THE RETIREMENT MODELER

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How the Retirement Forecast Model Works

A Plain-Language Guide to the Assumptions, Methodology, and Calculations

Overview

This tool builds a month-by-month simulation of your financial life from today through age 100. Every number you see — projected balances, sustainable income levels, tax estimates — comes from a single consistent calculation engine that runs the same math whether you are looking at the detailed month-by-month ledger, the 30-year forecast chart, or the summary comparison report. The goal is straightforward: tell you how much monthly gross income your portfolio can sustain for the rest of your life, and show you exactly how that number was derived.

The Two-Bucket System

Your retirement savings are treated as two separate pools of money. The first is your **Taxable Bucket** — traditional IRAs, 401(k)s, brokerage accounts, and any savings where you will owe income tax when you make a withdrawal. The second is your **Non-Taxable Bucket** — Roth IRAs, Roth 401(k)s, health savings accounts, and any assets where qualified withdrawals are tax-free. The model tracks these two buckets independently throughout the entire simulation because the tax character of a withdrawal affects both your annual tax liability estimate and the sequencing of which dollars are spent first.

How Each Month Works

The simulation processes every month in a strict four-step sequence. Understanding this order is important.

Step 1 — The Portfolio Grows

At the very start of each month, investment returns are credited to both buckets before anything else happens. Returns compound monthly using the formula **Monthly Rate = (1 + Annual Rate)^(1/12) – 1**, which converts your annual return assumption into its true monthly equivalent. This means your existing balance earns a full month of growth before any contribution is added or any withdrawal is taken.

Step 2 — Contributions Are Added

If you are still in the accumulation phase — meaning you have not yet reached your retirement date — your monthly contribution is deposited into the two buckets in proportion to their starting balances. Because this happens *after* growth is applied, your contributions begin earning returns in the following month, not the current one.

Step 3 — Windfalls Are Deposited

If you have entered a one-time lump-sum event (an inheritance, a property sale, a business exit), it is added in the month you specified, after growth and contributions, and then earns the post-retirement rate of return starting the following month.

Step 4 — The Portfolio Covers Your Income Gap

If the month is on or after your chosen income start date, the model calculates how much your fixed income sources (Social Security, pension, other) are providing that month, subtracts that from your monthly income goal, and withdraws the remaining shortfall from your portfolio. The taxable bucket is drawn first, dollar for dollar. If the taxable bucket is exhausted, the non-taxable (Roth) bucket covers any remaining shortfall. Any amount that cannot be covered from either bucket is recorded but does not create a negative balance.

Rate of Return Assumptions

The model uses two separate return assumptions divided by your retirement date, and **both are fully adjustable by you** on the assumptions page (Step 5). Before retirement, your portfolio grows at your chosen pre-retirement rate — the default is **5% per year**, but you can set it to any value that reflects your investment strategy. Once drawdowns begin, the rate switches to your post-retirement portfolio rate of return, which you also set independently. Many users choose a more conservative post-retirement rate to reflect a shift toward income-focused or lower-volatility investments in retirement. If there is a gap between your last day of contributions and the date you want income to begin — for example, you stop working at 62 but delay income draws until 65 — the portfolio grows at the pre-retirement rate during that gap period, with no contributions going in and no withdrawals coming out. Changing either rate immediately recalculates every forecast, ledger, and comparison in the model.

Inflation and Cost-of-Living Adjustments

The inflation rate used to escalate your monthly income goal is **fully adjustable by you** on the assumptions page (Step 5). The default is **3% per year**, but you can raise or lower it to test optimistic or pessimistic scenarios. At the beginning of every January, two escalation events happen simultaneously using your chosen rate. First, your monthly income goal increases by that rate, so the purchasing power of your target income stays constant in today's dollars over time. Second, all Social Security benefit amounts increase by the Social Security Administration's annual Cost-of-Living Adjustment (COLA) — a separate rate set by SSA, currently **2.5%** (the published 2026 figure). The COLA applies automatically and is not the same as your user-adjustable inflation rate. Both increases take effect in January itself, meaning the January payment already reflects that year's higher amounts. The model's built-in COLA rate is updated each year when SSA publishes its announcement, typically each October.

Social Security: Timing, Step-Ups, and the 2033 Scenario

You enter a start date for your Social Security benefit, and no SS income is assumed before that date. If you are married, your spouse's benefit has its own independent start date. The model also handles the **spousal step-up**: if one spouse's own earned benefit is lower than 50% of the higher earner's Primary Insurance Amount (PIA), the lower-earning spouse's amount is automatically topped up to that 50% cap at Full Retirement Age, with proportional reductions if they file earlier. When the higher-earning spouse is no longer in the picture, you can designate a step-up date on which the surviving spouse begins receiving the higher household benefit amount.

The model includes an optional scenario toggle for the Social Security trust fund outlook. If enabled, the simulation applies a **23% reduction** to all Social Security payments beginning in January 2033, consistent with Congressional Budget Office projections for the trust fund's depletion timeline. This lets you stress-test your plan against a worst-case SS scenario.

Future Fixed Income Sources: Pensions and Other Income

Pensions and any other recurring income sources — rental income, annuity payments, part-time work — are entered with a specific activation month and year. Before that date, those sources contribute nothing to your income; on and after that date, they contribute their full monthly amount. These amounts are **not** adjusted for inflation by the model — they are treated as fixed nominal payments unless you build an inflation assumption into the amount you enter. Because these income streams reduce the gap your portfolio must fill each month, the later their start date, the more the portfolio must carry in the early years of retirement.

Gross Income, Net Income, and the Tax Assumption

Your monthly income target is treated as a **gross income figure** — the total amount flowing into your household before taxes. The model does not inflate your portfolio withdrawals to cover your tax bill on your behalf. Instead, you are assumed to pay income taxes directly from your gross income, and the portfolio deducts only the raw gap between your gross goal and your fixed income sources. This matches how most people experience retirement spending: you decide your gross income target, the government takes its share, and you live on what remains.

To help you plan for that obligation, the model estimates your federal and state income tax each year. On the federal side it applies 2026 IRS tax brackets — with a standard deduction of $15,500 for single filers or $31,000 for married couples filing jointly — to your taxable income, which includes IRA and brokerage withdrawals, pension income, and the taxable portion of Social Security determined by the IRS provisional income rules (up to 85% of your SS benefit can become taxable, depending on total income level). State taxes are estimated using the effective marginal rate for your state of residence. These estimated figures appear on the forecast charts as an informational reference and are *not* deducted from your portfolio balance.

The Goal-Seek: Finding Your Sustainable Income

When you set a legacy target — for example, "$100,000 remaining at age 90" — the tool works backward using an automated binary search. It runs the full simulation repeatedly, adjusting the monthly income target up or down, until it finds the amount that causes the portfolio balance to land precisely at your chosen target on your exact birthday in the target year. The search runs up to 80 iterations and converges to within less than $0.10 per month before rounding to the nearest whole dollar. The balance check always reads from the simulation month corresponding to your actual birthday — not a December year-end approximation — so the figure shown on the summary report and the figure in the detailed month-by-month ledger will always agree.

What the Numbers Mean in Practice

Every balance figure in the detailed ledger reflects the **end-of-month balance**: the portfolio after that month's growth has been credited, contributions have been added, and withdrawals have been taken. Age labels in the ledger reflect your exact age as of that calendar month. When the summary report states a portfolio balance at a particular age, it reads from the simulation month of your actual birthday in that year — so "balance at age 90" means the balance in the specific month you turn 90, not at the end of that calendar year.

The model is **deterministic**: given the same inputs, it will always produce the same outputs. It does not model market volatility or sequence-of-returns risk in the main forecast — a single assumed annual return is applied consistently throughout. A separate Monte Carlo analysis uses statistical sampling to estimate the probability that your plan survives across a range of market environments, but the core 30-year forecast reflects this single-return assumption.

Key Assumptions at a Glance

Assumption	Default / Current Value	Where You Set It
Pre-Retirement Return	5.0% per year (user-adjustable)	Step 5 — Assets
Post-Retirement Return	User-specified (adjustable)	Step 5 — Assets
Inflation Rate	3.0% per year (user-adjustable)	Step 5 — Assets
Social Security COLA	2.5% (2026 SSA rate)	Applied automatically
Federal Standard Deduction	$15,500 single / $31,000 married	Applied automatically (2026)
SS Trust Fund Reduction (opt.)	23% reduction from Jan 2033	Optional toggle — Step 3
Withdrawal Sequencing	Taxable first, then Roth	Applied automatically
Monthly Income Goal	Gross income (pre-tax)	Step 6 — Income Target
Balance Milestone Timing	Exact birthday month	Applied automatically

This document describes the mathematical methodology and assumptions used by The Retirement Modeler. It is provided for transparency and educational purposes only and does not constitute financial, tax, or investment advice. All projections are based on the assumptions you provide and are not guarantees of future results. Tax brackets and COLA rates reflect published 2026 figures and are reviewed annually. Consult a qualified financial professional before making retirement planning decisions.