal role that early investment returns play in the financial stability of retirees. It depicts the success rates for US retirees with mean starting balances and a 60/40 asset allocation over a 25-year retirement period, considering two scenarios: (1) experiencing the worst returns first or (2) not encountering such early setbacks. Under the projections using forecasted returns in Exhibit 20, the sequence-of-returns risks are similar to those seen in Exhibit 14, which is based on historical returns.

Factors Affecting Sustainability of a 60/40 Portfolio

Based on the various simulations of retirement scenarios for both Australian and US retirees, the sustainability of a 60/40 portfolio is contingent on several factors:

Starting balances: A 60/40 portfolio's sustainability is greatly influenced by the size of the initial investment. Higher starting balances have consistently shown a higher success rate in sustaining retirees throughout the 25-year period.

Living standards: There is a stark contrast in portfolio sustainability between modest and comfortable living standards. Portfolios tend to last significantly longer for retirees living modestly, while those seeking a comfortable lifestyle are at a higher risk of depleting their funds entirely, often well before the 25-year mark.

Gender differences: The data indicate some gender-based disparities, with female retirees facing a higher risk of fund depletion because of lower starting balances compared with male retirees.

Market volatility and timing: Sequence-of-returns risk is particularly pivotal. Portfolios that encounter negative returns early in retirement show a markedly decreased sustainability, which can jeopardise long-term financial security.

Geographic context: The principles of portfolio sustainability remain consistent for both countries. For US retirees, the relatively high living cost and low Social Security benefits diminish the sustainability of a 60/40 portfolio upon retirement.

In conclusion, although a 60/40 portfolio can form the cornerstone of a retirement strategy, its sustainability is not assured under all conditions. Given these insights, it becomes imperative for future retirees to engage in comprehensive financial planning that goes beyond conventional wisdom. They may need to consider a variety of tactics, such as adjusting their asset allocation as they age, incorporating income-generating investments, or even delaying retirement to increase savings and reduce the withdrawal period.

What Is a Good Withdrawal Strategy?

Retirees are tasked with the complex issue of working out how to spread their life savings in a way that delivers enough income to cover living expenses over an uncertain timeframe. At the same time, retirees remain worried about running out of savings. Therefore, determining an effective strategy for withdrawal that balances income with longevity is a challenging dilemma.

By reviewing existing research on variable spending (Pfau 2017), we have identified key representative variable spending strategies. Here we explore the following:

- Bengen's (1994) constant inflation-adjusted spending

  Bengen considers a portfolio allocated 50/50 between equity and bonds. He finds that the best withdrawal strategy is one in which a client withdraws 4% of the balance in the first year of retirement, after which the annual amount withdrawn equals the previous year's withdrawal plus some inflation factor.

  A retiree who values inflation-adjusted spending stability would likely prefer following this spending rule. However, this approach comes with the risks of portfolio depletion, misaligned inflation increases, or lifetime underconsumption. These risks arise because the rule is exposed to sequence-of-returns risk, meaning it does not adjust for capital market fluctuations. The rule increases the annual spending amount automatically by the inflation rate, regardless of whether the portfolio's market returns for that year are above or below inflation.

- Fixed-percentage withdrawals (Pfau 2017)

  Under this method, a retiree withdraws a fixed percentage of the portfolio's value (say, 4%) each year, regardless of its performance. This approach automatically reduces spending during market downturns, which can help preserve the portfolio's longevity. Although the portfolio will not be depleted, the amount of withdrawal may be substantially reduced over time and can vary significantly from year to year, making it harder for retirees to plan their expenses.

- Bengen's (2001) hard-dollar floor-and-ceiling withdrawals

  The floor-and-ceiling withdrawal strategy, as advocated by Bengen, offers a straightforward yet effective approach for retirees to manage their withdrawals in a manner that balances income stability with long-term portfolio preservation.

  This method begins by establishing an initial withdrawal rate of 4% of the portfolio's first-year balance. To mitigate the impact of market variability, the strategy incorporates a ceiling, set at 20% above the fixed withdrawal percentage, and a floor, set at 15% below it.

  Subsequently, each year's withdrawal amount is calculated as 4% of the current portfolio balance. Retirees have the flexibility to adjust the actual withdrawal within the predetermined range of the ceiling and floor, providing them with some control over their income while ensuring it remains within bounds that sustain the portfolio over time.

  Although the 20% ceiling and 15% floor are somewhat arbitrary, Bengen contends that this strategy strikes a balance between ensuring a stable retirement income and preserving the portfolio over the long term by adjusting to market performance while providing income stability. However, it also carries the possibility of portfolio depletion.

We explored the outcomes of these withdrawal approaches for retirees in Australia and the United States, under varying scenarios. The following subsections present our findings.

Australia

AB_{i+1} is the account balance at the end of the year, calculated depending on withdrawal methods:

(1) Bengen's constant inflation-adjusted spending:

$$AB_{i+1} = \max\left[AB_i\left(1+R_{FP_i}\right) - AB_0 \times 4\%, 0\right],$$

where AB_0 is the initial account balance.

(2) Fixed-percentage withdrawals:

$$AB_{i+1} = \max\left[AB_i\left(1+R_{FP_i}\right) - AB_i \times 4\%, 0\right].$$

(3) Bengen's hard-dollar floor-and-ceiling withdrawals:

$$AB_{i+1} = \max\left[AB_i\left(1+R_{FP_i}\right) - W_i, 0\right].$$

The floor and ceiling values are given by

$$W_{floor} = 0.85 \times 4\% \times AB_0.$$

$$W_{ceiling} = 1.20 \times 4\% \times AB_0.$$

The yearly withdrawal amount is calculated by

$$W_i = 4\% \times AB_i,$$

where AB_i is the current account balance.

$$\text{If } W_i > W_{ceiling}, \text{ then } W_i = W_{ceiling}.$$

$$\text{If } W_i < W_{floor}, \text{ then } W_i = W_{floor}.$$

Panels A through C of **Exhibit 21** compare the outcomes of various retirement withdrawal strategies for Australian retirees, based on median starting balances for men.[21] Overall, although all strategies seem to offer high success rates, we observe trade-offs between spending levels and the remaining balance at the end of retirement.

The "constant inflation-adjusted spending" strategy results in the lowest success rate but higher variability of ending balances compared with other strategies. It can produce real ending balances ranging from 0 times the initial amount at the 5th percentile to 4.55 times the initial amount at the 95th percentile (Exhibit 21, Panel B). This means that 95% of the time, for the retiree starting with an account balance of AUD213,986 and a 4% withdrawal rate, after 25 years, the account balance would fall somewhere between AUD0 and AUD973,636.

The "fixed-percentage withdrawals" strategy provides a success rate of 100% across all groups, indicating this method is very effective at maintaining the portfolio for the duration of retirement. Even though the portfolio lasts, the amount available to spend each year may vary significantly with market performance because it reflects a fixed percentage of the portfolio value.

[21]See Appendix B for the results for male retirees with mean starting balances and for female retirees with median and mean starting balances.

In years when the portfolio's value decreases, the withdrawal amount will also decrease. At some point, the withdrawal amount will potentially fall below that required for modest living standards, as indicated by the spending amounts being below this threshold more than 25% of the time—which could impact the retiree's quality of life.

Exhibit 21. Comparison of Withdrawal Strategies, Australian Retirees

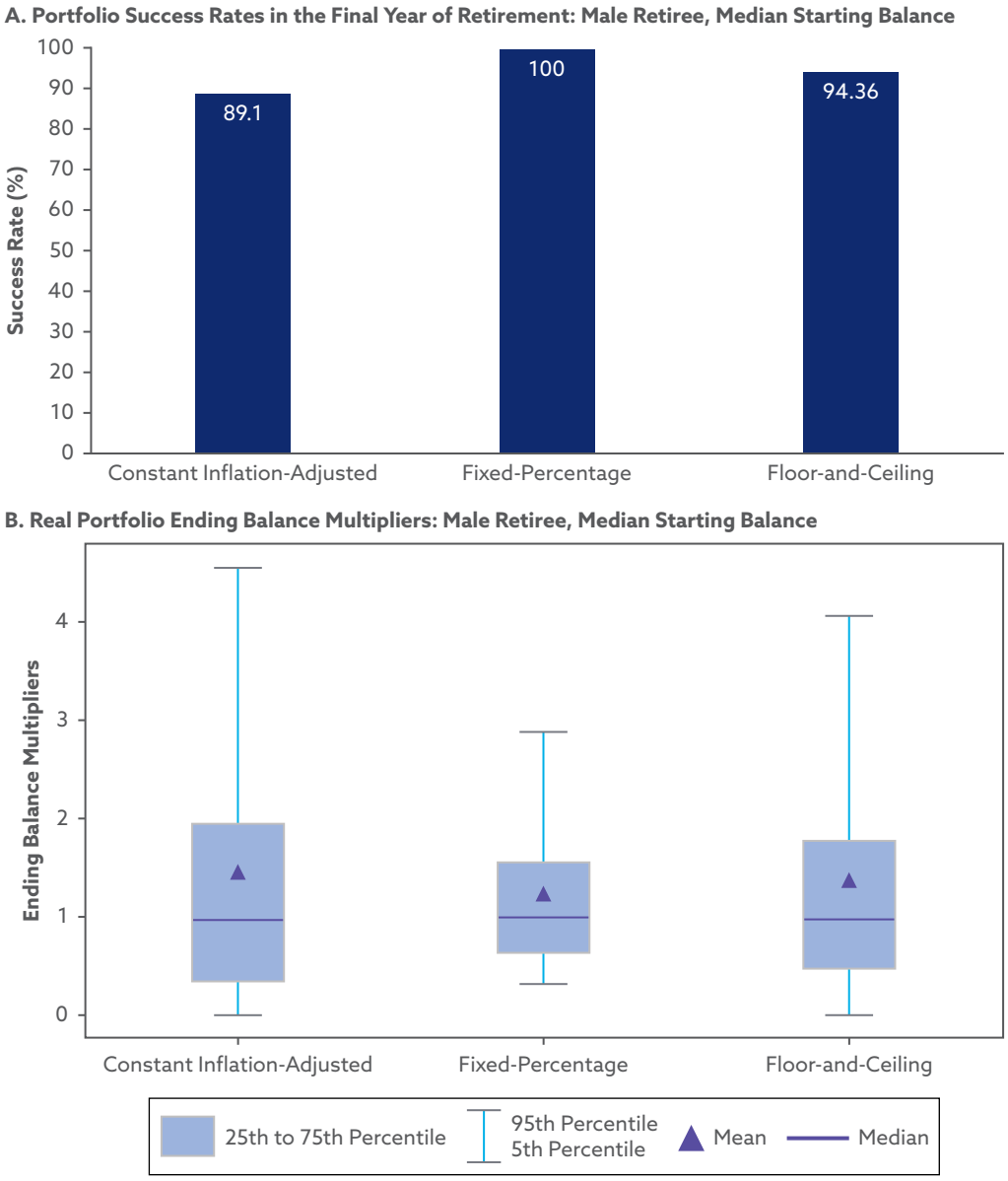
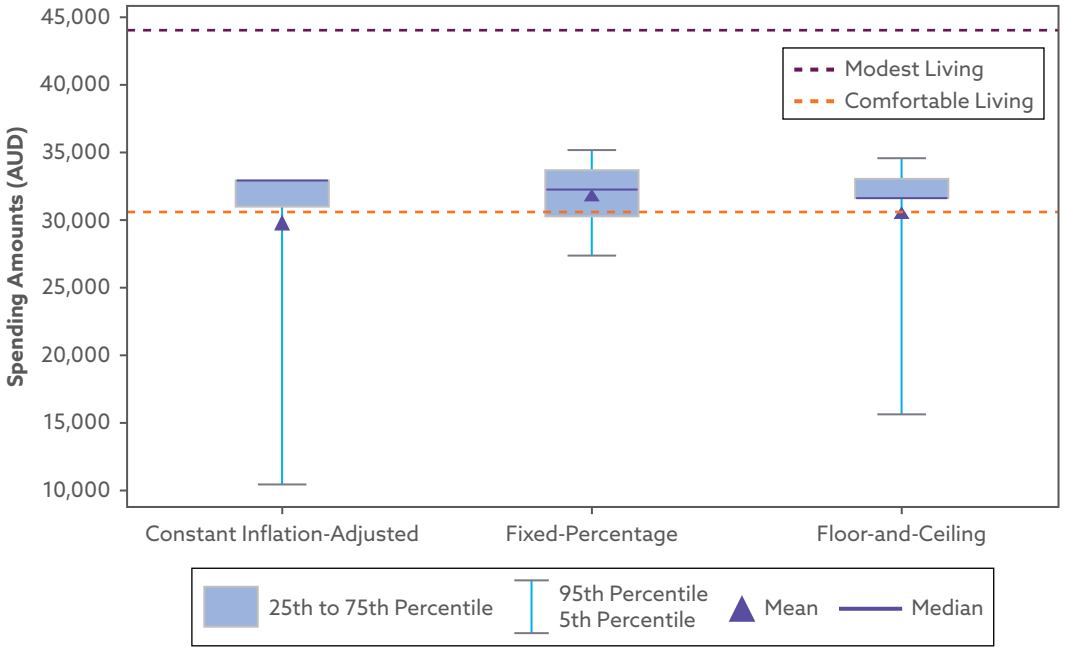
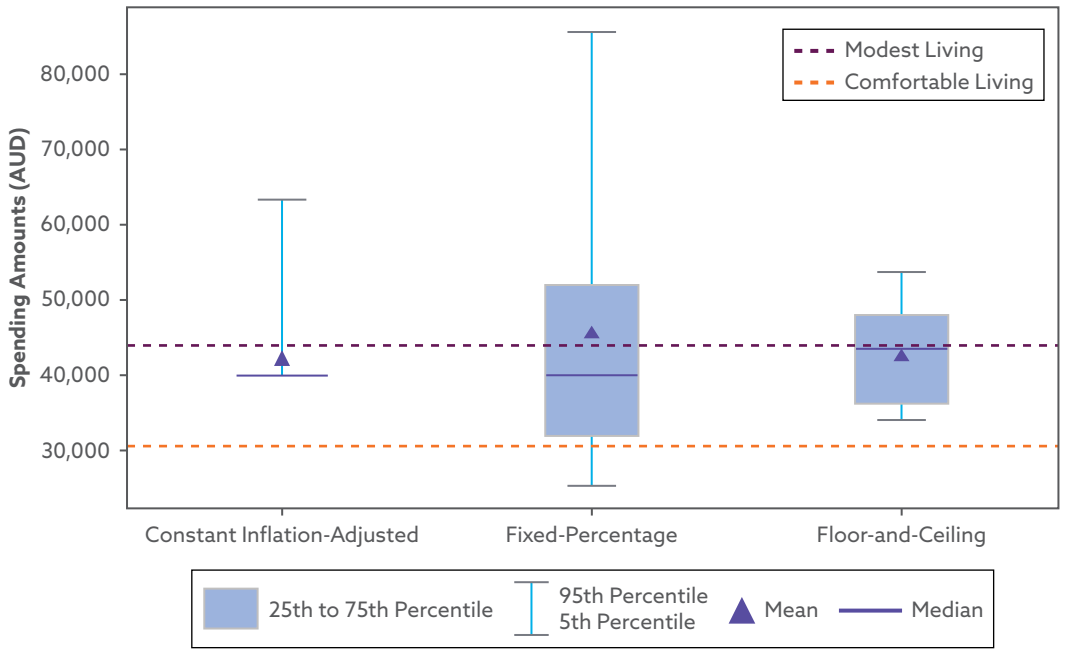


Exhibit 21. Comparison of Withdrawal Strategies, Australian Retirees (*continued*)

C. Real Annual Spending (withdrawal amount and pension): Male Retiree, Median Starting Balance



D. Real Annual Spending: Male Retiree, AUD1 Million Starting Balance



Note: Ending balance multiplier is defined as the ratio of ending account balance over starting account balance.

The "floor-and-ceiling withdrawals" strategy offers a good balance between spending range and ending balance, with a slightly lower but still high success rate of 94.36%. Spending amounts are similar to those of the "fixed-percentage withdrawals" strategy—mostly above the amount needed for modest living but below that for comfortable living. The spending volatility is higher, however, shown as a much broader range (Exhibit 21, Panel C).

The outlined spending figures in Australian retirees' withdrawal strategies reflect both actual withdrawals and entitled pensions. These amounts just manage to meet the requirements of a modest lifestyle around 75% of the time, however, and they fall short of the funds needed for a comfortable lifestyle 100% of the time. For someone prioritising high spending amounts and comfortable living, none of the strategies may be entirely satisfactory; all three approaches fall below the comfortable living threshold.

Even for retirees with a higher starting balance of AUD1 million, all three withdrawal strategies still show spending amounts that fail to reach comfortable living standards more than 50% of the time (Exhibit 21, Panel D). All the strategies are below the minimum withdrawal percentage mandated by the Australian government. The gap between the outcomes of these strategies and the government's requirements highlights the need for retirees to potentially adopt different strategies or adjust their withdrawals to enhance their living standards.

United States

AB_{i+1} is the account balance at the end of the year, calculated depending on the withdrawal methods:

(1) Bengen's constant inflation-adjusted spending:

$$AB_{i+1} = \max\left[AB_i \left(1 + R_{FP_i}\right) - \left(AB_0 \times 4\%\right) - TD_i, 0 \right],$$

where AB_0 is the initial account balance.

(2) Fixed-percentage withdrawals:

$$AB_{i+1} = \max\left[AB_i \left(1 + R_{FP_i}\right) - \left(AB_i \times 4\%\right) - TD_i, 0 \right].$$

(3) Bengen's hard-dollar floor-and-ceiling withdrawals:

$$AB_{i+1} = \max\left[AB_i \left(1 + R_{FP_i}\right) - W_i - TD_i, 0 \right].$$

The floor and ceiling values are given by

$$W_{floor} = 0.85 \times 4\% \times AB_0.$$

$$W_{ceiling} = 1.20 \times 4\% \times AB_0.$$

The yearly withdrawal amount is calculated by

$$W_i = 4\% \times AB_i,$$

where AB_i is the current account balance.

$$\text{If } W_i > W_{ceiling}, \text{ then } W_i = W_{ceiling}.$$

$$\text{If } W_i < W_{floor}, \text{ then } W_i = W_{floor}.$$

$$AB_{i+1} = AB_i\left(1+R_{FP_i}\right) - \max\left(L_i - SSB_i, \frac{AB_i}{DP_i}\right) - TD_i.$$

Panels A through C in **Exhibit 22** compare the outcomes of various retirement withdrawal strategies for US retirees, based on median starting balances for male retirees.[22] All three withdrawal strategies tend to result in spending amounts that fall short of expected living expenses. The "fixed-percentage withdrawals" approach carries a risk of significant variability in annual spending. In terms of the ending balance, although all strategies offer the possibility to significantly grow the initial balance, the "constant inflation-adjusted spending" and "floor-and-ceiling withdrawals" strategies show a greater range of outcomes. Conversely, the "fixed-percentage withdrawals" strategy is more conservative, with less variability in the ending balance.

Panel D of Exhibit 22 shows the variability and distribution of annual spending for US retirees with a USD1 million starting account balance, comparing three different withdrawal strategies against a benchmark for living expenses.

The "fixed-percentage withdrawals" strategy results in spending that falls significantly below the living expenses line 50% of the time. This outcome implies a very conservative approach that may preserve capital but also risks underfunding the retiree's annual living costs.

The "floor-and-ceiling withdrawals" strategy shows spending amounts that straddle the living expenses line. Although this approach has the potential to meet living expenses, it also has considerable variability, with some outcomes falling below this benchmark.

The "constant inflation-adjusted spending" strategy also aligns closely with the living expenses line but with slightly less variability than the "floor-and-ceiling withdrawals" strategy.

[22]See Appendix C for the results for male retirees with mean starting balances and female retirees with median and mean starting balances.

For retirees with a high starting balance, both the "constant inflation-adjusted spending" and "floor-and-ceiling withdrawals" strategies seem to offer a middle ground, potentially providing adequate spending in some years while also carrying the risk of not consistently meeting living expenses in others.

Exhibit 22. US Retirees: Comparison of Withdrawal Strategies

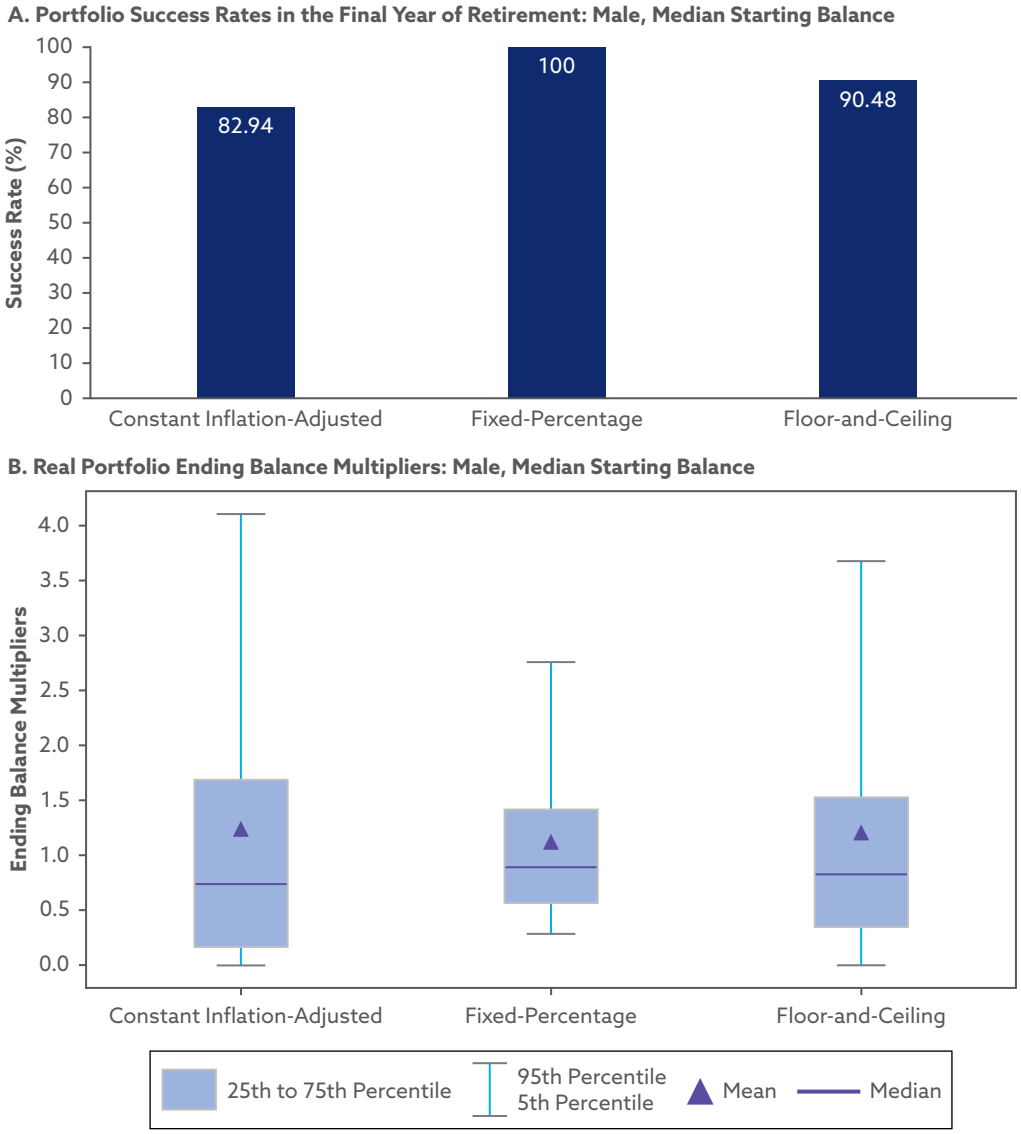
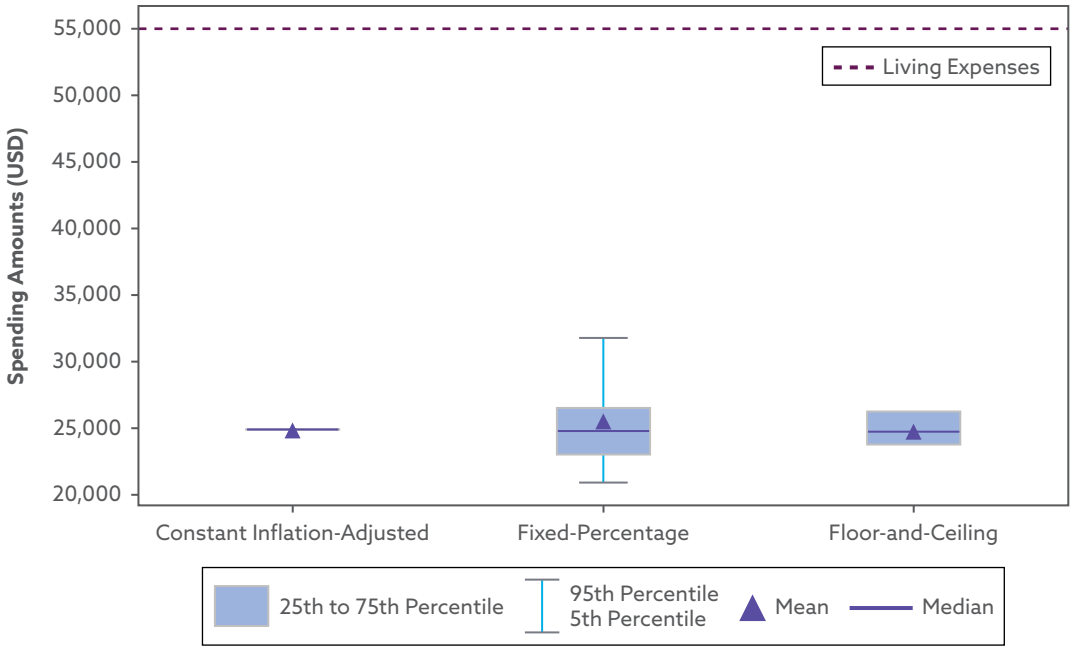
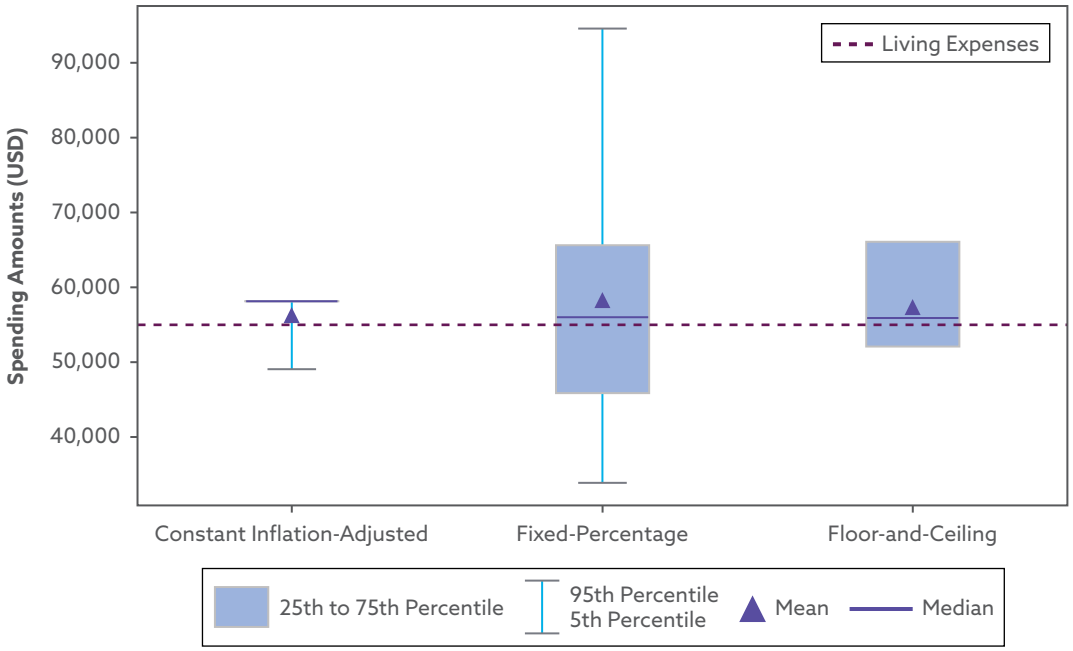


Exhibit 22. US Retirees: Comparison of Withdrawal Strategies (*continued*)

C. Real Annual Spending (withdrawal amount and Social Security benefits): Male, Median Starting Balance



D. Real Annual Spending: Male, USD1 Million Starting Balance



Note: Ending balance multiplier is defined as the ratio of ending account balance over starting account balance.

Highlight 6: No single withdrawal strategy offers a perfect solution. Each balances preserving retirement savings with ensuring stable income, making trade-offs for income stability, portfolio longevity, and the ability to meet living expenses.

Conclusion

Although the 60/40 strategy holds merit as a foundational approach to balancing investment risk and return, our findings reveal that several variables significantly influence its effectiveness. Initial investment size, living standards, gender, and the timing of market returns all play a role in determining whether this portfolio approach will meet a retiree's needs.

In both Australia and the United States, the simulation outcomes underscore a crucial insight: The sufficiency of a 60/40 portfolio is not guaranteed across all retirement scenarios. Higher initial balances and modest living expectations enhance the likelihood of this portfolio approach sustaining individuals throughout their retirement years. Aspirations for a comfortable lifestyle without adequate initial savings, however, amplify the risk of fund depletion—especially when early retirement years are marred by adverse market conditions.

The gender disparities highlighted in our analysis point to the broader issue of retirement savings inequality, necessitating tailored advice and planning strategies that consider individual circumstances. Moreover, the impact of sequence-of-returns risk cannot be overstated, with early negative returns posing a significant threat to the portfolio's longevity, irrespective of geographical context.

Given the complexity and variability of financial markets, retiree needs, and inflation rates, selecting an optimal withdrawal strategy requires a delicate balance between ensuring income stability, maintaining portfolio longevity, and adequately covering living expenses. Our findings highlight the necessity for personalised planning and flexibility in retirement financial management.

As we conclude, it is evident that despite being a valuable starting point, a 60/40 portfolio strategy requires careful consideration and possibly augmentation with other investment strategies to meet the complex needs of retirees. This report advocates for a dynamic approach to retirement planning, encouraging retirees and advisers alike to remain vigilant and responsive to changing economic landscapes and personal circumstances.

In light of these findings, the future of retirement planning appears to be one of personalised strategies rather than one-size-fits-all solutions. The evolving nature of financial markets and retirement policies calls for continuous research and adaptation of investment approaches, aiming to secure financial resilience and fulfilment for retirees in their golden years.

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Appendix A. About the MCFS Capital Market Assumptions

The MCFS CMAs[23] are the set of assumptions used for forecasting the returns, volatilities, and correlations of various markets over a specified time frame—in this case, 10 years. This framework aims to aid investors in developing long-term strategic asset allocations based on forward estimates for different financial markets, including equities and bonds.

Methodology for Equity Forecast

For equities, the MCFS CMAs follow a methodology that includes two approaches:

- CAPE approach: This approach uses the cyclically adjusted P/E (CAPE) to forecast future equity returns. A higher CAPE ratio is associated with below-average future returns over the next decade.
- Building block approach: This approach forecasts each component of equity returns, including income returns from dividends, earnings growth, and valuation changes. This approach also uses backtesting to compare and select the best performing model.

Methodology for Bond Forecast

For bonds, the methodology uses a return components approach and a building block approach:

- Return components: Bond returns are broken down into yield, price change resulting from yield shifts, and credit loss. The model considers expected future changes in bond yields, modified duration to account for price sensitivity, and expected credit losses.
- Building block methodology: This involves forecasting the individual components that constitute the overall bond returns, which are then aggregated. This method is also validated by backtesting to ensure the reliability of the model choice.

These methodologies focus on using historical data and statistical models to provide robust, data-driven forecasts for both equity and bond markets.

[23]See the Monash Centre for Financial Studies Capital Market Assumptions reports, available at www.monash.edu/business/mcfs/our-research/all-projects/investment-strategy/capital-market-assumptions.

Appendix B. Comparison of Various Withdrawal Strategies for Australian Retirees

Exhibits B1–B3 show results for a 60/40 portfolio over a 25-year retirement period.

Exhibit B1. Withdrawal Strategy Comparison: Female Australian Retirees, Median Starting Balance

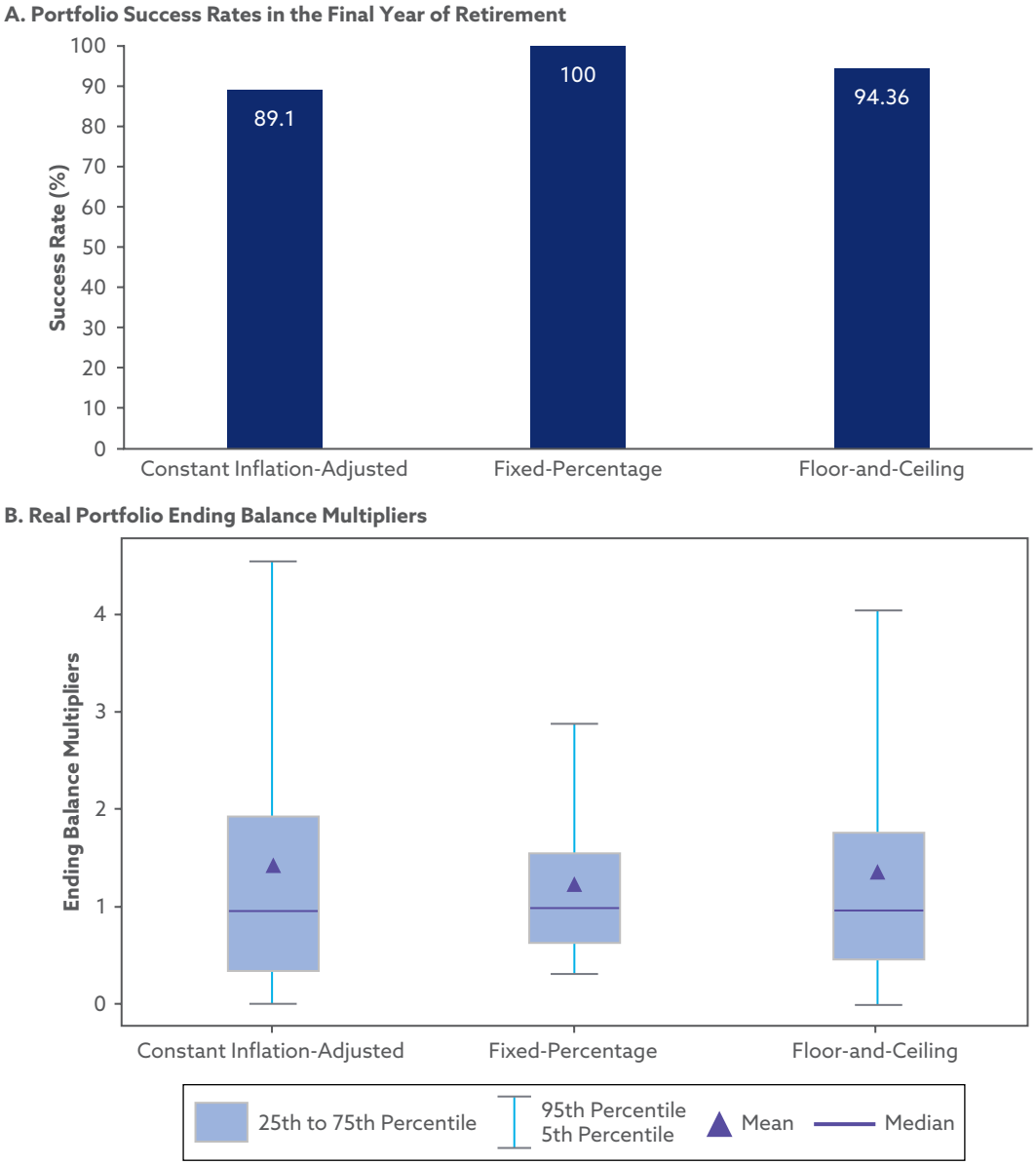


Exhibit B1. Withdrawal Strategy Comparison: Female Australian Retirees, Median Starting Balance (*continued*)

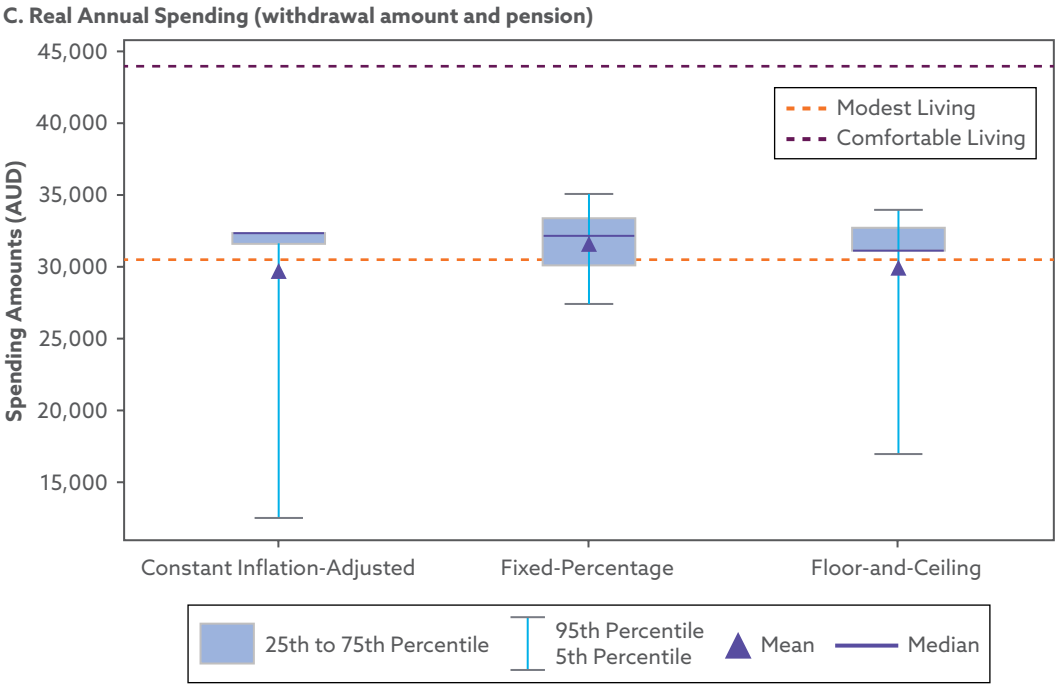


Exhibit B2. Withdrawal Strategy Comparison: Male Australian Retirees, Mean Starting Balance

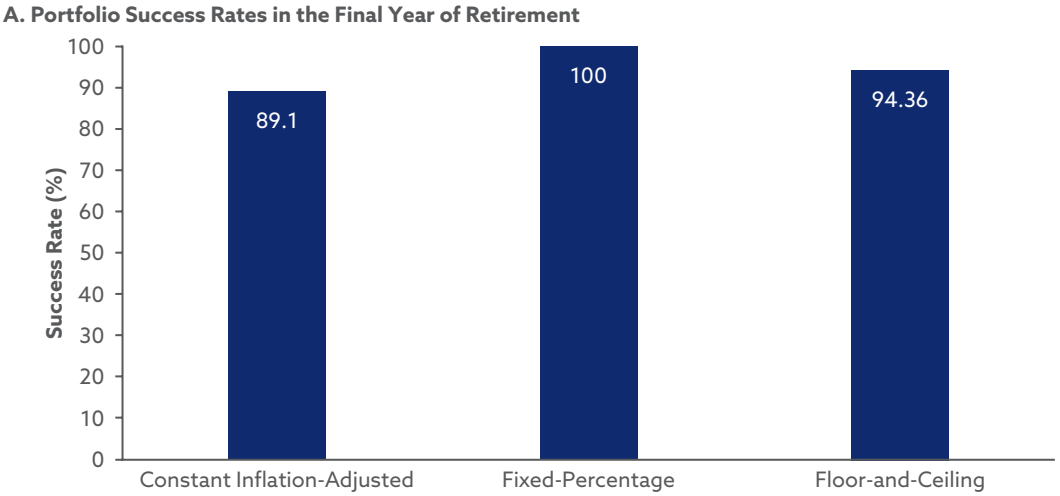
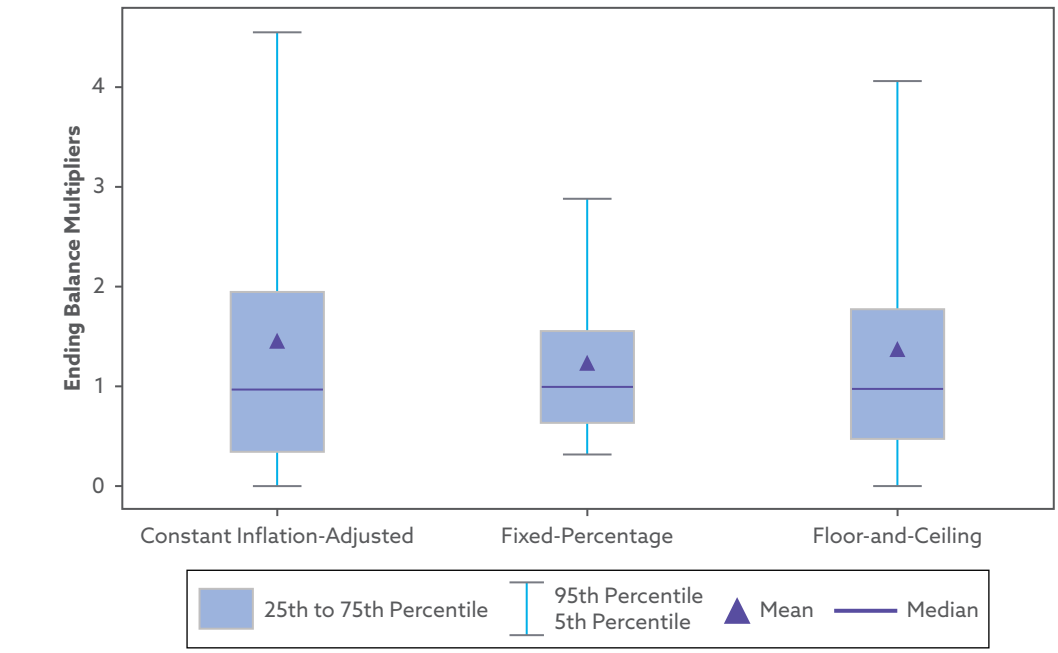


Exhibit B2. Withdrawal Strategy Comparison: Male Australian Retirees, Mean Starting Balance (*continued*)

B. Real Portfolio Ending Balance Multipliers



C. Real Annual Spending (withdrawal amount and pension)

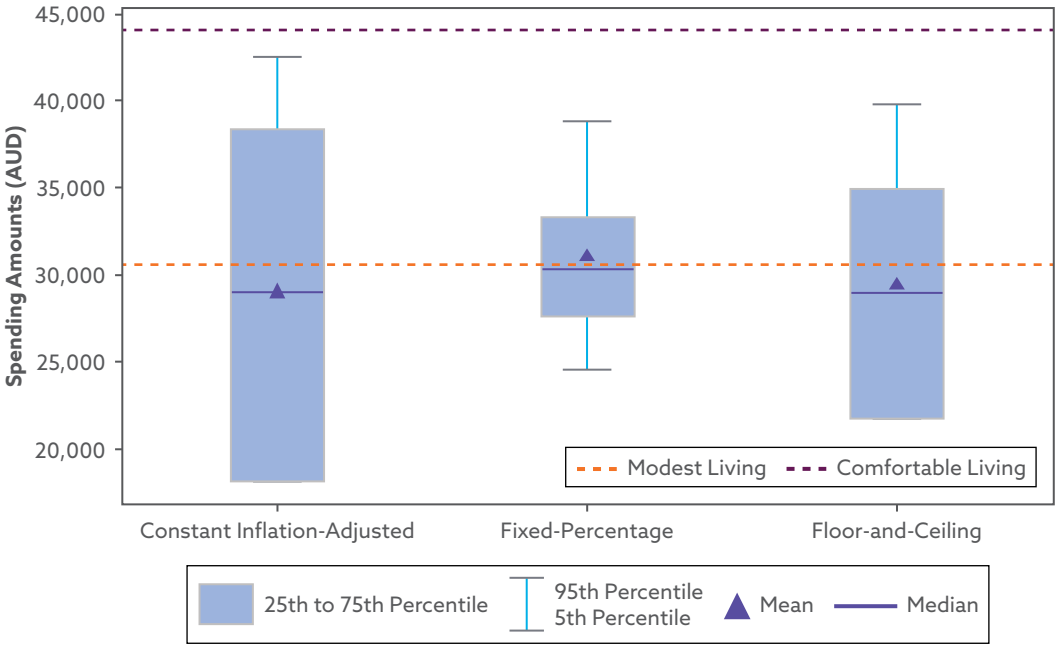


Exhibit B3. Withdrawal Strategy Comparison: Female Australian Retirees, Mean Starting Balance

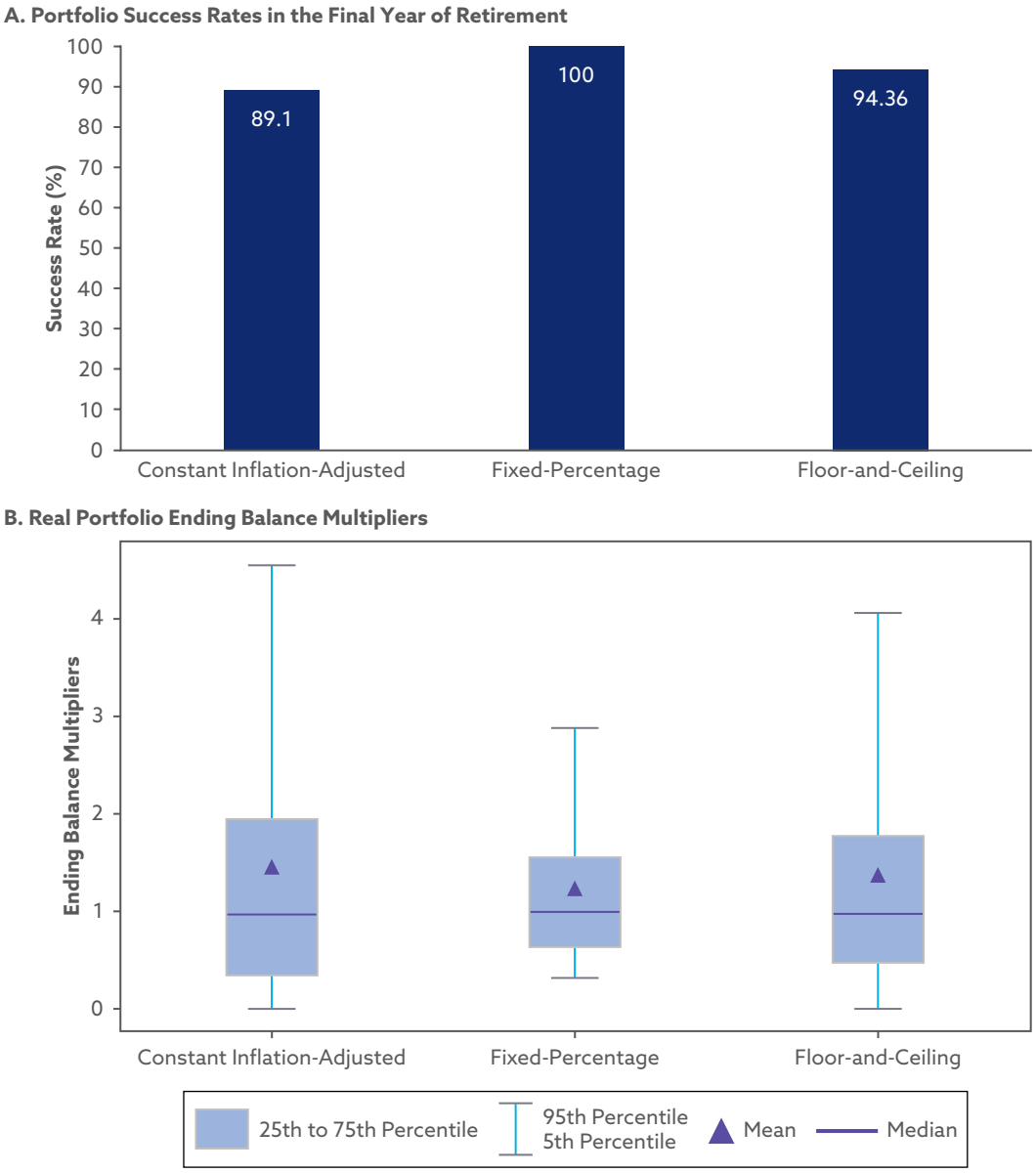
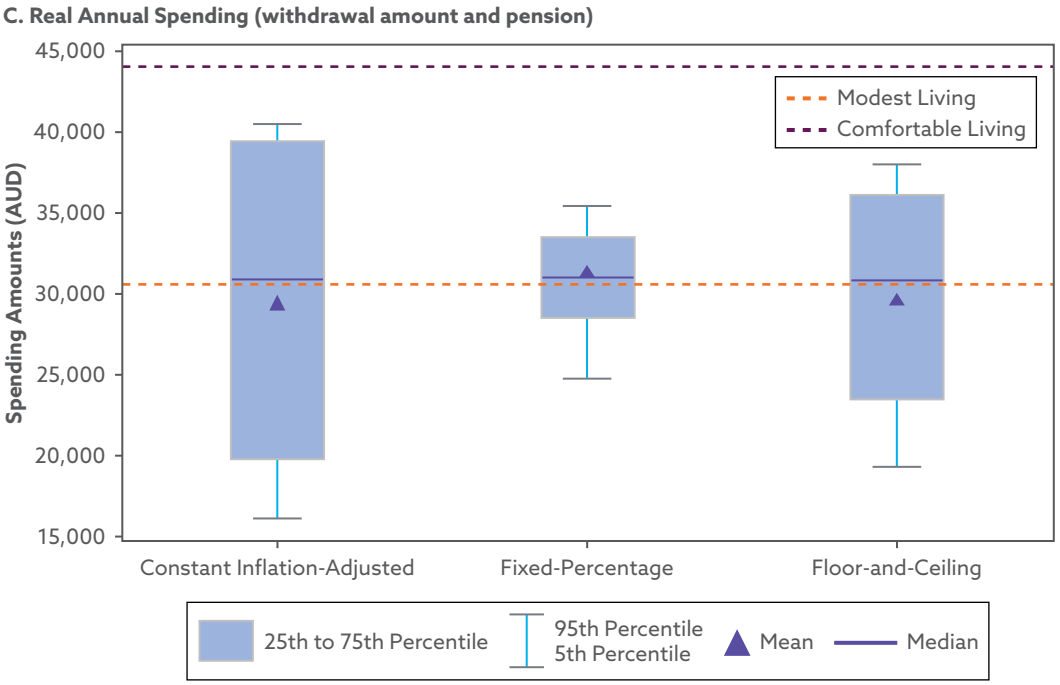


Exhibit B3. Withdrawal Strategy Comparison: Female Australian Retirees, Mean Starting Balance (*continued*)



Appendix C. Comparison of Various Withdrawal Strategies, US Retirees

Exhibits C1–C4 show results for a 60/40 portfolio over a 25-year retirement period.

Exhibit C1. Withdrawal Strategy Comparison: Female US Retirees, Median Starting Balance

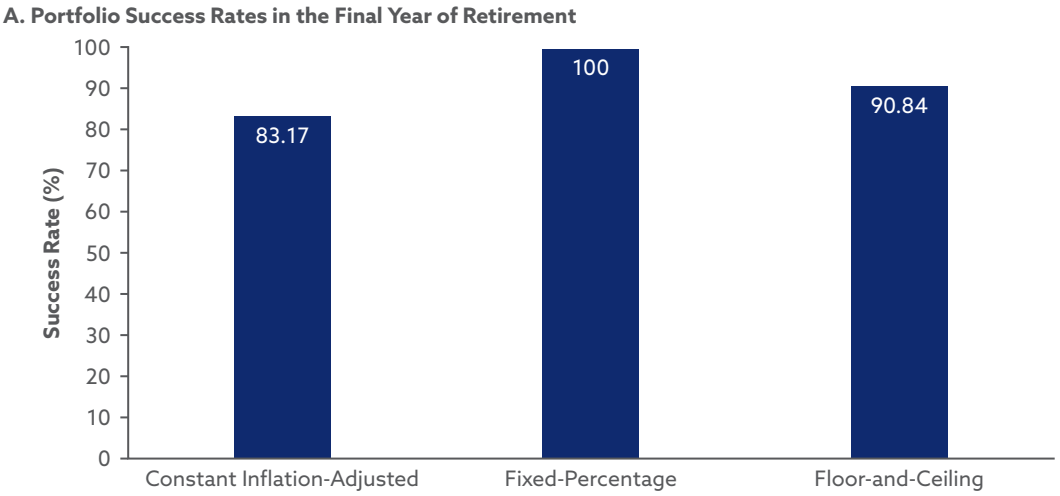
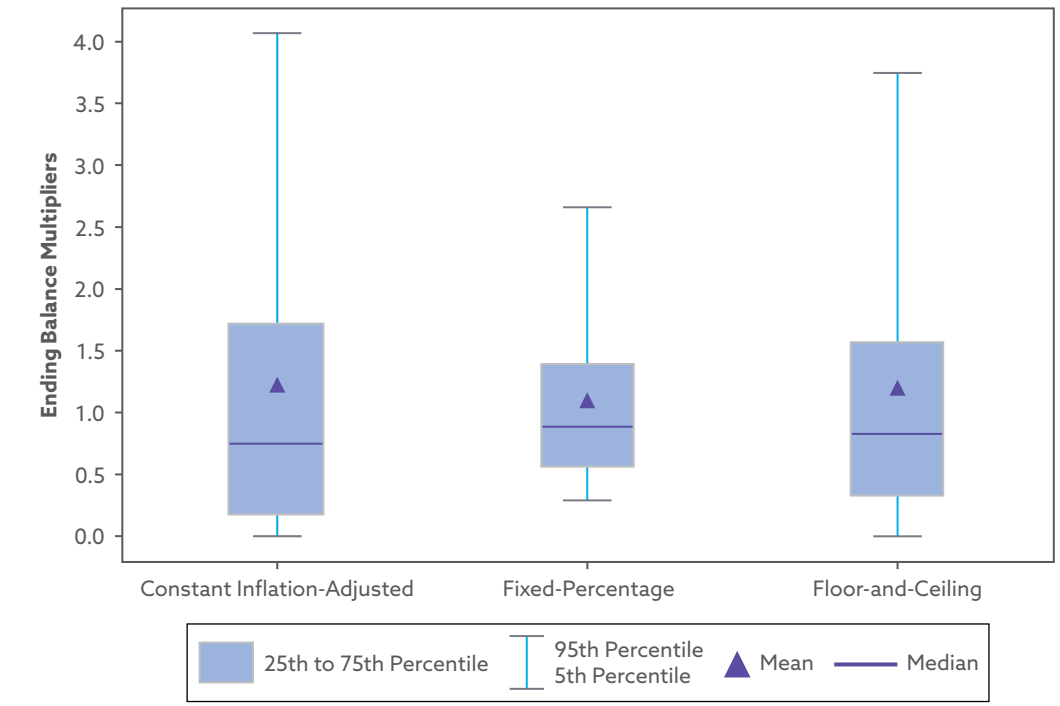


Exhibit C1. Withdrawal Strategy Comparison: Female US Retirees, Median Starting Balance (*continued*)

B. Real Portfolio Ending Balance Multipliers



C. Real Annual Spending (withdrawal amount and Social Security benefits)

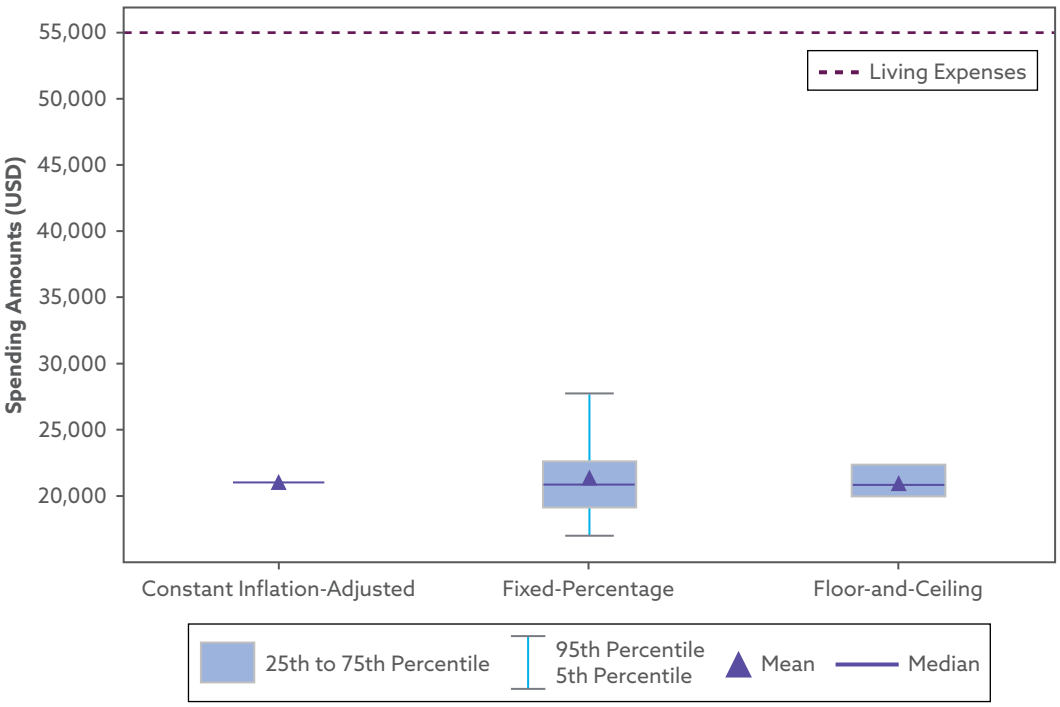


Exhibit C2. Withdrawal Strategy Comparison: Male US Retirees, Mean Starting Balance

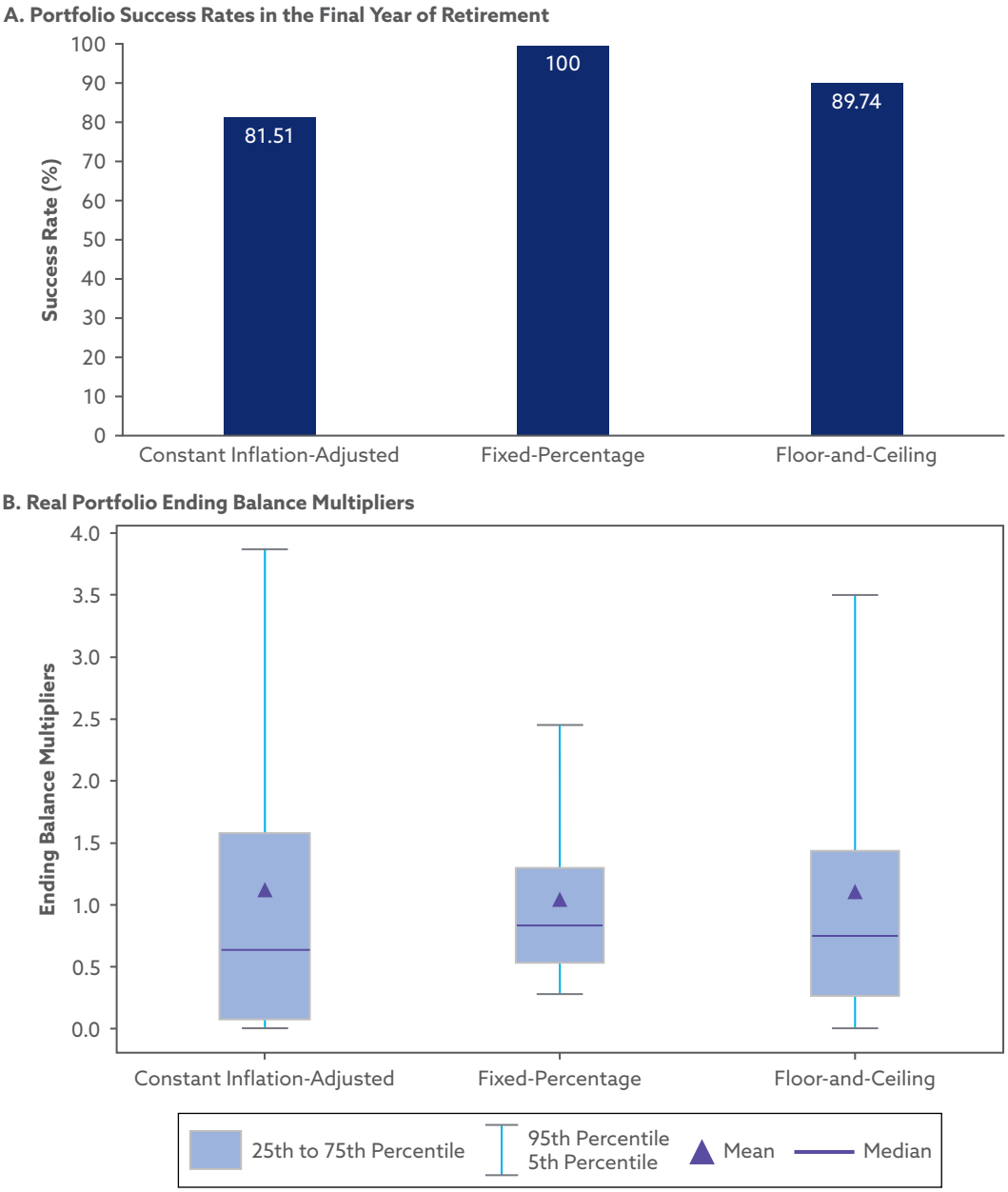


Exhibit C2. Withdrawal Strategy Comparison: Male US Retirees, Mean Starting Balance (*continued*)

C. Real Annual Spending (withdrawal amount and Social Security benefits)

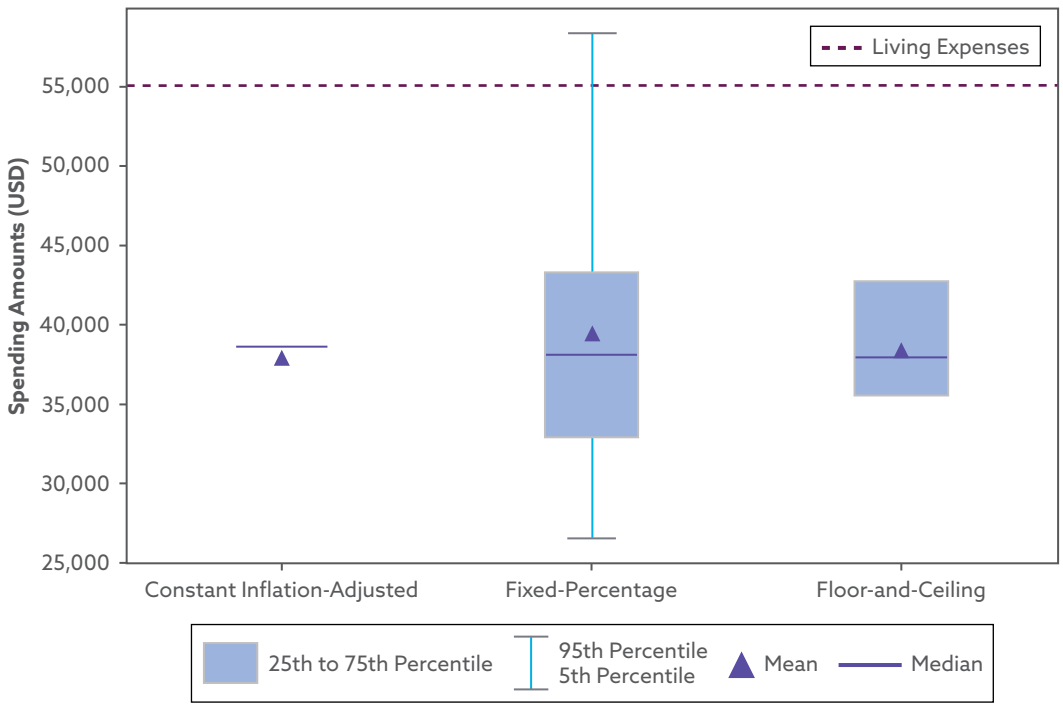


Exhibit C3. Withdrawal Strategy Comparison: Female US Retirees, Mean Starting Balance

A. Portfolio Success Rates in the Final Year of Retirement

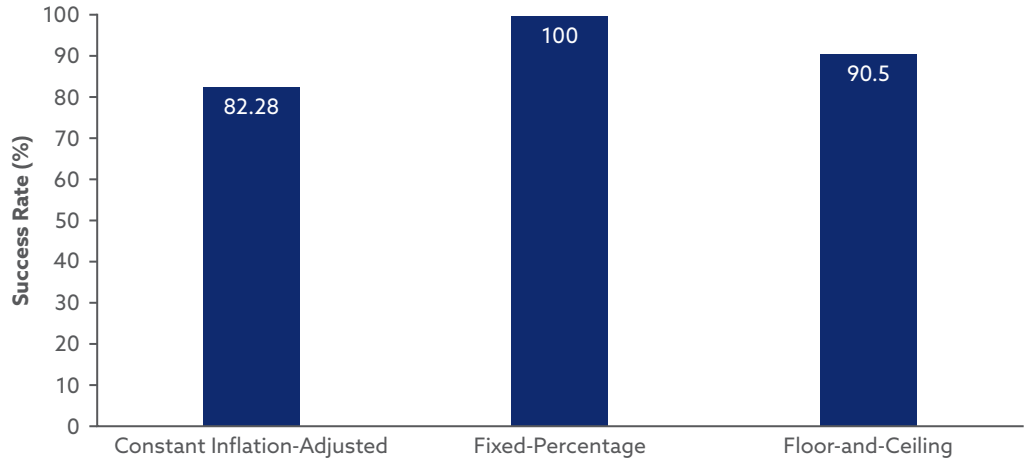
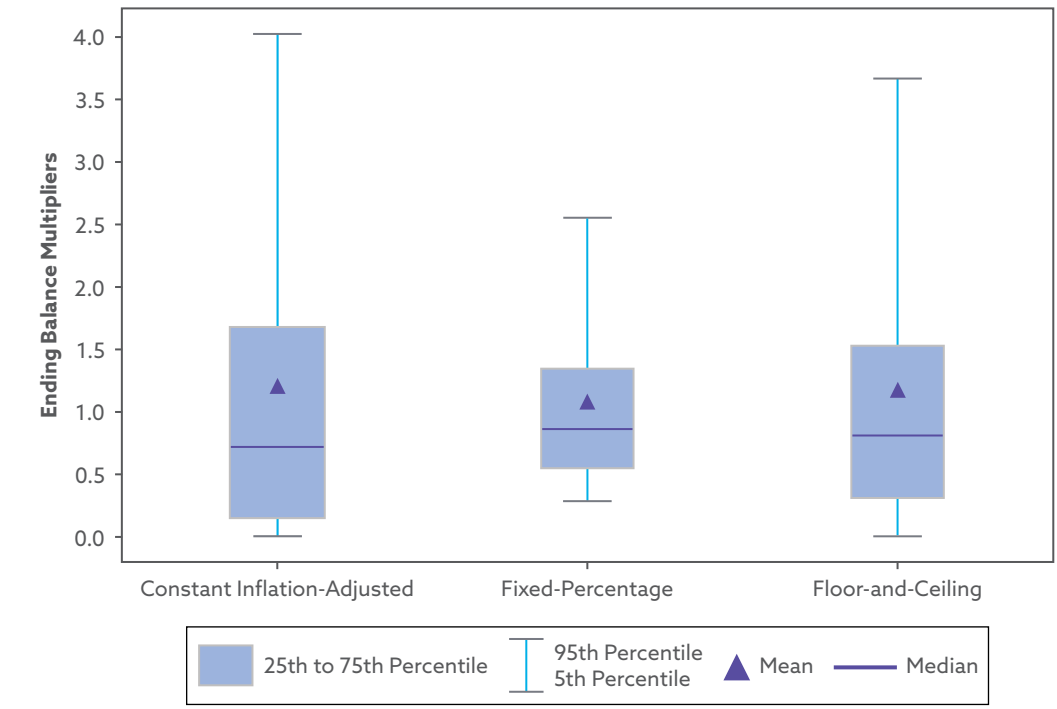


Exhibit C3. Withdrawal Strategy Comparison: Female US Retirees, Mean Starting Balance (*continued*)

B. Real Portfolio Ending Balance Multipliers



C. Real Annual Spending (withdrawal amount and Social Security benefits)

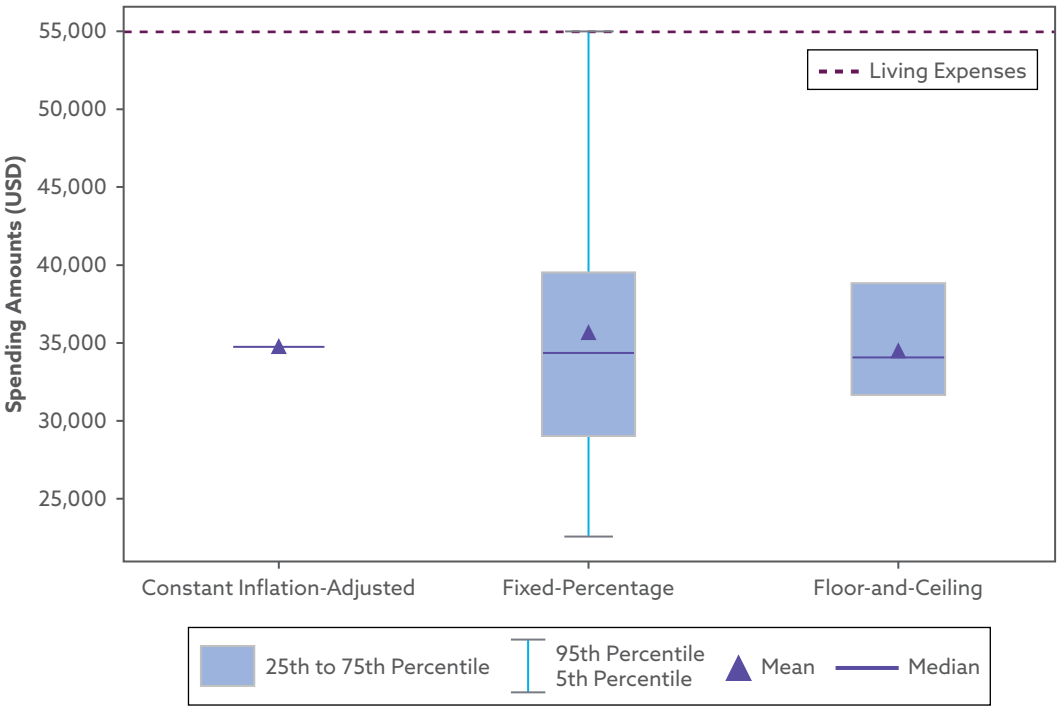


Exhibit C4. Withdrawal Strategy Comparison: Female US Retirees, USD1 Million Starting Balance

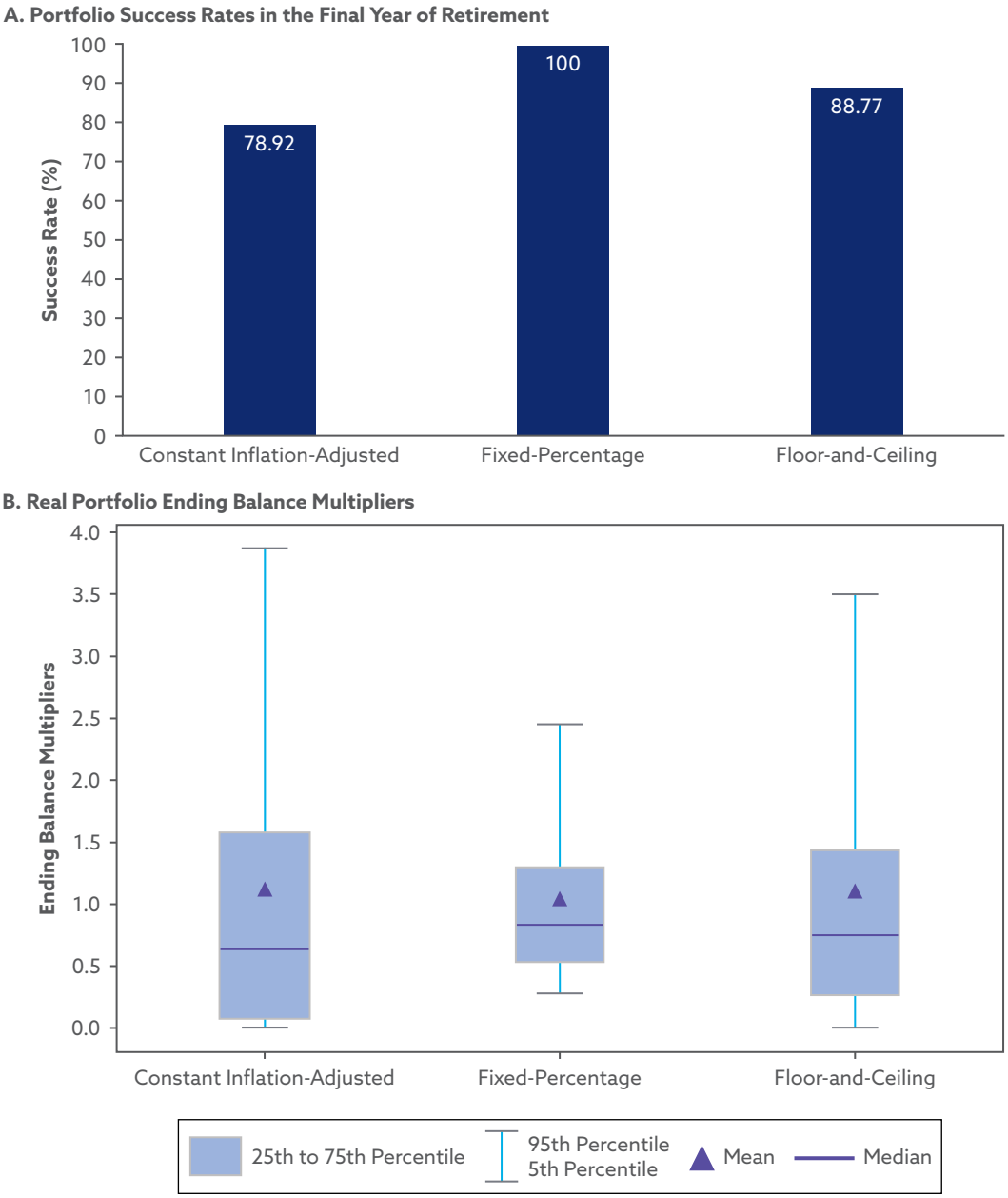
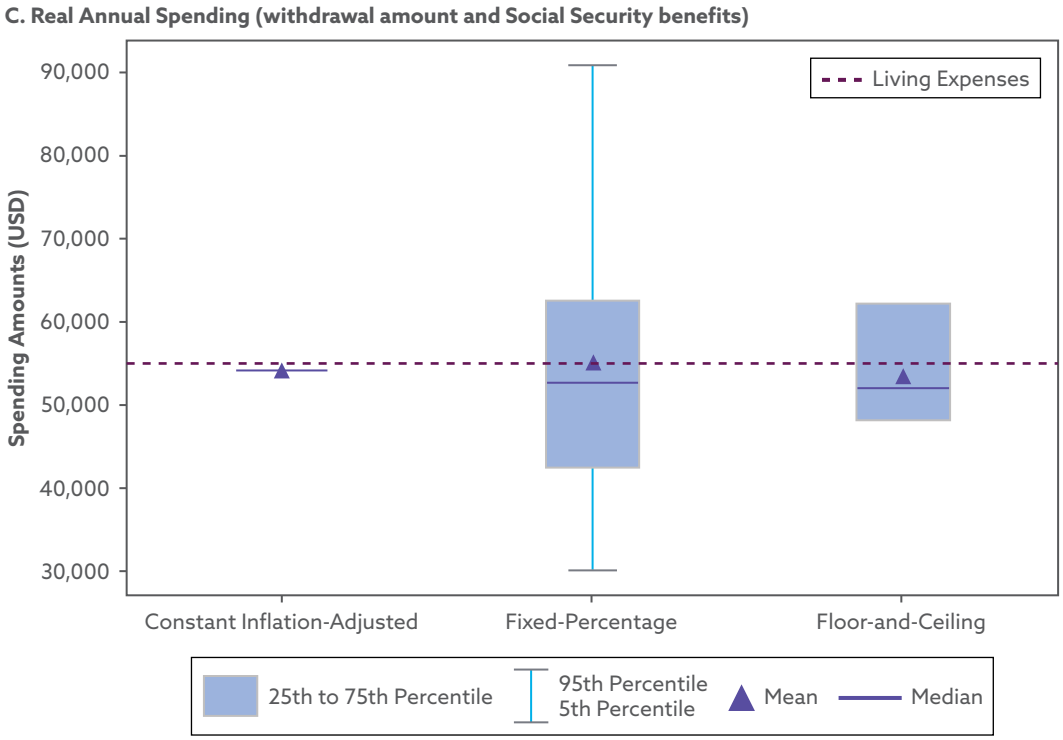


Exhibit C4. Withdrawal Strategy Comparison: Female US Retirees, USD1 Million Starting Balance (*continued*)



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