

Fine-tuning target-date funds for different goals

Vanguard Research

August 2021

Andrew S. Clarke, CFA, CFP®; Ankul Daga, CFA

- Target-date funds (TDFs) are a pillar of the U.S. retirement system. At the end of 2018, TDFs and related trusts accounted for 27% of the assets in 401k plans, up from 7% a decade ago (Investment Company Institute, 2021).
- Their simplicity is one of their greatest virtues. Investors can select a fund with a target date that aligns with their expected retirement date. In exchange, they receive a broadly diversified, professionally managed portfolio that reflects best practices in lifecycle investing theory.
- Most TDF series offer a single postretirement asset allocation designed to help investors replace a reasonable portion of pre-retirement income. Of course, some people reach retirement with resources that put them in a position to pursue additional goals. We use a retirement planning framework to demonstrate that a second postretirement asset allocation can help support these goals.

Acknowledgments: The authors are grateful to Colleen Jaconetti for her guidance on retirement income planning; to Harshdeep Ahluwalia, Victor Zhu, and Scott Donaldson for their lifecycle modeling expertise; and to Grace Terracciano for her research on the TDF landscape.

Target-date funds (TDFs) simplify the complex task of portfolio construction and management. Investors can start by considering a simple question: When do you expect to retire? They can then consider the fund that best matches their expected retirement date, making sure it aligns with their risk tolerance and investment goals. (Many defined contribution [DC] plans automatically enroll employees in the plan and direct their contributions to an age-appropriate TDF.)¹

The investor receives a professionally managed, diversified portfolio that follows an asset allocation “glide path” over time. When an investor is many years from retirement, the typical TDF invests more aggressively. As retirement approaches, these portfolios seek to moderate an investor’s exposure to market risk and enhance the likelihood that the portfolio, combined with Social Security, will help the investor replace a reasonable portion of pre-retirement income.

A 2020 analysis of Vanguard’s DC recordkeeping data finds that 54% of participants hold a single TDF (Alling, Clark, and Stinnett, 2020). Among these participants who are 65 and older, a majority hold an “income fund” (the final postretirement asset allocation) or funds that are fast converging on the income allocation. These investors represent a diversity of retirement goals and resources.

We use a retirement planning framework to determine whether having more than one postretirement asset allocation option could enhance investors’ ability to pursue these varied goals. Our simulations of a hypothetical TDF series show that the addition of a second income fund could provide some cohorts with a benefit that they may value by as much as 24 basis points per year.²

Notes on risk

IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model® (VCMM) and the Vanguard Life-Cycle Model (VLCM) regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modeled asset class. Simulations as of June 2020. Results will vary with each use and over time. Please see Appendixes 1 and 2 for additional information about VCMM and VLCM.

All investing is subject to risk, including the possible loss of the money you invest. Past performance is no guarantee of future results. Diversification does not ensure a profit or protect against a loss. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income.

Investments in target-date funds are subject to the risks of their underlying funds. The year in the fund name refers to the approximate year (the target date) when an investor in the fund would retire and leave the work force. The fund will gradually shift its emphasis from more aggressive investments to more conservative ones based on its target date. An investment in target date funds is not guaranteed at any time, including on or after the target date.

Target-date fund providers are responsible only for selecting the underlying funds and periodically rebalancing the holdings of target-date investments. The asset allocations selected for the funds are based on the provider’s investment experience and are geared to the average investor. Investors should regularly check the asset mix of the option they choose to ensure it is appropriate for their current situation.

¹ TDFs are an eligible qualified default investment alternative (QDIA) under the Pension Protection Act of 2006.

² A basis point is one-hundredth of a percentage point. See the discussion on certainty fee equivalents on page 5.

Vanguard's retirement planning framework

Some retirees depend on their TDF and Social Security to cover basic living expenses. Others may be able to cover these expenses with guaranteed income they receive from a defined benefit (DB) plan, an annuity, or a similar product. These retirees may use the TDF to support higher levels of discretionary spending or a bequest. Jaconetti et al. (2021) develop a conceptual framework to assess how different goals, risks, and resources can lead to different asset allocation and spending strategies in retirement. The framework consists of four steps, detailed in **Figure 1**:

1. Determine goals.
2. Understand risks.
3. Assess available financial resources and tools.
4. Develop a plan to achieve goals and mitigate risks.

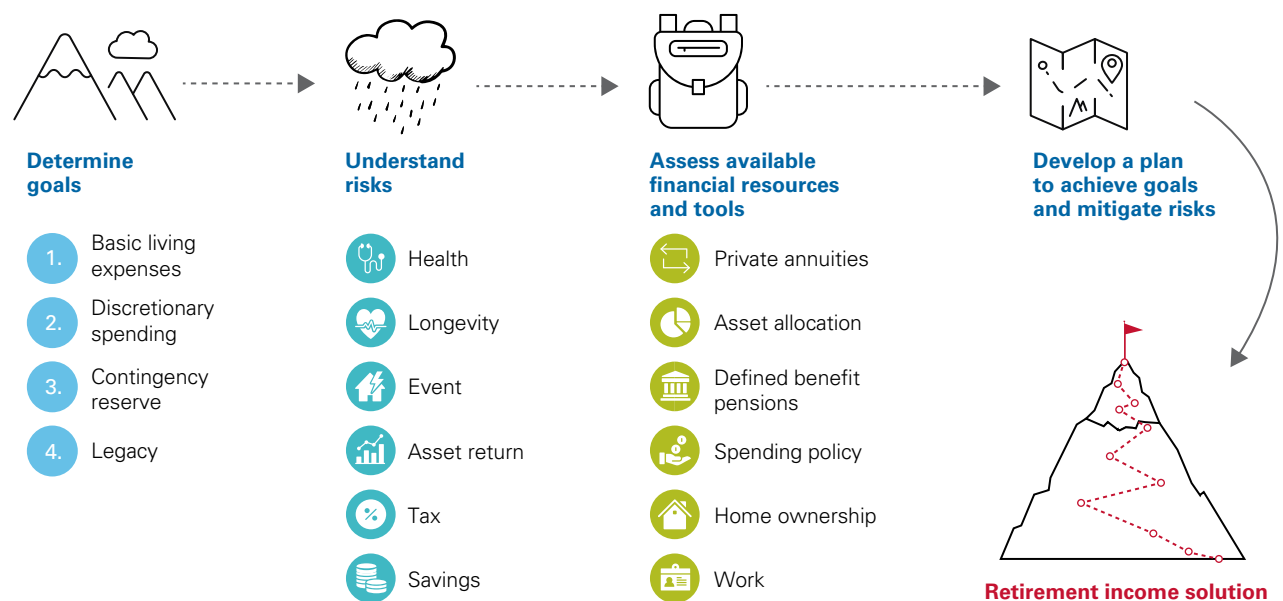
The asset allocation guidance embedded in TDFs integrates a limited number of these goals, risks, and resources. TDFs aim to replace a reasonable percentage of pre-retirement income. They model just two risks, asset return uncertainty and longevity risk. And they rely on a single tool, asset allocation, to manage these risks.

A retirement planning framework that incorporates more risks and tools can produce advice better tailored to a wider range of investor goals. A key implication of Vanguard's retirement planning framework is that there is no single "retirement income solution." There are many. And they exist along a spectrum.

At one end is a typical TDF designed to meet what is the most important goal for the largest number of investors: replacing a portion of pre-retirement income. TDFs' ease of use and their basis in lifecycle investing principles make them ideal in settings such as employer-sponsored plans (Donaldson et al., 2019). In these settings, an investment manager has limited insight into participants' goals and circumstances.

At the other end of the spectrum is personalized advice. Here, an advisor evaluates the client's unique goals, risks, and resources to develop personalized spending, asset allocation, and tax-planning strategies.

Figure 1. Differences in goals, degrees of susceptibility to risk, and access to tools mean there's no single retirement income solution for all investors



Source: Vanguard.

The case for having more than one income fund in a TDF series

We use Vanguard's retirement planning framework and a portfolio construction engine, the Vanguard Lifecycle Model (VLCM) (Aliaga-Díaz et al., 2021), to demonstrate that a second post-retirement allocation in a TDF series could enhance outcomes for TDF investors with the willingness and means to pursue goals beyond income replacement. This second fund could help investors tailor their portfolio to their goals to a degree that sits in between the single-goal, single-fund end of the retirement planning spectrum and personalized advice.

Today, TDF selection depends in large part on the expected retirement date. We would ask two more questions as workers approach retirement. What are your retirement-spending goals? What resources do you have to meet those goals? Adding these two questions preserves most of a TDF's simplicity and scalability, while gathering enough information to develop portfolios consistent with a broader range of retirement goals.

We use the VLCM to translate these answers into TDF glide paths with different terminal asset allocations. (We detail the model inputs in **Appendix 7**.) We then examine how the interaction of different goals and different investor resources shapes the glide path. First, a description of the three main investor goals and what they entail:

- **Maintaining lifestyle** is consistent with the aim of most TDF series: to help clients replace a reasonable portion of their pre-retirement income. In our modeling, we assume that the TDF, combined with Social Security, can help clients replace 86% of their pre-retirement income to cover basic living expenses (assumed to be 70% of pre-retirement income) and some discretionary spending. Clients have a high probability of meeting their basic living expenses, limited capacity to fund discretionary spending, and no plans to leave a legacy.
- **Enhancing lifestyle** calls for a level of retirement spending greater than 86% of pre-retirement income. We assume that clients with this goal can accept more risk in meeting their basic living expenses from the TDF. They would spend 6% of their portfolio's value annually, increasing their spending in line with the Internal Revenue Service's required minimum distribution (RMD) tables from age 83 onward.
- **Leaving a legacy** combines enhancing lifestyle with the desire to leave a bequest. Spending levels are the same as those supported by the "enhance lifestyle" glide path. Again, clients must be willing to accept more risk in meeting their basic living expenses from the TDF. In this simulation, we add a new coefficient to the VLCM utility function used to identify the optimal glide path. This coefficient allows us to assign a higher weight to the satisfaction delivered by a bequest.

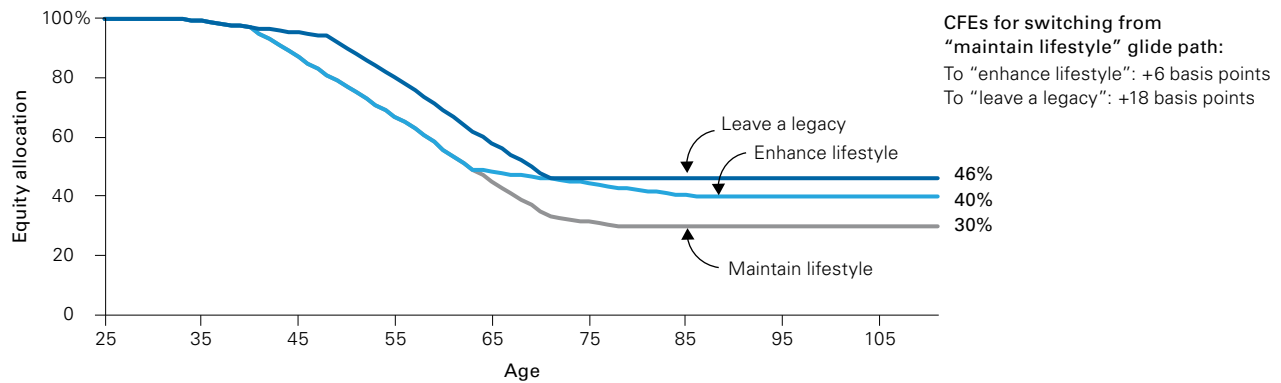
Different glide paths for different goals

From the goals described earlier, we generate three associated glide paths (see **Figure 2**). We also show the certainty fee equivalents (CFEs) relative to the “maintain lifestyle” glide path, our proxy for the postretirement TDF allocations that predominate today.

The CFE is derived from the VLCM’s utility function (see **Appendix 2** for further details about the model). Utility is an abstract concept, used mainly in economics literature. Utility functions allow researchers to compare any two outcomes and determine which one would be most consistent with a client’s goals and preferences.

The CFE translates a utility score associated with a customized glide path into basis points. A reasonable interpretation of the CFE is that it is the maximum that an investor would pay to switch from a maintain lifestyle glide path to a new glide path. The higher the CFE, the greater the benefit of switching. (Note that these glide paths assume no change in risk aversion among those who choose to pursue more ambitious spending goals. A reduction in risk aversion would yield materially higher equity allocations.)

Figure 2. Higher spending goals lead to higher equity allocations in retirement



Notes: Analysis is based on the VLCM and VCMM. See appendixes for more detail. The CFE is derived from the VLCM’s utility function (see Appendix 2).
Source: Vanguard.

Three client groups

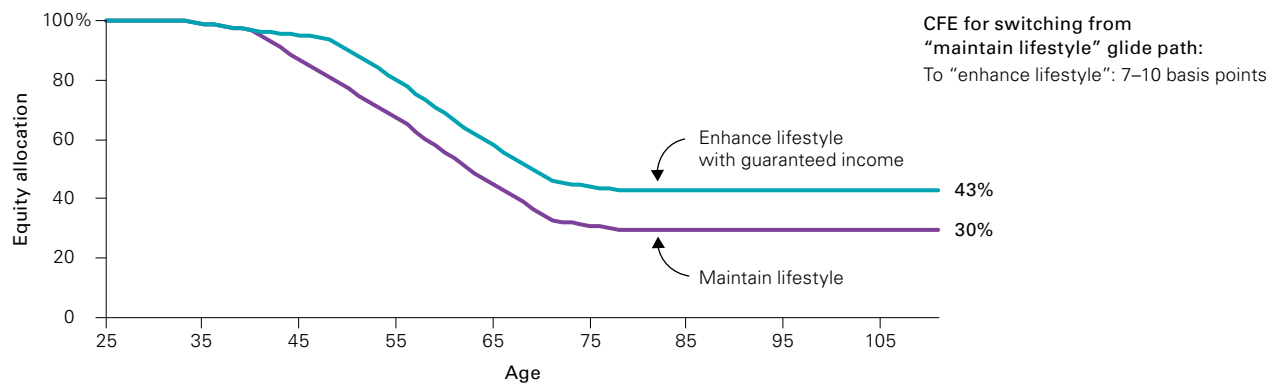
What kind of clients might accept a higher risk of not meeting basic living expenses in exchange for the probability of being able to spend more throughout retirement? We identify three hypothetical groups. We then use the VLCM to explore how the interaction of goals and the resources available to these groups shapes the optimal asset allocation for a glide path that would suit them. The three groups:

1. TDF investors who feel confident that they can meet basic living expenses with a combination of Social Security and guaranteed income such as a DB pension or annuity.
2. Participants approaching retirement (age 55 or so) who recognize that they have more than enough assets to cover basic living expenses in most market environments.
3. Participants who combine the characteristics of the first two groups. They can rely on guarantees beyond Social Security and have enjoyed strong investment performance during their accumulation years.

Figure 3 shows the glide path suitable for the first group, those who can rely on guaranteed income to meet most of their basic living expenses. A guaranteed income limits the number of VLCM simulations in which income falls below 70% of pre-retirement income, nudging the equity landing point to 43%. This higher equity allocation gives the investor a better chance of meeting more ambitious spending goals. Our CFE estimate suggests that investors who can rely on guarantees and hope to enhance their lifestyles in retirement would pay 7 to 10 basis points per year to shift from the maintain lifestyle glide path to the enhance lifestyle glide path.

As fewer workers participate in DB plans, guarantees are less common. But they remain important. At the end of 2019, 29% of households had both DB plans and other retirement assets such as a DC plan or an IRA. Annuities accounted for 7.1% of household retirement assets (Investment Company Institute, 2021). These figures suggest that a sizable group of retirees can cover basic living expenses with guarantees. Their TDF assets could be used to pursue more ambitious spending goals.

Figure 3. Having guaranteed income leads to a higher equity allocation in retirement



Notes: For modelling purposes, *guaranteed income* is defined as having 10% of target income or 20% of portfolio assets allocated to a single premium immediate annuity at age 65. Analysis is based on the VLCM and VCMM. See appendixes for more detail. The CFE is derived from the VLCM’s utility function (see Appendix 2).

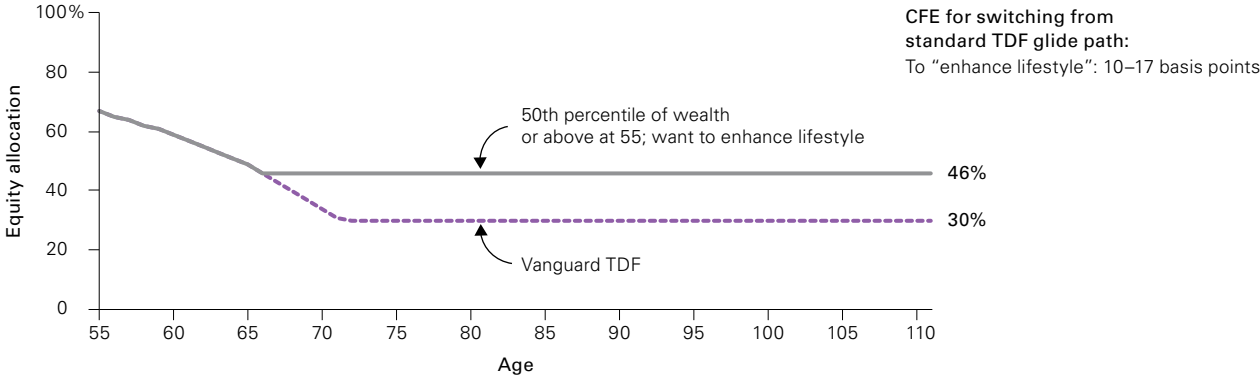
Source: Vanguard.

Our second group is those who have accumulated more than enough to limit the risk of meeting basic living expenses in most market environments. These investors first enrolled in a TDF in their 20s. At that time, the TDF glide path reflected uncertainty about prospective asset returns and what these accounts would be worth in 30 years. This glide path contemplated, first, the possibility that stock market returns would be poor during the accumulation years and, second, that this possibility would limit an investor’s capacity to accept market risk in retirement. Some 30 years later, the uncertainty is gone. At age 55 or 60, investors know what their accounts are worth.

We use the VLCM to create a second glide path at age 55. This enhance lifestyle glide path is informed by the better-than-median level of wealth already accumulated. We stitch the glide path created at age 25, when the investor was uncertain about how much wealth he or she would accumulate over the next 30 years, to a new glide path created at age 55, when age-55 wealth is known. This stitching leads to a higher equity allocation, with a higher probability of supporting more ambitious retirement-spending goals. Our CFE estimate suggests that this group of investors would pay 10 basis points or more per year to switch to this new glide path.

In **Figure 4**, we model glide-path changes for investors who have benefited from favorable investment returns during their accumulation years. Their age-55 wealth puts them at or above the 50th percentile of wealth levels that, some 30 years ago, had been simulated from age 25 to 55.

Figure 4. Investors who fared well in their accumulation years can choose to take on more risk to pursue a greater number of retirement goals

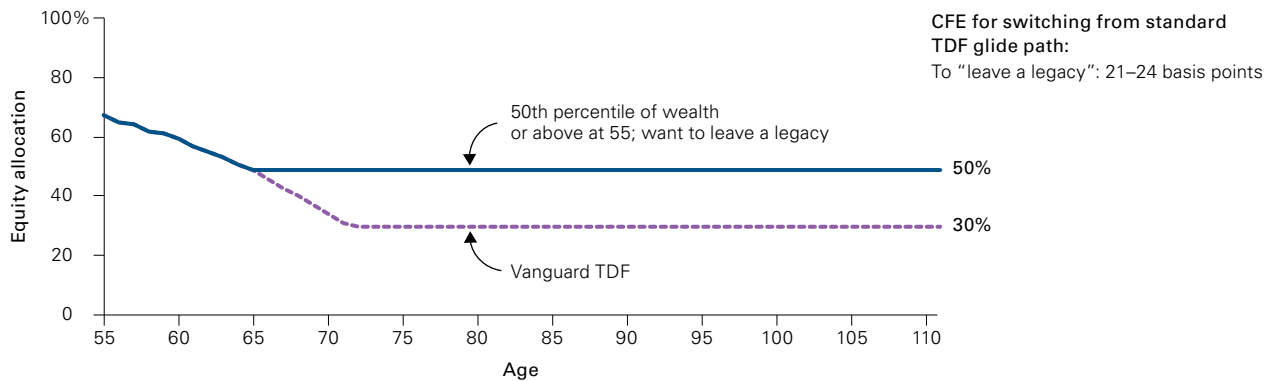


Notes: Analysis is based on the VLCM and VCMM. See appendixes for more detail. The CFE is derived from the VLCM’s utility function (see Appendix 2). Source: Vanguard.

Our third group represents clients who can cover most of their basic living expenses with guaranteed income, have accumulated wealth that puts them at or above the VLCM simulation's 50th percentile, and wish to pursue more ambitious spending goals, including leaving a bequest to family or charity.

Figure 5 shows that having this combination of goals and resources leads to a retirement equity allocation of 50%. Investors with this combination of goals and circumstances may be willing to pay 21 basis points or more per year to switch from a maintain lifestyle glide path to this alternative.

Figure 5. Having certain wealth facilitates greater risk-taking to pursue a greater number of retirement goals



Notes: Analysis is based on the VLCM and VCMM. See appendixes for more detail. The CFE is derived from the VLCM's utility function (see Appendix 2).
Source: Vanguard.

In **Figure 6**, we summarize the interaction among goals, client groups, and postretirement asset allocations. This figure can serve as a guide to postretirement asset allocations that would be most appropriate for different participant populations. The most important observation, however, is that the shift from “maintain lifestyle” to

other retirement spending goals is more consequential than the allocation differences among the additional goals. The first shift results in a 13-percentage-point increase in postretirement equity allocation and captures much of the benefit produced by additional refinements.

Figure 6. The biggest shift in equity allocation comes from the shift from maintaining to enhancing lifestyle

Clients who . . .	Optimal post-retirement equity allocation
Want to maintain lifestyle; will rely on portfolio to meet basic spending needs	30%
Want to enhance lifestyle; have enough guaranteed income to meet basic spending needs	43%
Want to enhance lifestyle; have accumulated enough assets to limit the risk of not meeting basic spending needs	46%
Want to enhance lifestyle and leave a legacy; have accumulated enough assets and benefit from guaranteed income	50%

Note: The percentages given represent the optimal equity allocation for select combinations of client circumstances and goals. These allocations are derived from the VLCM and VCMM. See appendixes for more detail.

Source: Vanguard.

Conclusion

TDFs have revolutionized the U.S. retirement system. In 2008, these portfolios accounted for 7% of the assets in DC plans. Today, that figure is 27% and rising. TDFs address a challenge facing many investors: constructing and managing a portfolio that can help them achieve a secure retirement.

Once an investor selects an expected retirement date, the TDF manager assumes responsibility for portfolio construction and ongoing lifecycle rebalancing. Today, TDFs generally assume a single investor goal: to replace a reasonable portion of pre-retirement income.

We use a retirement planning framework to show that adding a second postretirement asset allocation to a TDF series could support additional retirement goals for those with the resources and desire to pursue them. Such an addition would increase the value of a TDF series to its investors while preserving the simplicity that has made these vehicles a pillar of the U.S. retirement system.

References

- Aliaga-Díaz, Roger, Harshdeep Ahluwalia, Victor Zhu, Scott Donaldson, Ankul Daga, and David Pakula, 2021. *Vanguard's Life-Cycle Model (VLCM): A General Portfolio Framework for Goals-Based Investing*. Valley Forge, Pa.: The Vanguard Group.
- Alling, Brian T., Jeffrey W. Clark, and David Stinnett, 2020. *How America Saves 2020*. Valley Forge, Pa.: The Vanguard Group.
- Donaldson, Scott J., Francis M. Kinniry Jr., Brian J. Scott, Ted Dinucci, and Edoardo Cilla, 2019. *Vanguard's Approach to Target-Date Funds*. Valley Forge, Pa.: The Vanguard Group.
- Holley, Hana, 2006. *Retirement Planning Survey Among U.S. Adults Age 40 and Older*. Washington, D.C.: AARP.
- Investment Company Institute, 2021. *2021 Investment Company Fact Book: A Review of Trends and Activities in the Investment Company Industry*; available at https://www.icifactbook.org/?utm_medium=banner&utm_source=display&utm_campaign=factbook&utm_term=fb2021&utm_content=bannerlink.
- Jaconetti, Colleen, Jonathan Kahler, Kelly McShane, and Nathan Zahm, 2021. *Vanguard's Roadmap to Financial Security: A Framework for Decision-Making in Retirement*. Valley Forge, Pa.: The Vanguard Group.

Appendix 1. The Vanguard Capital Markets Model

IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use and over time.

The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM. More important, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

The VCMM is a proprietary financial simulation tool developed and maintained by Vanguard's Investment Strategy Group. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the Vanguard Capital Markets Model is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.

Appendix 2. The Vanguard Lifecycle Model

The Vanguard Lifecycle Model (VLCM) is designed to identify the product design that represents the best investment solution for a theoretical, representative investor who uses the target-date funds to accumulate wealth for retirement. The VLCM generates an optimal custom glide path for a participant population by assessing the trade-offs between the expected (median) wealth accumulation and the uncertainty about that wealth outcome, for thousands of potential glide paths. The VLCM does this by combining two set of inputs: the asset class return projections from the VCMM and the average characteristics of the participant population. Along with the optimal custom glide path, the VLCM generates a wide range of portfolio metrics such as a distribution of potential wealth accumulation outcomes, risk and return distributions for the asset allocation, and probability of ruin, such as the odds of participants depleting their wealth by age 95.

The VLCM inherits the distributional forecasting framework of the VCMM and applies to it the calculation of wealth outcomes from any given portfolio.

The most impactful drivers of glide-path changes within the VLCM tend to be risk aversion, the presence of a defined benefit plan, retirement age, savings rate and starting compensation. The VLCM chooses among glide paths by scoring them according to the utility function described and choosing the one with the highest score. The VLCM does not optimize the levels of spending and contribution rates. Rather, the VLCM optimizes the glide path for a given customizable level of spending, growth rate of contributions and other plan sponsor characteristics.

A full dynamic stochastic life-cycle model, including optimization of a savings strategy and dynamic spending in retirement is beyond the scope of this framework.

Appendix 3. Rational objective function for retirement goal

The main principle behind the Vanguard Life Cycle Model (VLCM) is to maximize expected lifetime utility (or derived value) of consumption and wealth, $\overline{U}_{Rational}$, given by:

$$\overline{U}_{Rational} = U_{66} + U_{67} + \dots + U_{119}$$

The utility function used is constant relative risk aversion (CRRA):

$$U(X) = \frac{X^{(1-\gamma)}}{1-\gamma}$$

where X is the outcome from which investors derive satisfaction (in this case, the consumption they receive during their lifetimes and the bequest(s) when they pass away).

In other words, lifetime utility is the sum of utility scores of consumption and terminal wealth at each age postretirement. More specifically, each year utility is received from consumption if the investor is alive, or from a hypothetical bequest if the investor is no longer alive. The model calculates each year's utility as the mortality probability-weighted utility across the full distribution of VCM simulation.

Additionally, periodic consumption is the sum of consumption from the portfolio, consumption from social security payments, consumption from defined benefit plan payments, and income from external sources like rental income, if applicable. Rational objective function at time t is below:

$$U_t = \beta^{t-65} S_{t-1} [P_t E[U(C_{pt,t} + C_{ss,t} + C_{DB,t} + C_{El,t})]] + (1-P_t) \theta E[U(W_{t-1} * (1 + R_{t-1}))]$$

Where:
$$\beta = \frac{1}{(1+r)}$$

β = investor's time preference (a behavioral preference; see Appendix 4)

r = investor's subjective discount factor parameter

P_t = the conditional probability of survival to the end of period t

S_t = the probability of survival to the end of period t

θ = importance of bequest for the investor

$C_{pt,t}$ = consumption from the portfolio during year t

$C_{SS,t}$ = consumption from Social Security payments during year t

$C_{DB,t}$ = consumption from defined benefit plan payments during year t

$C_{El,t}$ = consumption from external income payments during year t

W_{t-1} = portfolio wealth during year $t-1$

R_{t-1} = return from portfolio during year $t-1$

Appendix 4. Behavioral component: Income shortfall aversion

Income shortfall aversion captures the pain felt by investors when their income falls below a certain threshold. Utility functions can be modified to accommodate such preferences, by overweighting the lower utility outcomes when consumption is below a target, thus avoiding solutions that are likely to fall short of the expected consumption targets. In other words, income shortfall aversion introduces a kink in the utility function.

In the case of the retirement goal, the threshold is applied to the replacement ratio, which is the percentage of ending salary needed to be replaced by Social Security, or other forms of income. This, in effect, represents the client's basic standard of living need. Any drop below that standard of living will warrant a large drop in utility for these investors. The calculation occurs across the full range of VCMM market return forecasts. Thus income shortfall aversion is embedded in the rational objective function A2 and A3.

$$E^*[U(C_i)] = \frac{\sum_{i=1}^n A(U(C_i))}{\sum_{i=1}^n A}$$

Where:

$$A = \begin{cases} (1 - \alpha), & \text{if } C_i \geq \bar{C} \\ \alpha, & \text{if } C_i < \bar{C} \end{cases}$$

C = actual periodic consumption

\bar{C} = spending threshold for shortfall aversion

α = shortfall loss aversion parameter

U = CRRA utility function

i = forecasted path of market returns out of 10,000 simulations

Appendix 5. Behavioral component: Myopic loss aversion

Myopic loss aversion, another behavioral preference, is incorporated into the VLCM as a separate objective within the objective function. In addition to being risk averse, investors are also disproportionately sensitive to losses. For instance, the pain of past financial loss is much stronger than the satisfaction gained from profit of similar magnitude. In other words, the utility function applies a greater weight for losses the higher the myopic loss aversion. α is the myopic loss aversion parameter, and a range between 0.5 and 1.0 implies there is no loss aversion. Therefore, myopic loss aversion causes the VLCM to prefer investment stability over investment volatility. Assuming an evaluation period of one year (t):

$$E(v_t) = \frac{\sum_{i=1}^n A(U(1 + R_{t-1}))}{\sum_{i=1}^n A}$$

Where:

$$A = \begin{cases} (1 - \alpha), & \text{if } R_{t-1} \geq 0 \\ \alpha, & \text{if } R_{t-1} < 0 \end{cases}$$

v_t = utility of stability objective in year t

R_{t-1} = portfolio return during year $t - 1$

α = loss aversion coefficient ≥ 1

Appendix 6. Putting it all together

The rational and myopic loss aversion objective are combined by weighting the utilities of each objectives in a fixed proportion. At the heart of the VLCM, the most optimal glide path will be the one that maximizes the following equation:

$$CE(U_{Total}) = 92.5\% * CE(U_{Rational}) + 7.5\% * CE(U_{Myopic})$$

CE = certainty equivalent

The VLCM checks the expected utility score for thousands of potential glide paths. The glide path that maximizes utility, based on the above questions, is optimal for that specific investor.

Appendix 7. VLCM inputs for glide-path simulations

The tables below highlight the inputs used in creating the glide-path simulations.

VLCM Inputs	
Starting age	25
Retirement age	65
Starting salary	\$26,600
Contribution rate	7% to 13% over time
Social Security	47% of final salary
Defined benefit pension	0% and 10% of target income
Annuitization	20% of wealth at age 65
Risk aversion	12
Myopic loss aversion (balance stability)	0.925 = moderate aversion to short-term losses

Investor goals	Spending rule	Spending level	Income shortfall aversion
Maintain lifestyle	Fixed dollar	86% of final salary	None
Enhance lifestyle	Required minimum distribution (RMD)	Maximum (6% of portfolio or RMD)	Yes
Leave a legacy	Required minimum distribution (RMD)	Maximum (6% of portfolio or RMD)	Yes

Connect with Vanguard® > [vanguard.com](https://www.vanguard.com)

For more information about Vanguard funds, visit [vanguard.com](https://www.vanguard.com) or call 800-662-2739 to obtain a prospectus or, if available, a summary prospectus. Investment objectives, risks, charges, expenses, and other important information about a fund are contained in the prospectus; read and consider it carefully before investing.

CFA® is a registered trademark owned by CFA Institute.

Vanguard®

© 2021 The Vanguard Group, Inc.
All rights reserved.
Vanguard Marketing Corporation, Distributor.

ISGFTTD 082021