

## Methodology & Assumptions

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### Projected Portfolio Values

The site generates projected portfolio values based on each user's inputs, taking into account the user's reported age, retirement savings, risk tolerance, and anticipated retirement age. The projected portfolio values are either part of (i) the Educational Analysis Tool, which compares the user's current asset allocation (of assets in user's accounts held outside of the program that user linked for purposes of the analysis) to a hypothetical recommended portfolio; or (ii) the Managed Service, which shows the projected portfolio value of client's account(s) enrolled in the managed service.

The validity of the projections is dependent upon the accuracy of the data entered by the user. Differences in account size, investment horizon, risk tolerance, asset allocation, timing of transactions, and market conditions prevailing at the time of investment may lead to results that differ from the projections. The projected portfolio values are generated using a Monte Carlo simulation, which is a statistical modeling technique that forecasts a set of potential future outcomes based on the variability and central tendencies we believe are associated with relevant investments. The projections shown are drawn from the median outcome of 6,000 simulations. The projected growth rate and the projected total value of the portfolio are not adjusted for inflation. The simulation runs over a maximum investment horizon of 50 years. Projections are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. No representation is made that an investor will achieve results similar to those shown and you may lose money.

In the Managed Service, portfolio projections assume quarterly rebalancing back to the recommended asset allocation, are net of fund expenses, and are net of the Account Fee, which includes the advisory and program fees. Taxes are not considered in these projections.

In the Educational Analysis Tool, current portfolio projections assume annual rebalancing back to the user's current asset allocation and do not take into account management fees. Recommended portfolio projections are based on the investor's Sample Asset Allocations, and assume quarterly rebalancing and are net of the account management fee. Both current portfolio projections and recommended portfolio projections in the Educational Analysis Tool are net of fund expenses but do not take into account commission fees, taxes or other miscellaneous fees and expenses that you may incur through any other investment management or brokerage service, which if included would reduce the portfolio's performance. The impact of account management fees would reduce the performance of the user's actual portfolio. Taxes and trade commissions are not considered in these projections.

### Long Term Capital Market Assumptions

The Monte Carlo simulation used on the site is based on long-term capital market assumptions ("CMAs") produced by BlackRock, including but not limited to the CMAs in the table below. CMAs refer to BlackRock's return, risk and correlation expectations for each asset class

(correlation measures how asset classes move in relation to each other). CMAs are based on historical returns, proprietary models, and BlackRock's subjective assessment of the current market environment and forecasts as to the likelihood of future events. BlackRock's CMAs incorporate forecasts of risk-free rates, market risk premium and sensitivity to systematic risk, and are generated using the Capital Asset Pricing Model. The models used to generate CMAs used in the Monte Carlo simulation are developed and maintained by a global team of researchers within BlackRock.

**Expected Return and Volatility Assumptions (As of September 30, 2019)**

<b>Asset class</b>	<b>Expected annual return</b>	<b>Expected volatility</b>
US Equity Large	7.84%	14.31%
US Equity Small	9.16%	15.84%
International Equity Total	8.21%	13.46%
Emerging Markets Equity	10.66%	16.81%
Broad US Bonds	2.27%	3.45%
Corporate US Bonds	2.94%	4.05%
US TIPS	2.26%	4.11%
International Emerging Debt	4.48%	6.58%

The asset allocation and securities portfolios generated by the site are constructed by the BlackRock Multi Asset Strategies group. The asset classes were selected to broadly reflect the types of core equity and fixed income exposures that are commonly included within diversified portfolios. Other asset classes not considered in the portfolios may have characteristics similar or superior to those included in this analysis.

Investments are not insured or guaranteed by the Federal Deposit Insurance Corporation (FDIC) or any other government agency and investment returns and yield will fluctuate with market conditions. The main risk with stocks are the potential to lose some or even all of the money you invest or not obtaining the returns expected. Two main risks related to fixed income investing are interest rate risk and credit risk. Typically, when interest rates rise, there is a corresponding decline in bond values. Credit risk refers to the possibility that the bond issuer will not be able to make principal and interest payments. Non-investment-grade debt securities (high-yield/junk bonds) may be subject to greater market fluctuations, risk of default or loss of income and principal than higher-rated securities. International investing involves additional risks, such as risks related to foreign currency, limited liquidity, less government regulation and the possibility of substantial volatility due to adverse political, economic or other developments. These risks often are heightened for investments in emerging/developing markets or in concentrations of single countries. Investing in small-cap companies may entail greater risk than large-cap companies, due to shorter operating histories, less seasoned management or lower trading volumes.

Long-term capital markets assumptions are subject to high levels of uncertainty regarding future economic and market factors that may affect actual future performance. There is no guarantee that the expected returns will be achieved, and actual returns may be significantly higher or lower than those shown. Long-term Capital market assumptions should not be relied on as a forecast or prediction of future events, and they should not be construed as guarantees as to returns that may be realized in the future from any investment or asset class described herein.

Because of the inherent limitations associated with the use of portfolio projections and Sample Asset Allocation based on capital markets assumptions, investors should not rely exclusively on the Sample Asset Allocations shown in the tool when making an investment decision. The Sample Asset Allocations shown in the site cannot account for the impact that economic, market, and other factors may have on an actual investment. Unlike actual investments, the portfolio value projections, and Sample Asset Allocations shown in the Site do not reflect actual trading, liquidity constraints, fees, expenses, taxes and other factors that could impact an investor's realized future returns.

## **Educational Analysis Tool Calculations**

### *Portfolio Risk*

The Educational Analysis Tool analyzes the user's portfolio risk by estimating annualized volatility. It assesses the user's portfolio at an asset allocation-level, and does not take into account information at the security-specific level, such as the individual securities the user holds. The inputs used in the computation are the user's current portfolio allocation, assumed annual volatilities per asset class, and assumed correlations between asset class returns.

In order to compare the current risk level to levels implied by risk tolerances, the site also estimates the annualized volatilities of the target portfolios at each risk tolerance level. It uses the target portfolio allocation as an input; the calculation is otherwise the same as the user's current portfolio risk.

The recommended portfolio risk level is the annualized volatility of the recommended portfolio.

### *Asset Allocation*

In order to determine whether the user's current asset allocation provides a satisfactory level of expected return, the site employs a scoring method to compare the current asset allocation of the user's current holdings with that of the recommended portfolio.

### *Uninvested Cash*

The site identifies any cash (currency or cash equivalent securities) held within an account reported by a user. To estimate how the idle cash could grow if invested, we take the aggregate amount of cash across all accounts in the portfolio, less the amount implied by the Sample Asset Allocations, and if this difference is positive, we apply the Monte Carlo simulation methodology.

### *Fund Fees*

The site estimates the annual amount the user is currently paying in fund fees. This does not include trade commissions, loads, or redemption fees. The annual fee amount is compared to the annual fund fees the user would see if completely invested in the recommended portfolio. Note that actual results may vary if the user enrolls in the Managed Service, since we may decide not to trade out of some holdings if the cost of the trade outweighs the benefits. If the user enrolls in the Managed Service, the user will pay account management fees that may be equal to or greater than the reduction in fund fees gained by enrolling in the Managed Service.

### *The Bottom Line – “Portfolio Health”*

Your portfolio “health” is the dollar impact difference between current and recommended portfolio projections. This projected performance does not represent the projected performance of the actual securities held in your current portfolio or that would be held in your recommended portfolio, rather the Monte Carlo simulation is based on the fee-adjusted expected returns of the applicable asset classes in your current and recommended portfolios. Diversification and asset allocation strategies do not guarantee low volatility, profit or protection against loss.

### **Performance Calculations**

Performance is provided separately for each account that is householded for a particular goal. Your rate of return is calculated using a time-weighted rate of return method. This rate of return method removes the impact of cash flows from the calculation. Cash flows are transactions that add or remove assets from your account(s), such as contributions and withdrawals, and do not include fees charged. By excluding the impact of cash flows, the resulting performance calculation better represents the performance of the underlying investment strategy. Performance reflects advisor management fees, program fees, and underlying ETF fees and expenses, and miscellaneous fees charged pursuant to the account agreement. For more information about how performance is calculated, please reach out to your advisor.