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Manulife's analysis

Longevity risk: how longer lifespans affect shortfall risk in retirement planning

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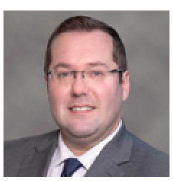

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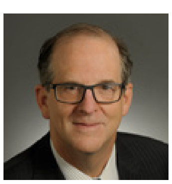

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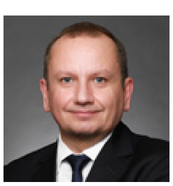

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As people live longer, the socioeconomic implications are profound. The quality of additional years of life largely depends on maintaining good health and having sufficient financial resources. For individuals, accumulating enough money to fund a retirement that could last multiple decades is a formidable challenge. To have any chance at retirement readiness, retirement planning and investing requires the continued and focused attention of plan sponsors, fiduciaries, insurers, asset managers, financial professionals, and policymakers.

As a global asset manager and steward of financial capital, our goal is to help individuals make better financial decisions that lead to a higher probability of successful retirement readiness. Our role is to support plan sponsors and other financial professionals in achieving the potential for successful plan outcomes—and the potential for long-term retirement readiness for members and participants—through plan design and investment choice.

Our analysis seeks to quantify and assess the main risks that individuals encounter as they save for retirement. It offers data to explore the critical question that almost every individual faces: Will I have enough money to live a quality life in retirement?

In the context of retirement, this constitutes analyzing shortfall risk. Understanding and quantifying shortfall risk is complex because it depends on personal circumstances and factors both in and outside one's control. Our aim is to facilitate the essential discussions that financial professionals have with plan sponsors to help individuals achieve retirement readiness success against a backdrop of an extended lifespan. Moreover, we aim to contribute to the ongoing research related to the decisions plan sponsors must consider when designing retirement plans. These include considerations around setting default contribution rates, employer matches, increasing employee engagement, and the investment options offered.

Key findings

- Contribution rate has a major effect on retirement readiness. A contribution rate of 15% over the long term can significantly reduce shortfall risk, while contributions at a level of 5% have a high probability of increasing shortfall risk by as much as 84%, even when saving over a long time horizon.[1]
- Accumulation time period is a significant factor in long-term retirement planning. All else being equal, a 10-year delay in starting the accumulation phase may cost an individual 47% in cumulative growth, even if the same amount is saved.[1] Higher contributions later in an accumulation period cannot match the growth that results from early compounding.
- While many individuals often categorize their risk profile as moderate to conservative, investment choice may play a key role in decreasing or increasing shortfall risk. Conservative cash-type investments may increase the probability of shortfall to as much as 90% in Canada, 84% in Hong Kong, and 74% in the United States.[1]
- All these factors—contribution rate, accumulation period, and investment choice—are interdependent and are made even more critical by increasing longevity. This adds to the complexity of successful long-term retirement planning and underpins the importance for plan sponsors to consider a broader approach that carefully balances a variety of factors in plan design and employee engagement.

Why planning for lifelong income is so challenging

Planning for retirement has generally become more challenging as a result of two predominant and converging trends. As societies become wealthier, people on average are living longer; at the same time, the trend toward do-it-yourself defined contribution (DC) plans is generally growing. In the days of traditional government and corporate defined benefit (DB) plans, retirement planning was relatively simple. Contribution rates, if any, were predetermined, enrollment was mandatory, withdrawals or loans before retirement weren't permitted under any circumstances, and at retirement age, individuals received a monthly income for life.

The availability of corporate pension plans has declined sharply in many parts of the world; in the United States until the late 1970s, for example, workers typically participated in a DB plan more than in any other type of retirement plan. Today, only 10% of nonunion private sector workers participate in a DB plan, while 63% participate in a DC plan.[2]

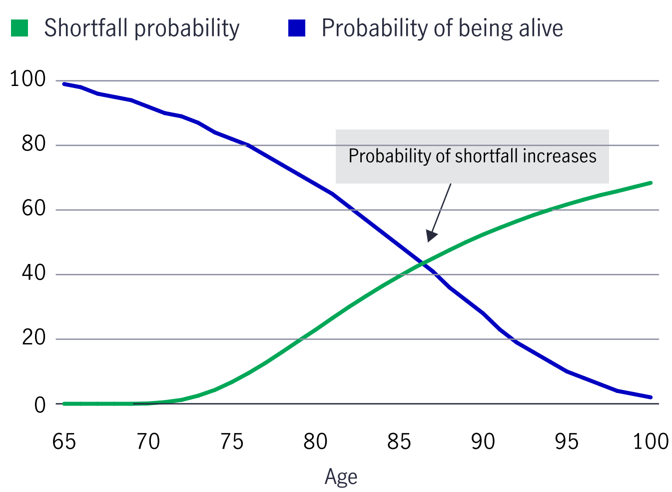
DC plans are now the standard in many parts of the world with much of the decision-making authority now resting on the individual's choices—which investments to use, the contribution rate, when to start, how much to withdraw in retirement, and so on. These are difficult decisions for individuals to make, and they're affected by how long an individual may live.

1 Multi-Asset Solutions Team, Manulife Investment Management, December 23, 2023. See important disclosures below for more information. **2** Employee Benefits in the United States, Bureau of Labor Statistics, September 21, 2023.

Longevity and shortfall probability

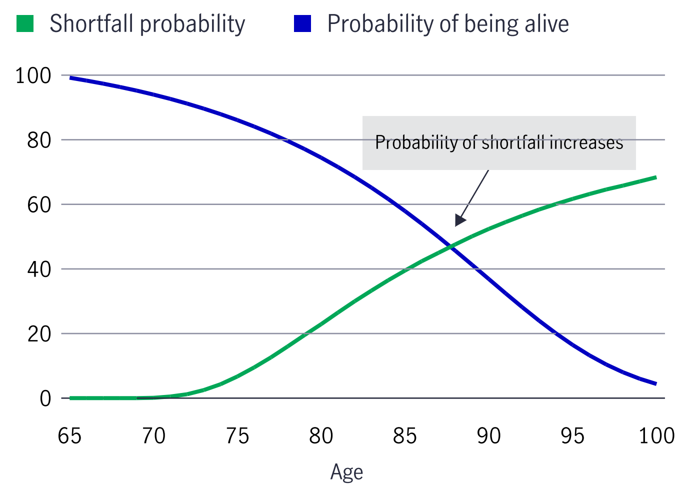
Most people naturally fear running out of money in retirement and the loss of control and dignity that comes with no longer being financially independent. The fact that we simply don't know how long we'll live adds a layer of uncertainty for almost everyone saving for retirement. Using actuarial tables for average longevity, we can measure the probability of being alive at a given age and the probability of having an income shortfall. For both men and women in the United States, for example, a particularly high-risk period is around age 85, when the average probability of being alive is relatively high[3]—close to 50%—and the probability of income shortfall begins to increase; however, it would be remiss to focus on one specific age. For a person who lives to age 95 with an estimated 60% probability of income shortfall, it's a devastating event.

Probability of being alive at a specific age for men



Source: Multi-Asset Solutions Team, Manulife Investment Management, actuarial tables RP-2014, Society of Actuaries (most recent information accessible). Based on a 20-year-old man in 2024 in the United States.

Probability of being alive at a specific age for women



Source: Multi-Asset Solutions Team, Manulife Investment Management, RP-2014, Society of Actuaries (most recent information accessible). Based on a 20-year-old woman in 2024 in the United States.

We have a note of caution about the challenges of measuring average longevity. While actuarial tables and averages are often used based on the availability of accurate data, longevity is unevenly distributed across societies. We often refer to women having longer average lifespans than men, but socioeconomic status is a larger determinant of longevity than gender.[4] Not everyone is living longer and certainly not longer and healthier. This is one of the great challenges facing societies, and one that, like helping individuals achieve financial sustainability in retirement, will require collaborative effort and attention across industry groups, institutions, and policymakers.

3 RP-2014 Mortality Tables, Society of Actuaries, 2014 (most recent information accessible). **4** "*Work, Retire, Repeat*" Teresa Ghilarducci, March 6, 2024.

Three pillars to a successful retirement

We believe there are three key pillars to achieving retirement readiness: contribution rate, accumulation period, and investment choice. The potential to achieve a sustainable income in retirement depends on each of these pillars being optimally implemented throughout a person's life. Complicating matters is the fact that the measure of success is largely determined by one factor that no one has control over—how long they'll live.

In the context of longer lifespans, we examine how outcomes are influenced within each pillar based on the choices individuals may make. Relatively small differences in choices may have an outsized effect on increasing or decreasing shortfall risk. This highlights the crucial role of plan sponsors in plan design, investment lineup selection, and ongoing engagement throughout an individual's retirement journey.

1. Contribution rate

Contribution rate is the first pillar in helping to achieve a successful long-term retirement. Starting salaries face tremendous pressure from the rising cost of living, often making it difficult for individuals to set aside what would be considered an optimal contribution rate. Behavioral biases also play a role, leading individuals to believe that they can potentially catch up on savings later in their career.

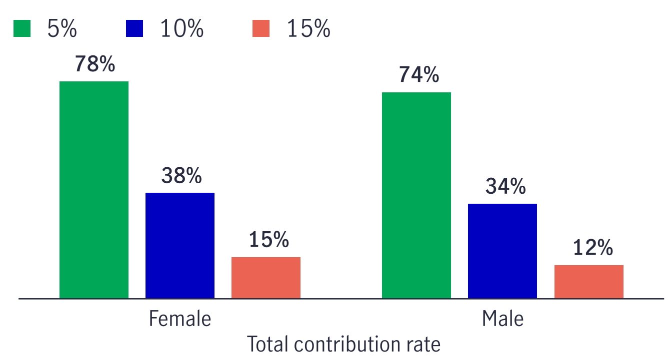
Using our base case contribution rate of 10%, we looked at the effects on shortfall risk of a 5% lower—and higher—contribution and assessed what this means for retirement readiness.

Increasing total contributions from 10.0% to 15.0%—which could constitute 7.5% from an individual and a 7.5% employer match—has the potential to more than halve shortfall risk across all the markets that we analyzed. In contrast, decreasing contributions from 10.0% to 5.0% significantly increases retirement income shortfall risk—74.0% for men and 78.0% for women in the United States—reaching 83.0% in Canada. Hong Kong ranges from 59.0% to 68.0% for men and women, respectively.

The base case scenario for our analysis includes the following. This is for illustrative purposes only. Individual circumstances may vary and may not reflect the situation of every member or participant:

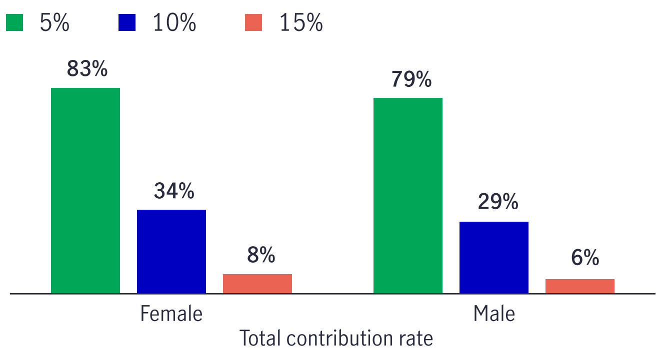
- An accumulation phase of 40 years (starting at age 25)
- A total contribution rate of 10% (consisting of employee contribution plus employer match)
- Retirement age of 65
- A target income replacement goal of 70% comprising a combination of 35% government pension (e.g., Social Security) and 35% savings
- Mortality data for three markets—Canada, the United States, and Hong Kong
- A moderate allocation to a target-date portfolio and our capital market assumptions to forecast asset class growth potential

Probability of shortfall based on contribution rate: United States



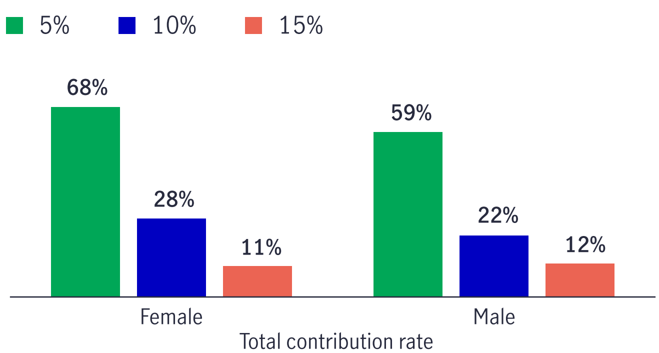
Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023.

Probability of shortfall based on contribution rate: Canada



Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023.

Probability of shortfall based on contribution rate: Hong Kong



Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023.

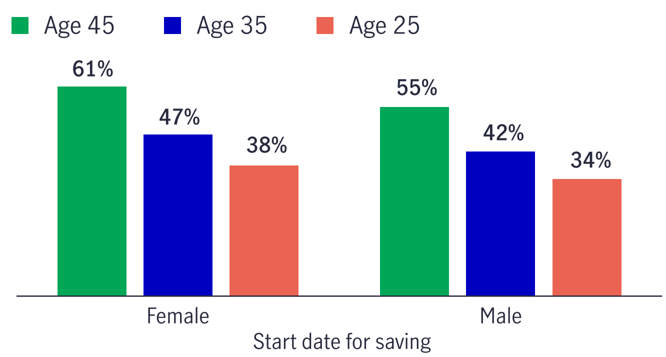
Achieving an overall contribution rate of 15% isn't necessarily easy and can be a significant hardship for many individuals. For some, even reaching our base case contribution rate of 10% may be a challenge. However, equipped with an understanding of the potential impact of different contribution rates on long-term retirement readiness, individuals may be better positioned to make informed choices.

For plan sponsors, this plays a role in considerations needed around default contribution rates during plan design. Moreover, it has bearing when engaging with employees about the merits of escalating contributions and illustrating varying scenarios that they may face.

2. Accumulation period

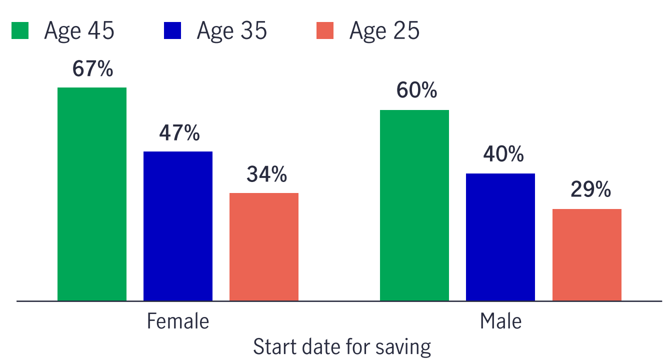
When faced with potentially funding a retirement spanning several decades, the urgency of starting to accumulate savings becomes acute. There is simply no time to waste. According to our base case, there's a risk—around 34% to 38%—of an individual not meeting their income replacement goal, even over a 40-year accumulation period, because of the potential effect that a longer lifespan has on accumulated savings. Delaying the start of accumulation significantly increases shortfall risk. Yet for varying reasons, many people don't start saving for retirement in their 20s. By the mid-30s, shortfall risk rises to nearly 50%, while by the mid-40s it can be as high as 67%.

Probability of income shortfall based on start date: United States



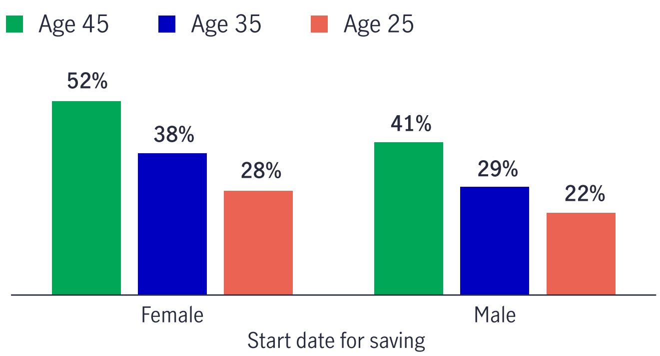
Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023.

Probability of income shortfall based on start date: Canada



Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023.

Probability of income shortfall based on start date: Hong Kong



Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023.

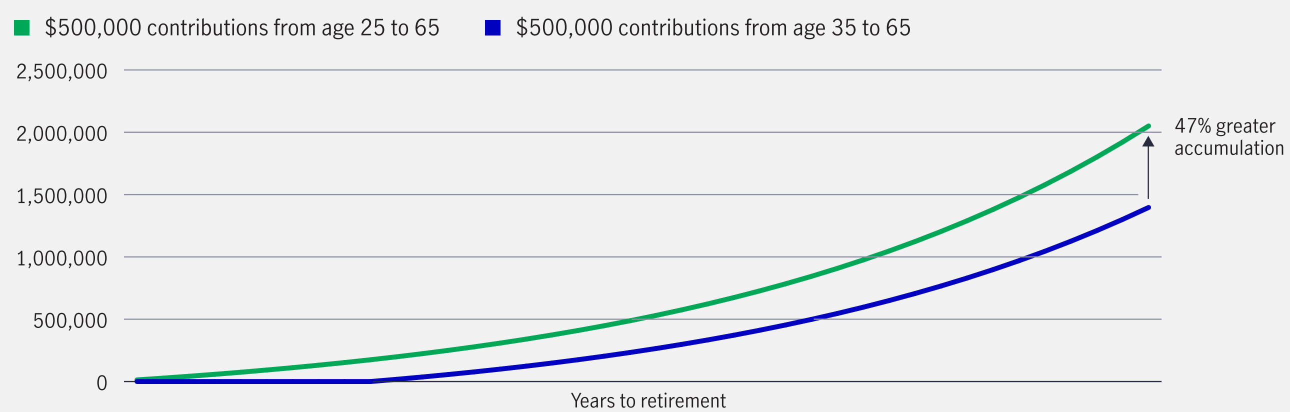
Behavioral biases often result in individuals discounting the effects of events further in the future while prioritizing nearer-term events. This is a key factor in poor long-term planning and often leads to individuals to delay addressing retirement needs until retirement itself is a nearer-term event. Individuals may believe that they can make up for lost time later in their career when they reach their peak earning years. However, the reality is that the opportunity to catch up diminishes rapidly over time and the contribution levels that would be required to stay on track for retirement readiness may often escalate to unattainable levels.

The long-term positive effects of early compounding

Even if an individual ultimately sets aside the same total contributions, the early benefits of compounding cannot be matched later; in this hypothetical scenario, two individuals accumulate an identical amount of savings, experience the same growth over time, but one starts 10 years earlier than the other. The result is 47% higher accumulated growth over the period.

Individual 1	Individual 2
$500,000 total contributions over 40 years from age 25 to age 65	$500,000 total contributions over 30 years from age 35 to age 65
Growing at 6% per year	Growing at 6% per year
End value: $2,050,596	**End value: $1,396,695**

Measuring the effects of early compounding



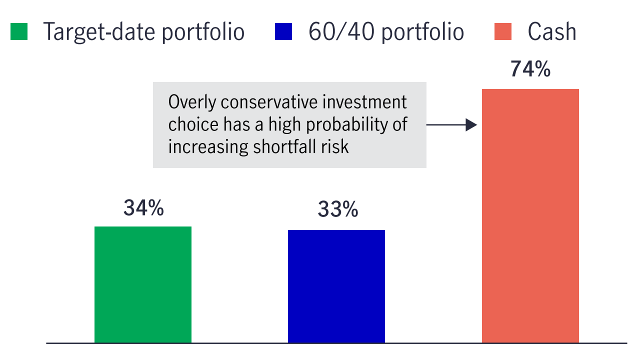
Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023. The above illustration does not depict an investment in any John Hancock portfolio and is a hypothetical example for comparison purposes only. Rates are subject to change. This illustration does not reflect the effect of asset charges and account fees. These fees would reduce the performance shown in the above illustration. The investment return and principal value of an investment may fluctuate so that distributed investments may be worth more or less than their original value. The illustration assumes: (1) no initial lump sum, $12,500 invested yearly for 40 years; (2) no initial lump sum, $16,667 invested yearly for 30 years. (3) no withdrawals. All hypothetical assumptions include a compound annual growth rate of 6%, accrued yearly. There are no guarantees that the results shown will be achieved.

3. Investment returns

Investment choice generally receives a lot of attention in DC retirement plans, and for good reason: Individuals usually carry the risk of low investment returns and the implications that this will have on their long-term retirement readiness. One of the key challenges of successful retirement planning is that when it comes to investment choice, a baseline of knowledge is required about a complex topic. Many individuals consider their investment approach to be moderate to conservative, yet there's a significant increase in shortfall risk when growth assets are minimized. Being too conservative in investment choice could have as large—if not larger—effect on shortfall risk as delaying accumulation or contributing too little. This highlights the important of the investment choices made available to individuals and the financial education and engagement that supports their choices.

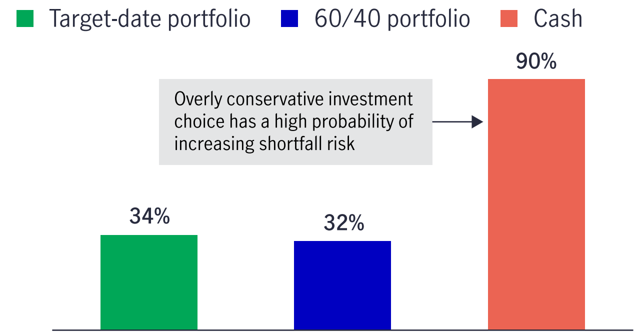
Growth asset exposure is critical to reducing shortfall risk

Probability of shortfall based on investment choice: United States



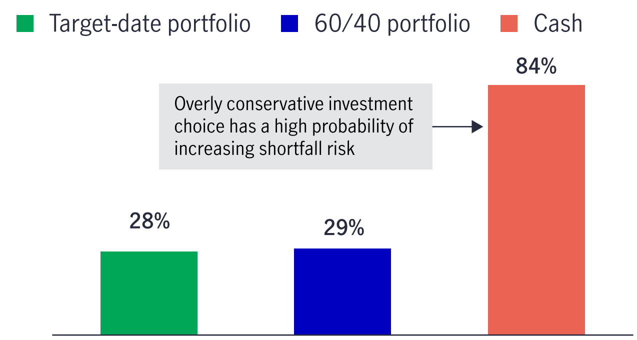
Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023. Above portfolios are based on indexes. Please see important disclosures below for a list of indexes used. It is not possible to invest directly in an index. Past performance does not guarantee future results.

Shortfall probability based on investment choice: Canada



Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023. Above portfolios are based on indexes. Please see important disclosures below for a list of indexes used. It is not possible to invest directly in an index. Past performance does not guarantee future results.

Shortfall probability based on investment choice: Hong Kong



Source: Multi-Asset Solutions Team, Manulife Investment Management, December 2023. Above portfolios are based on indexes. Please see important disclosures below for a list of indexes used. It is not possible to invest directly in an index. Past performance does not guarantee future results.

Retirement planning implications and opportunities for plan fiduciaries

A longer life can be a gift, but without financial independence, it can also be a burden. The prevalence and growth of DC plans today exposes individuals to the complexities of long-term retirement planning. This is evidenced by the fact that as advanced economies have become wealthier, individuals in these economies face greater risks to their retirement readiness. In the United States, the average worker needs $600,000 to supplement Social Security and maintain their standard of living, yet for all workers aged 55 to 64 the median holding in a retirement account is only $15,000.[5] In 2024, more baby boomers will turn 65 than ever before—more than 11,000 a day—and that number is expected to grow over the next decade.[6] Meanwhile, by the time a 20-year-old today—part of the Gen Z cohort—reaches age 65, their career path, assets, spending habits, and outlook will have been shaped differently to those of today's generations. This is where all stakeholders, including plan sponsors, fiduciaries, financial professionals, and asset managers, can help individuals through plan design, investment choice, education, and ongoing engagement. These issues will evolve over time—as each generation ages, they'll face a unique set of circumstances that distinguish them from previous generations. By regularly reviewing and analyzing these topics, we aim to support financial professionals and plan sponsors in helping individuals achieve retirement readiness for the future.

5 "*Work*, *Retire*, *Repeat*", Teresa Ghilarducci, March 6, 2024. **6** Retirement Income Institute Alliance for Lifetime Income, January 31, 2024.

Important disclosures

1 Multi-Asset Solutions Team, Manulife Investment Management, December 23, 2023. Our analysis uses a base-case scenario that includes an accumulation phase of 40 years (starting at age 25); a total contribution rate of 10% (consisting of employee contribution plus employer match); retirement age of 65; target income replacement goal of 70% comprising a combination of 35% government pension (e.g., Social Security) and 35% savings; mortality data for three markets—Canada, the United States, and Hong Kong; a moderate allocation to a target-date portfolio and our capital market assumptions to forecast asset class growth potential. Asset class assumptions data is based on Manulife Investment Management's Multi-Asset Solutions Team (MAST) asset class forecasts, which comprise MAST's expectations of how different asset classes will perform in the future over a 20-year-plus time horizon. Refer below to the list of indexes used. It is not possible to invest directly in an index. Past performance does not guarantee future results. Forecasts are derived using quantitative modeling techniques, which are mathematical and statistical based methods—some of which are widely used in financial markets and some of which are developed specifically by MAST—for analyzing complex financial data. In addition, forecasts include estimates of anticipated economic conditions, including, but not limited to, inflation and interest rates, GDP and currency exchange rates, and the anticipated effects these may have on financial markets and asset prices. There is no assurance that such events will occur, and actual asset class returns may be significantly different from those shown here. This material should not be viewed as a recommendation or a solicitation of an offer to buy or sell any investment products or to adopt any investment strategy and are not meant as predictions for any particular index, mutual fund, or investment vehicle. View important disclosures below for portfolio compositions and indexes uses. It is not possible to invest directly in an index.

Data for the United States and Canada: Target-date portfolio at age 25 consists of equities (97%), cash (2%), U.S. Treasuries (1%); at age 65 consists of equities (55%), fixed income (38%), real assets (5%), cash (2%). **60/40 portfolio** consists of equities (60%) and fixed income (40%), **cash portfolio** consists of cash (100%).

Equities consist of **U.S. large cap**, represented by the S&P 500 Index, which tracks the performance of 500 of the largest publicly traded companies in the United States. **U.S. mid cap** is represented by the S&P MidCap 400 Index, which tracks the performance of 400 mid-cap companies in the United States. **U.S. small cap** is represented by the S&P Small Cap 600 Index, which tracks the performance of 600 small-cap companies in the United States. **EAFE small cap** is represented by the MSCI Europe, Australasia, and Far East (EAFE) Small Cap Index, which tracks the performance of small-cap stocks of companies in those regions. **Canadian large cap** is represented by the S&P/TSX Index, tracks the performance of the Canadian equity market on the Toronto Stock Exchange (TSX). **Non-U.S. developed** is represented by the MSCI Europe, Australasia, and Far East (EAFE) Index, which tracks the performance of large- and mid-cap stocks of companies in those regions. **Emerging markets** is represented by the MSCI Emerging Markets (EM) Index, which tracks the performance of large- and mid-cap EM stocks.

Fixed income consists of **U.S. investment grade**, represented by the Bloomberg U.S. Aggregate Bond Index, which tracks the performance of U.S. investment- grade bonds in government, asset-backed, and corporate debt markets. **U.S. long term Treasuries** is represented by the Bloomberg U.S. Long Treasury Index tracks the performance of U.S. Treasury obligations with maturities of 10 years or more. **U.S. short core investment grade blend** is represented by a blend of the Bloomberg U.S. Aggregate 1–3 Year Index, which tracks the performance of the investment-grade, U.S. dollar-denominated, fixed-rate taxable bond market, including instruments with a remaining maturity of one to three years; and the Bloomberg U.S. Aggregate Bond Index tracks the performance of U.S. investment grade bonds in government, asset-backed, and corporate debt markets. **U.S. intermediate term credit** is represented by the Bloomberg U.S. Intermediate Credit Index tracks the performance of investment grade, U.S. dollar-denominated, fixed-rate, taxable corporate and government-related bond markets with maturities greater than one and less than ten years. **U.S. short TIPS** is represented by the Bloomberg U.S. 1–5 Year U.S. Treasury Inflation-Protected Securities (TIPS) Index tracks the performance of inflation-protected securities issued by the U.S. Treasury with maturities between one and five years. **U.S. high yield** is represented by the Intercontinental Exchange (ICE) Bank of America (BofA) U.S. High Yield Index, which tracks the performance of below-investment-grade U.S. dollar-denominated corporate bonds publicly issued in the U.S. domestic market and includes issues with a credit rating of BBB or below. **U.S. leveraged loans** is represented by the J.P. Morgan U.S. Liquid Index (JULI), which tracks the performance of a specific corporate bond or sector against the subset of the most liquid bonds in the investment-grade market. **Canadian investment grade** is represented by the FTSE Canada Universe Bond Index, which tracks the performance of marketable government and corporate bonds outstanding in the Canadian market. **Global investment grade** is represented by the Bloomberg Global Aggregate Bond Index, which tracks the performance of global investment-grade debt in fixed-rate treasury, government-related, corporate, and securitized bond markets. **Canadian mortgage-backed securities** is represented by the FTSE Canada MBS Index 3-5 Yr Non-prepayable, which tracks the performance of Canadian mortgage-backed securities with maturities ranging from 3 to 5 years that are not subject to prepayments. **Emerging markets debt** is represented by a combination of the J.P. Morgan EMBI Global Diversified Index, which tracks the performance of U.S. dollar-denominated Brady bonds, Eurobonds, and traded loans issued by sovereign and quasisovereign entities, capping exposure to countries with larger amounts of outstanding debt; the J.P. Morgan Corporate Emerging Markets Bond Index (CEMBI), which tracks the performance of U.S. dollar-denominated debt issued by EM corporations; the J.P. Morgan Government Bond Index-Emerging Market (GBI-EM) Broad Index, which tracks the performance of local currency EM government bonds.

Real assets are based on **global REITs**, which are represented by the FTSE EPRA Nareit Developed Index, which tracks the performance of listed real estate companies and real estate investment trusts in developed markets on a free float-adjusted basis. **Commodities** are represented by futures contracts of commodities. **Private infrastructure** is represented by the Burgiss Global Infrastructure Funds Index, which is calculated from the Burgiss Manager Index, one of the most comprehensive datasets of private capital funds, funds of funds, and their holdings.

Cash is represented by the Bloomberg U.S. Short Treasury 3–6 Month Index tracks the performance of U.S. Treasury bills, notes, and bonds with no more than six months to maturity. For Canada, cash is represented by the FTSE 91-day T-Bill Index, which measures the performance of U.S. Treasury bills with a maturity of approximately 91 days.

Data for Hong Kong: Target-date portfolio at age 25 consists of equities (95%), cash (1%), fixed income (4%); at age 65 consists of equities (50%), fixed income (45%), cash (5%). **60/40 portfolio** consists of equities (60%) and fixed income (40%), **cash portfolio** consists of cash (100%).

Equities are represented by the **FTSE MPF Hong Kong Index**, a benchmark index that tracks the performance of the Mandatory Provident Fund (MPF) scheme in Hong Kong. The MPF is a compulsory retirement savings scheme for employees in Hong Kong, and the index includes the constituent funds of the scheme. The FTSE MPF North America Index consists of eligible U.S. and Canadian large and mid cap companies which are listed on the stock exchanges approved by the Mandatory Provident Fund Schemes Authority (MPFA). The **FTSE MPF Europe Index** consists of eligible large-cap and mid-cap European companies, which are listed on the stock exchanges approved by the Mandatory Provident Fund Schemes Authority (MPFA). The FTSE MPF Japan Index consists of eligible large-cap and mid-cap Japanese companies, which are listed on the stock exchanges approved by the Mandatory Provident Fund Schemes Authority (MPFA). The **FTSE MPF Asia Pacific ex Japan & Hong Kong Index** consists of eligible large cap and mid cap Asia Pacific companies in the FTSE MPF All-World Index, excluding Japanese, Hong Kong, and Hong Kong listed Chinese companies, which are listed on the stock exchanges approved by the Mandatory Provident Fund Schemes Authority (MPFA).

Fixed income is represented by **global core investment grade**, which is represented by the Bloomberg U.S. Aggregate Bond Index, which tracks the performance of U.S. investment- grade bonds in government, asset-backed, and corporate debt markets. Asia local bonds are represented by the Markit iBoxx Asian Local Bond Index, which is a benchmark index that tracks the performance of local currency-denominated fixed-rate sovereign and quasi-sovereign debt in the Asian region. **Hong Kong bonds** are represented by the Markit iBoxx ALBI Hong Kong Index, which is a subset of the broader Markit iBoxx ALBI (Average Life Bond Index) that focuses specifically on the Hong Kong bond market. It tracks the performance of the Hong Kong dollar-denominated fixed-rate bond market, including both sovereign and corporate bonds.

Cash is represented by the MPFA Prescribed Savings Rate, which is used as a benchmark to decide whether MPF trustees can collect fees on their Conservative Fund.

Although the target-date funds are managed for investors on a projected retirement date timeframe, the fund's allocation strategy does not guarantee that investors' retirement goals will be met. The target date is the year in which an investor is assumed to retire and begin taking withdrawals.

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CRET-21032-632798-EN 01/25 MGRTBD AODA