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# Retirement Calculator Assumptions

The following assumptions were used for purposes of calculating estimated retirement savings needed.

a. The calculator will make use of the existing asset allocation and expected returns based on U.S. Bank Asset Management Group's asset allocation models and Capital Market assumptions below. These views are subject to change at any time based upon market or other conditions. Please see list of indices used in these calculations and their descriptions below.

Broad Asset Class	AMG Asset Allocation Models				
	Aggressive Growth	Growth Balanced	Balanced	Conservative Balanced	Income
Stocks	72%	65%	56%	44%	20%
Bonds	10%	20%	35%	50%	80%
Other	18%	15%	9%	6%	0%

Assumed Return	8.60%	8.26%	7.46%	6.58%	4.97%
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b. The calculator assumes retirement ends at age 90.

c. Annual salary increases each year at an assumed rate of inflation of 3%, which impacts the actual total saved each year.

d. Expenses increase at the assumed rate of inflation of 3% beginning in year two of retirement. Inflation is compounded annually. For example, year one has expenses equal to the entered amount. Expenses in year two and beyond are equal to one, plus the rate of inflation multiplied by the previous year's expenses.

e. Rate of return is constant through the entire scenario, both pre- and post-retirement.

f. Social Security estimates are calculated and should be input as future dollars. Changing retirement age will not impact the Social Security amount on the input screen, although it may change the timing of when Social Security may begin.

g. All amounts on the "Total Projected Assets" view are in terms of amounts at the start of retirement.

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h. A surplus is determined when a positive balance remains at the end of the projected scenario. A shortfall is reflected if a negative balance exists.

i. The “Assets Over Time” view is calculated from the spouse’s (or unmarried person’s) current age to age 90.

j. All retirement expenses are assumed to be withdrawn at the beginning of each year, all Social Security benefits are assumed to be received at the beginning of the year and all returns are compounded annually.

## U.S. Bank Benchmark Descriptions:

The following is a list of the indices employed by U.S. Bank Wealth Management as market benchmarks in relative to rate of return assumptions for each asset class in the asset allocation model. Indexes shown are unmanaged and are not available for investment;

Stocks:

*U.S. Equities – Wilshire 5000:* The Wilshire 5000 Total Market Index, or more simply the Wilshire 5000, is a market-capitalization-weighted index of the market value of all stocks actively traded in the United States.

*Developed Foreign Equities – MSCI EAFE:* MSCI Europe, Australia and Far East or more simply MSCI EAFE is a market-capitalization weighted index that is designed to measure the equity market performance of developed markets outside of the U.S. & Canada. The index includes approximately 1,000 companies representing the stock markets of 21 countries in Europe, Australasia and the Far East (EAFE).

*Emerging Foreign Equities– MSCI EM:* MSCI Emerging Markets Index or more simply MSCI EM is a free float-adjusted market capitalization index that is designed to measure equity market performance in the global emerging markets.

*Hedged Equities– HFRIEHI:* HFRI Equity Hedge (EH) Total Index or simply HFRIEHI is an equally weighted performance index. It uses the HFR database and consists only of EH funds with a minimum of US \$50 million AUM or a 12-month track record and that reported assets in USD. It is calculated and rebalanced monthly, and shown net of all fees and expenses. EH strategies invest in a core holding of all equities hedged at all times with short sales of stocks/or stock index options. Some managers maintain a substantial portion of assets within a hedged structure and commonly employ leverage. Where short sales are used, hedged assets may be comprised of an equal dollar value of long and short stock positions. Other variations use short sales unrelated to long holdings and/or puts on the S&P 500 index and put spreads. Conservative funds mitigate market risk by maintaining market exposure from zero to 100%. Aggressive funds may magnify market risk by exceeding 100% exposure.

*Private Equities – Cambridge Associates LLC US Private Equity:* The Cambridge Associates LLC U.S. Private Equity Index is based on returns data compiled for U.S. private equity funds (including buyout, growth equity and mezzanine funds) that represent the majority of institutional capital raised by private equity partnerships formed since 1986.

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Bonds:

*Investment Grade Fixed Income – Barclays Bond U.S. Aggregate Index* is an unmanaged, market-value-weighted index of taxable investment-grade U.S. domiciled fixed-rate debt issues, including government, corporate, asset-backed, and mortgage backed securities, with maturities of one year or more.

*Municipal Fixed Income – Barclays Capital U.S. Insured Municipal Bond Index* is an unmanaged, market-value-weighted index of investment-grade U.S. domiciled municipal bonds with maturities of one year or more.

*Foreign Sovereign Debt – Barclays Global Treasury Ex-US TR USD Index* is an unmanaged, market-value-weighted index of government bonds issued by investment-grade countries outside the U.S., in local currencies, that have a remaining maturity of one year or more and are rated investment grade.

*High Yield Fixed Income – The Bank of America Merrill Lynch U.S. High Yield Master II Index* or more simply BofAML US HY Master II is a market value-weighted index of all domestic and yankee high-yield bonds, including deferred interest bonds and payment-in-kind securities. Issues included in the index have maturities of one year or more and have a credit rating lower than BBB-/Baa3, but are not in default. The Bank of America Merrill Lynch U.S. High Yield Master II Constrained Index limits any individual issuer to a maximum of 2% benchmark exposure. The Bank of America Merrill Lynch U.S. High Yield Index tracks the performance of U.S. dollar denominated below investment grade corporate debt publicly issued in the U.S. domestic market. Qualifying securities must have at least one year remaining term to final maturity, a fixed coupon schedule and a minimum amount outstanding of \$250 million. *Inflation Protected Securities – Barclays US Treasury US TIPS* is unmanaged index includes all publicly issued, U.S. Treasury inflation-protected securities that have at least one year remaining to maturity, are rated investment grade, and have \$250 million or more of outstanding face value.

*JP Morgan Emerging Markets Bond Index Global - The J.P.Morgan Emerging Markets Bond Index Global ("EMBI Global")* tracks total returns for traded external debt instruments in the emerging markets. The EMBI Global includes U.S.dollar-denominated [Brady bonds](#), loans, and Eurobonds with an outstanding face value of at least \$500 million.

Other:

*Hedged Fixed Income – HFRI Relative Value Fixed Income Corporate Index (HFRIFIHY)* is an equally weighted performance index. It uses the HFR database and consists of only RV Fixed Income Corporate funds with a minimum of US \$50 million AUM or a 12-month track record and that reported assets in USD. It is calculated and rebalanced monthly, and shown net of all fees and expenses. Fixed Income Corporate includes strategies in which the investment thesis is predicated on realization of a spread between related instruments in which one or multiple components of the spread is a fixed income instrument. Fixed Income Corporate strategies differ from Event Driven Credit Arbitrage in that the former more typically involve more general market hedges which may vary in the degree to which they limit fixed income market exposure, while the later typically involve arbitrage positions with little or no net credit market exposure, but are predicated on specific, anticipated idiosyncratic developments.

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*Commodities: S&P GSCI – The Standard & Poor's Goldman Sachs Commodity Index* or more simply S&P GSCI is a composite index of commodity sector returns representing an unleveraged, long-only investment in commodity futures that is broadly diversified across the spectrum of commodities. The returns are calculated on a fully collateralized basis with full reinvestment. The combination of these attributes provides investors with a representative and realistic picture of realizable returns attainable in the commodities markets. Individual components qualify for inclusion in the S&P GSCI® on the basis of liquidity and are weighted by their respective world production quantities. The principles behind the construction of the index are public and designed to allow easy and cost-efficient investment implementation. Possible means of implementation include the purchase of S&P GSCI® related instruments, such as the S&P GSCI® futures contract traded on the Chicago Mercantile Exchange (CME) or over-the-counter derivatives, or the direct purchase of the underlying futures contracts.

*U.S. Listed Real Estate – DJ US Select REIT - Dow Jones U.S. Select REIT* or more simply DJ US Select REIT is a The Dow Jones U.S. Select REIT Index intends to measure the performance of publicly traded REITs a REIT-like securities. The index is a subset of the Dow Jones U.S. Select Real Estate Securities Index (RESI), which represents equity real estate investment trusts (REITs) and real estate operating companies (REOCs) traded in the U.S. The indices are designed to serve as proxies for direct real estate investment, in part by excluding companies whose performance may be driven by factors other than the value of real estate. Firms included in the index must be both an equity owner and operator of commercial and/or residential real estate; at least 75% of the firm's total revenue must be derived from the ownership and operation of real estate assets; the firm must have a minimum total market capitalization of USD 200 million at the time of its inclusion; and, liquidity of the company's stock must be commensurate with that of other institutionally held real estate securities. Mortgage REITs, net-lease REITs, real estate finance companies, mortgage brokers and bankers, commercial and residential real estate brokers and estate agents, home builders, large landowners and subdividers of unimproved land, hybrid REITs and timber REITs are excluded from the index. The Dow Jones U.S. Select REIT Index was first calculated on January 30, 1987

*Foreign Listed Real Estate – Standard & Poor's Developed Ex US Property* – The S&P Global Ex-U.S. Property defines and measures the investable universe of publicly traded property companies domiciled in developed and emerging markets excluding the U.S. The companies included are engaged in real estate related activities such as property ownership, management, development, rental and investment.

*Direct Real Estate – NCREIF Property* – The NCREIF Property Index is a quarterly time series composite total rate of return measure of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only. All properties in the NPI have been acquired, at least in part, on behalf of tax-exempt institutional investors - the great majority being pension funds. As such, all properties are held in a fiduciary environment.

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