T. Rowe Price®
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Retirement Income Calculator Methodology and Assumptions

OVERVIEW

The T. Rowe Price Retirement Income Calculator allows retirement savers to estimate the durability of their current savings across 1,000 randomly generated market scenarios, and to assess the impact of different savings rates, time horizons, and asset allocations on the projection of retirement income. The projections are used to provide monthly retirement income estimates presented in today's dollars.

The projections generated by the tool regarding the likelihood of various investment outcomes are based on historical performance data of specific asset classes as described below, but are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. The tool presents only a range of possible outcomes. There can be no assurance that the projected or simulated results will be achieved or sustained. The potential for loss (or gain) may be greater than demonstrated in the simulations. Results may vary with each use or over time, depending on changes to your inputs or periodic updates to the underlying assumptions.

The Retirement Income Calculator assesses the adequacy of retirement savings based on an asset allocation you specify or a model asset allocation T. Rowe Price believes to be generally appropriate for an investor of your age, or the age of your planning partner, if older. You may include a planning partner, such as a spouse, with whom you are jointly planning your retirement.

Although you may input information about outside accounts, other income and specific expenses into Retirement Income Calculator, it is not required. Please be sure to take other assets, income and investments into consideration in reviewing results that do not incorporate that information.

DATA USED AND HYPOTHETICAL PROJECTION METHODOLOGY

Data and Assumptions about You. In order to determine how likely your current and projected retirement savings are to last through retirement, we use data and assumptions about you, as follows.

We use salary information you provide, a retirement age of 65 (unless you have specified a different age) and a planning period in retirement of 30 years (unless you have specified a different planning period), and an assumed annual workplace contribution rate (15% unless you specified a different rate). You may also enter other, non-workplace annual retirement savings. We assume that your salary, workplace contributions, and other savings (if entered) will increase at a rate to keep pace with inflation (assumed to be 3% based on historic inflation rates) and will stop at retirement. We use any anticipated retirement income you provide, and you may include Social Security benefits in the analysis, which we estimate based on your stated or assumed retirement age and current salary, but assume benefits begin at retirement. You may input your own Social Security estimate. We assume that you are planning as an individual unless you provide information about a partner. See "Retirement Income and Withdrawal Assumptions" for more information about partners.

If you are an existing T. Rowe Price customer and you log in when using the tool, your birthdate and account balances held under your name and tax id at T. Rowe Price will be automatically imported into the tool. The tool treats all retirement accounts entered in the "About how much have you saved for retirement so far?" box as tax-deferred and does not distinguish among contribution sources. You may provide data about outside investment accounts through the tool. By logging in, the data you enter into the tool will be saved. For subsequent uses, your updated T. Rowe Price account balances will be available to include through the worksheet link. (Your T. Rowe Price account values will not automatically update unless you choose to do so through the worksheet link.)

Calculating Hypothetical Future Values of Asset Class Portfolios. The tool uses Monte Carlo analysis to generate 1,000 hypothetical market scenarios so that users can analyze hypothetical outcomes for specific asset class portfolios under a range of market conditions. (Asset classes used are limited to stocks, bonds and short-term bonds). Monte Carlo analysis models future uncertainty based on probability. Our Monte Carlo analysis creates potential simulated portfolio values by using asset class portfolio returns selected randomly from a consistent data set comprised of over 1 million potential monthly return values, net of inflation.

The data set of potential monthly returns was developed using the following assumptions:

Potential return values, net of inflation, were generated using historic rates of return for each of the three asset classes since inception through 2010, in combination with our long-term view of market conditions. We used the S&P 500® Index for stocks, Bloomberg Barclays U.S. Aggregate Bond® Index for bonds, and Barclays® U.S. 1-3 Year Government/Credit Bond Index for short-term bonds. These yielded the following compound rates of return, net of inflation:

	Stocks	Bonds	Short-term Bonds
Long-term Annual Compound Rate of Return	4.9%	2.23%	1.38%

We adjusted these returns for expenses using the following assumptions:

	Stocks	Bonds	Short-term Bonds
Expense Assumptions	0.70%	0.60%	0.55%

We assumed a variability of returns based on historic volatility data from market indices in combination with our long-term view of market conditions:

	Stocks	Bonds	Short-term Bonds
Volatility	18%	6.5%	4%

Finally, we assumed that returns of each asset class would move in correlation to the other asset classes in a manner consistent with historical experience as follows:

	Stocks	Bonds	Short-term Bonds
Stocks		0.4	0.3
Bonds	0.4		0.8
Short-term Bonds	0.3	0.8	

The correlation (which ranges from -1.0 to 1.0) indicates how much the assets move in tandem. The closer the value is to 1.0 indicates the higher the tendency the assets have to move in the same direction.

We use the assumptions above for all retirement accounts.

Asset Allocation Assumptions. If you do not enter your own asset allocation, the tool calculates retirement income projections based on a model asset allocation we believe to be appropriate for hypothetical investors of your age, or the age of your planning partner if older. Model asset allocations have been developed based on stock increments from 40% to 90% and are assigned as follows:

Model Asset Allocations		
Age	**Saving or Preparing for Retirement**	**Retired**
47 or younger	90% stock/10% bond	40% stock/40% bond/20% short-term bond
48–55	80% stock/20% bond	40% stock/40% bond/20% short-term bond
56–69	60% stock/30% bond/10% short-term bond	40% stock/40% bond/20% short-term bond
70–89	40% stock/40% bond/20% short-term bond	40% stock/40% bond/20% short-term bond
90 or older	40% stock/40% bond/20% short-term bond	40% stock/40% bond/20% short-term bond

Once an allocation is set in the tool, it will remain until updated via the slider bar. The tool assumes monthly rebalancing. The model asset allocations are based upon analysis that seeks to balance long-term return potential with anticipated short-term volatility. The model reflects our view of appropriate levels of tradeoff between potential return and short-term volatility for investors of certain ages.

Taxable Account Returns. If you have included taxable accounts as part of the tool's assessment or such accounts become part of the tool's withdrawal assumptions, see below, our model assumes that taxes decrease earnings of that account. Accordingly, the model uses data from the Lipper peer group for each asset class to calculate an assumed percentage of four categories of earnings with different tax impacts: realized short-term capital gains, realized long-term capital gains, qualified dividend payments and interest or nonqualified dividend payments. The coefficients used to determine the amount by which we assume taxes reduce earnings in taxable accounts (the "tax drag") are:

Asset Class	Tax Drag Coefficient
Stocks	12%
Bonds	26%
Short-term Bonds	30.53%

These coefficients are used to reduce monthly return assumptions for your taxable assets in the 1,000 hypothetical market scenarios.

Retirement Income and Withdrawal Assumptions. Retirement income projections are presented as a snapshot of the first month in retirement and are displayed in today's dollars. In order to model your retirement income, we start with the assumed value of your account at an asset class level based on the median result from the 1,000 hypothetical return projections, and assume withdrawals pro rata across asset classes at the assumed or stated goal level, increased each year for inflation. The figures do not take into account any taxes that may be due upon withdrawal. We assume that required minimum distributions for non-Roth IRA accounts begin at age 70½, and are made in 12 equal monthly payments. To the extent Social Security payments or required minimum distributions exceed your assumed or stated retirement income goal, we assume the amounts are reinvested in a taxable account.

Our projections also depend on your stated goal:

- **Saving for retirement.** We assume that you will need 75% of your pre-retirement salary and we calculate the percentage of times that your data will generate that amount in our 1,000 market scenarios. We also calculate a projected monthly retirement income amount that leaves at least $1 of savings in 70% or more of our market scenarios.

- **Preparing for Retirement.** We calculate the percentage of times that the monthly amount you would like to withdraw from your estimated retirement savings leaves at least $1 at the end of the withdrawal horizon in our market scenarios. We also calculate the monthly withdrawal amount that leaves at least $1 at the end of the withdrawal horizon in 80% or more of our market scenarios.

- **Living in Retirement.** We calculate the percentage of times that your stated monthly withdrawal amount leaves at least $1 at the end of the withdrawal horizon in our market scenarios. We also calculate the monthly withdrawal amount that leaves at least $1 at the end of the withdrawal horizon in 80% or more of our market scenarios.

In withdrawing to meet the income goal, we assume a specific withdrawal sequence from account types. We start with any required minimum distributions. We then move to any taxable accounts, followed by tax-deferred accounts. Finally, we withdraw from any tax-free Roth IRA accounts. When a planning partner is included, we follow the same sequence, but take into account the age of the partner.

If you are modelling retirement income with a planning partner, we calculate each person's Social Security benefits separately, and assume that the surviving spouse or partner is entitled to receive the higher of the two estimated Social Security benefits through the end of the planning period. If you have entered data concerning a pension benefit, we allow you to determine the amount of the pension that will be paid to your planning partner. Required minimum distributions are calculated using the uniform lifetime table even if your planning partner is a spouse more than 10 years younger than you.

We do not take any taxes into account that may be due upon withdrawal.

We provide an estimate of how much more we think you'll need to save in order to close the gap between what you're projected to have and what we think you'll need. In our market simulations, the additional savings produced an account value (the median result from 1,000 hypothetical return projections) equal to what we think you'll need to save.

LIMITATIONS

While the Retirement Income Calculator has been designed with reasonable assumptions and methods, the tool provides hypothetical projections only and has certain limitations.

- Failure of the model to accurately project actual market conditions, inflation, or tax rates may result in over- or understatement of projected retirement income.

- The salary, contribution and other savings growth rate assumption (3%) may not match your circumstances and may result in over- or under-statement of retirement savings and income projections.

- At certain salary levels, the failure to incorporate IRS or plan contribution limits may also result in overstated retirement savings and income projections.

- The failure to take into account taxes at distribution may result in overstated retirement income projections. Future spending capacity from the projected income stream will be impacted by taxes.

- The use of current salary to estimate Social Security payments may not represent your situation.

- The assumption that Social Security payments will increase by the amount of assumed inflation may result in overstated retirement income projections.

- If your input includes information about a planning partner that is not your spouse, then assumptions about the transfer of Social Security or pension benefits to a surviving spouse do not apply and may result in overstated projected retirement income for the survivor.

- The model asset allocation displayed may not be appropriate for you if your risk tolerance varies from the assumptions we used in creating the model.

The information provided in this tool is for general and educational purposes only, and is not intended to provide legal, tax or investment advice. This tool does not provide fiduciary recommendations concerning investments or investment management. Other T. Rowe Price educational tools or advice services use different assumptions and methods and may yield different outcomes.

IMPORTANT: The projections or other information generated by the Retirement Income Calculator regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. The simulations are based on assumptions. There can be no assurance that the projected or simulated results will be achieved or sustained. The charts present only a range of possible outcomes. Actual results will vary with each use and over time, and such results may be better or worse than the simulated scenarios. Clients should be aware that the potential for loss (or gain) may be greater than demonstrated in the simulations.