

## Actuarial Perspectives on Determining a Retirement Income Budget

JULY 2020

### Key Points

- Deciding on a retirement income budget is a challenge for many retirees as a result of varying circumstances, goals, and uncertainties about the future.
- Several approaches from an actuarial perspective are described that can be used in addressing the challenges of lifetime income budgeting ranging from as simple as required minimum distributions to complex probabilistic analyses.
- It is important that retiree find an approach that creates a structure for retirement finances.

### Introduction

A spending budget in retirement is important, but a foundation for that is an income budget that sets the limits of the spending budget. Deciding on a retirement income budget approach is a challenge for many retirees.

An income budget can be defined as the amount of money that one can generate on a gross (pre-tax) basis from all potential sources. Retirees can generate income from one or more sources, including Social Security, a company pension, an insured annuity, investments including both investment earnings and principal, income that can be generated from home equity, as well as other sources. Individual sources of income could be constant, increasing, or decreasing, and in combination should ideally be designed to last for the lifetime needs and goals of the individual (or a couple in the case of joint planning).

The challenge stems from the complexity of addressing individual circumstances, an uncertain life expectancy, uncertain financial markets, and the possible occurrence of unexpected events that may require an unknown financial expenditure (such as home repair, a homeowner's association assessment, or the need for long-term care). There are many approaches to determining a retirement income budget ranging from very simple to very complex. For a better understanding of the challenge in predicting life expectancy, the American Academy of Actuaries and the Society of Actuaries have jointly developed the Actuaries Longevity Illustrator.<sup>1</sup>



AMERICAN ACADEMY of ACTUARIES

*Objective. Independent. Effective.™*

1850 M Street NW, Suite 300  
Washington, DC 20036  
202-223-8196 | [www.actuary.org](http://www.actuary.org)

Craig Hanna, Director of Public Policy  
Linda K. Stone, Senior Pension Fellow

© 2020 American Academy of Actuaries. All rights reserved.

<sup>1</sup> Available at <https://www.longevityillustrator.org>.

Among the key actuarial principles that apply to retirement income budgeting are periodic reevaluation and risk pooling, specifically longevity pooling. Without longevity pooling, an individual might need to plan to spend a fixed amount of assets over the longest plausible lifetime, resulting in less income available each year. Longevity pooling can provide more each year by allowing the individual to plan around the *average* longevity of many similarly aged retirees. It achieves this result by the sharing of a pool of assets that provides lifetime income to all participants regardless of how long they live. Examples of this practice include Social Security, defined benefit pension plans, and lifetime annuities sold by insurance companies. Longevity pooling primarily focuses on providing lifetime income for an individual (or an individual and beneficiary in a joint case) and, thus, might not appeal to individuals seeking to leave a bequest.

## Overview

This issue brief describes three general approaches for drawing down personal savings and assets in 401(k) plans, other defined contribution plans, and individual retirement accounts (IRAs) that are not part of a longevity risk pool. The first approach is quite simple, while the second and third approaches are structured to consider the impact of alternative decisions such as the purchase of annuity products that consider longevity pooling or the timing of when Social Security benefits should commence. The third method also allows for the consideration of alternative investment allocations in conjunction with these decisions.

All three approaches described in this paper could include either or both tax-qualified and non-tax-qualified funds, thereby adding tax consequences as another factor to be considered. In any of the methods it is necessary to take into consideration the impact of taxation on tax-qualified funds (except Roth IRA accounts) and earnings on non-tax-qualified assets, but this will depend upon each person's circumstances. Tax considerations are beyond the scope of this analysis. Given the complexity of tax implications, some seek advice of an expert. In addition, other individual circumstances, such as knowledge of poor health, can be considered in the second and third methods.

**Members of the Lifetime Income Risk Joint Committee, which authored this issue brief, include Noel Abkemeier, MAAA, FSA—Co-chairperson; Mark Shemtob, MAAA, FSA, FCA, EA, MSPA—Co-chairperson; Scott Allen, MAAA, FSA; Rachel Barnes MAAA, FSA, FCA, CERA, EA; Bruno Caron, MAAA, FSA; John Esch, MAAA, FSA; John Esch, MAAA, FSA; Debra Fickett-Wilbar, MAAA, FSA; Scott Japko, MAAA, FSA, FCA, EA; Chris Kinnison, MAAA, FSA; Grace Lattyak, MAAA, FSA, FCA, EA; Cynthia Levering, MAAA, ASA; Zorast Wadia, MAAA, FSA, FCA, EA; and Benjamin Yahr, MAAA, FSA.**

## Required Minimum Distribution Approach

The required minimum distribution (RMD) approach has a basis in actuarial principles, in that it entails that each year there is a redetermination of the amount to withdraw based on an approximation of life expectancy and the balance at the end of the prior year. It is, perhaps, better recognized for its ability to create an income stream that lasts for life as well as its simplicity. It exclusively addresses invested assets (after any set aside for a legacy bequest, if applicable) and is independent of Social Security and other income.

The approach is simply to draw down assets (from qualified and non-qualified sources) at the rate specified for RMD, including an extension for the period prior to age 72.<sup>2</sup> (That is, the RMD approach can be applied regardless of whether the individual has actually reached the IRS' "required beginning date.") This approach has an advantage over other simple approaches such as the "X% Rule" (e.g., 4% rule), which are easy to calculate but do not adjust for remaining life expectancy. Consequently, with other simple approaches a market decline could mean that the income does not last for the individual's entire lifetime. On the other hand, a smaller annual withdrawal might have a greater likelihood of lasting an entire lifetime but might not generate enough income to maintain the retiree's standard of living or could result in a larger bequest than planned for.

*Pros.* The calculation is relatively simple and can be done by the retiree with the published values in the IRS tables in footnote 2.<sup>3</sup> The annual drawdowns are based on the referenced tables that reflect life expectancy, so the income will continue throughout a lifetime, while it automatically adjusts for a reducing life expectancy. Investment return assumptions are not required because actual returns are immediately recognized in the assets supporting the next year's spending level.

*Cons.* The life expectancy used is "one size fits all" and is not tailored to an individual's situation. It is based on the lives of the retiree and a beneficiary<sup>4</sup> (with a 10-year-younger age for the beneficiary),<sup>5</sup> and thus will understate the amount of income that can be withdrawn relative to using a table that relies on only a single life expectancy. Consequently, the IRS tables are more appropriate for two beneficiaries. It also gives no recognition of health status, and thus a person in poor health might want to withdraw funds more rapidly in recognition of a shorter life expectancy. Although this approach always provides some income, it will vary from year to year. The greater the investment allocation to equities, the more likely the annual swings in income will be significant,

---

<sup>2</sup> The RMD life expectancies for ages 72 and above for funds held in tax-qualified plans are provided annually by the plan administrator. The values can also be found in IRS Publication 590-B in the Uniform Lifetime Table in Appendix B, Table III. Values for all ages can be found in IRS Revenue Ruling 2002-42. Revised tables have been proposed by the Internal Revenue Service and, pending approval, would be applicable January 1, 2021.

<sup>3</sup> See, for example, the calculations at [https://www.fidelity.com/bin-public/060\\_www\\_fidelity\\_com/documents/UniformLifetimeTable.pdf](https://www.fidelity.com/bin-public/060_www_fidelity_com/documents/UniformLifetimeTable.pdf).

<sup>4</sup> The life expectancy that is calculated is based upon the age at death of the second to die.

<sup>5</sup> For beneficiaries more than 10 years younger, other tables are used for RMDs, and these can be found in IRS Publication 590-B; however, for income budgeting purposes, it is simplest to use the Uniform Lifetime Table.

although there are some variations on this approach that can be used to limit the fluctuations between increases and decreases in income in any given year. There is no formal inflation adjustment, although, absent investment volatility, it would be common for the income to rise in earlier years and then eventually begin to fall much later in retirement. In addition, this approach does not recognize how income from other sources such as Social Security, pensions or fixed income annuities could be coordinated with the income generated by the investments.

## Deterministic Scenario Approach

This approach estimates assumed financial experience throughout retirement and solves for the income that can be afforded. This approach may include other sources of income, such as Social Security, an employer-sponsored pension, continuing part-time employment, or some other sources, and also could include a set-aside for a bequest. However, to the extent that these additional sources of income and a bequest allocation are to be considered in the overall desired retirement income budget, the calculations are more complicated.

The deterministic scenario approach requires assumptions such as life expectancy, the investment return, and possibly inflation. The life expectancy is calculated from a mortality table and is based on current age and gender. This is then often adjusted to reflect health status, conservatism (addition of several years to life expectancy), and possibly other factors, such as availability of other reliable sources of income. The investment return assumption can range from a conservative rate to an actual expected return based on the portfolio's asset allocation and capital market expectations. The calculations can be done with either set of investment return assumptions to provide a range of outcomes. Then, based on the assumed life expectancy, expected investment return, and the amount of retirement savings, an expected income level is determined. The model can also be adjusted for annual increases in income, modifications to desired income at later stages of retirement, and a variation in annual income to come from an investment portfolio. It can also take into account other sources of income. There is the option to consider the impact of longevity pooling by measuring the results of alternative approaches that take into account the purchase of fixed income immediate annuities or delayed Social Security.

This approach would be best revisited annually in order to adjust for past investment income experience, actual expenditures, changes in the planned income pattern, or modified mortality, investment, and inflation assumptions.

*Pros.* Calculators that use this approach can be found on the internet, including from investment managers, brokers, and financial bloggers. This approach can provide a practical tool to analytically oriented retirees and pre-retirees; however, it requires a basic understanding of the assumptions and how to use them. Performing calculations with several sets of assumptions, particularly those relating to investment income, life expectancy, and inflation, can provide a good understanding of the range of affordable lifetime income possibilities. The method provides a specific amount that can be available for spending, which makes it easy to put into action; however, the calculations must be kept up to date with periodic updates that reflect cumulative actual experience, especially investment returns.

*Cons.* Results are only as good as the assumptions; consequently, care must be taken in the choice of assumptions. Use of unrealistic assumptions can lead to either overstating or understating an affordable lifetime income level. As noted above, the modeling is more complex when considering non-investment-portfolio sources of income as well as other complex income features.

## Probabilistic Scenario Approach

This approach has some similarities to the deterministic scenario approach insofar as it is based on a model with certain assumptions; however, it does not rely on a single life expectancy or investment return assumption, but rather it uses stochastic modeling<sup>6</sup> to generate thousands of simulations based on a range of possible experience. A planning strategy generally comprises an annual income goal, which can be flat or varying, and all sources of income, which could include investment earnings, drawdown of principal, Social Security, fixed income annuities, employer-sponsored pensions, continued wages, and possibly others.

Within the simulations, rates of return are generated for each year based on Monte Carlo techniques.<sup>7</sup> Rates of return generated are based upon both an expected return and volatility. Simulations recognize age-based mortality rates, though they generally incorporate a randomly generated age at death. This age at death is generated based upon the probability of death at each age during retirement based on mortality tables that reflect sex, health, and possibly other factors. The thousands of results from the simulations can then be categorized in various ways to determine the probability of certain outcomes. Examples of outcomes that may be measured include the range of the level of income that can be expected compared to the income goal as well as the range of

---

<sup>6</sup> A stochastic model is a tool for estimating probability distributions of potential outcomes by allowing for random variation in one or more inputs over time. A very large number of scenarios are modeled in the process.

<sup>7</sup> Monte Carlo simulations are used to model the probability of different outcomes in a process that cannot easily be predicted due to the intervention of random variables. It is a technique used to understand the impact of risk and uncertainty in prediction and forecasting models.

amounts that would remain for a bequest. Alternative planning strategies can be analyzed and compared. This approach should be revisited periodically to determine whether experience has had an impact on the strategy that was selected. Longevity pooling is considered to the extent that the use of annuities or the timing of Social Security is considered.

*Pros.* This method produces thousands of potential outcomes for each planning strategy being analyzed. Those outcomes can be categorized to assign probability of occurrence. For example, a given strategy might show that 95% of the time there will be enough retirement income generated to satisfy the income goal for the retiree’s lifetime. Competing strategies can be analyzed to determine the relative attractiveness of each. The model must be kept up to date with periodic updates that reflect cumulative experience.

*Cons.* The results may be difficult for many retirees to fully understand, as they require the ability to analyze and interpret a percentile range or a chance of failure. Results are only as good as the assumptions; consequently, care must be taken in the choice of assumptions. Selection of assumptions can be complex because expected returns, expected variances in those returns, and covariances in returns among asset classes need to be selected. The amount of effort required may be a deterrent to periodic reevaluation and readjustment.

## Conclusion

The three types of approaches can be compared, as follows:

CHARACTERISTIC	TYPE OF APPROACH		
	RMD	Deterministic	Probabilistic
Information Provided	Income from one asset source	Income from multiple sources and with desired pattern	Probability of achieving desired income goal
Assumptions Needed	Age	Age and gender; Investment yield; Conservative mortality; Health estimate; Inflation; Other income sources; Desired income pattern	Age and gender; Investment yield and volatility; Mortality and, possibly, variability; Health estimate Inflation; Other income sources; Desired income pattern
Resources Needed	RMD factors; Annual asset balance	Spreadsheet model	Stochastic model
How to interpret	Single annual income amount available	Available annual income amount reflective of pattern of needs	Measure probabilities against personal risk tolerance

The actuarial approaches outlined in this issue brief provide a range of complexity in the determination of a retirement income budget. The RMD approach is an easy-to-calculate method based solely on a single measure of life expectancy. The deterministic approach measures life expectancy and an assumed rate of return to determine an annual income amount. Probabilistic analysis utilizes the range of anticipated investment return and mortality assumptions. It is best used to test a variety of decision points including longevity pooling techniques and asset allocations. It requires an understanding of how probability applies to an individual and how to interpret risk.

The second and third approaches outlined in this issue brief require periodic reevaluation and adjustment; otherwise, individuals could underestimate the available budget if experience is more favorable than assumed or could face a severe and unpalatable adjustment to their retirement plans when experience is less favorable than assumed. With reevaluation, the amount of income will change, but hopefully by a smaller amount that the retiree can more easily adapt to.

The approach selected will likely vary based on the needs and circumstances of the individual. There is no universal approach that will work best for all retirees, but all retirees could be better informed by considering any or all of the above methods in determining their drawdown strategy.

The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.