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Target-date strategies and advice

The impact of saving and spending differences

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In this paper we examine the ways advice adds value through personalization for different saving and spending behaviors.

Our research shows that the impact of the portfolio personalization, goal setting, and financial planning dimensions of advice for participants who save more—and those who save less—than the baseline assumptions for self-directed (target-date fund) participants can be meaningful.

A look at expected participant behavior

To identify participant behavior that differs from that of the broad population, we define a baseline set of measures that drive retirement outcomes. That baseline includes participant saving and spending rates—components that heavily influence retirement readiness and are, in large part, within participants' control. Participants may have very different priorities and retirement lifestyle goals, from replacing a reasonable portion of pre-retirement income to pursuing an enhanced lifestyle with greater spending, or even leaving a bequest to heirs. Their goals and priorities could influence their total saving rate, a key element in determining sufficient retirement wealth accumulation.

As mentioned in our earlier research, most target-date investments are constructed with a generalized participant demographic in mind. Vanguard Target Retirement Funds, for example, assume the average investor saves between 8.8% and 12.0% of their salary over the course of their working years (ages 25 to 65). These percentages include participant contributions and employer match.

Most studies suggest planning for between 70% and 85% of pre-retirement income to support annual retirement spending needs.[1] When constructing the Target Retirement Fund and evaluating for retirement income sufficiency, Vanguard assumes a retiree will aim to replace 79% of their ending salary in retirement, with 42% supplied by income from savings and investments and 37% from Social Security benefits.

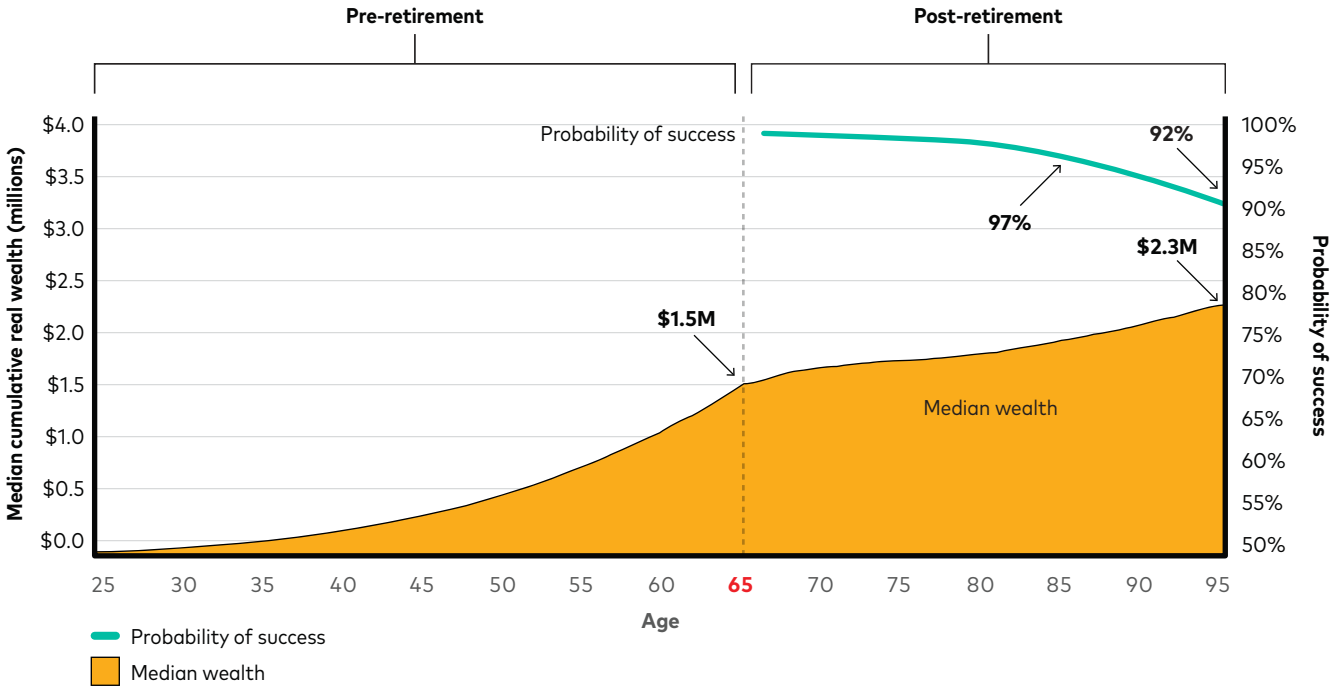
Combining these baseline saving and spending assumptions for a self-directed investor, the hypothetical participant would achieve a 92% probability of success at age 95 **(Figure 1)**. The probability of success in this example is the likelihood a participant meets or exceeds the 79% income replacement ratio with the Vanguard Target Retirement Fund glide path. A self-directed investor could take advantage of the many financial wellness programs and retirement readiness tools offered by their retirement plan to assess whether their current saving and investing behavior, as well as their desired retirement spending level, has them on track to meet their retirement objectives.

In the earlier paper, *Target-Date Strategies and Advice: Behavioral and Portfolio Considerations*, we highlighted the benefit of target-date funds for do-it-yourself investors and the value of advice for participants created through portfolio personalization and/or behavioral coaching. Specifically, using Vanguard's Life-Cycle Investing Model (VLCM),[2] we illustrated how a personalized glide path may benefit participants with risk attitudes meaningfully different than those of the expected baseline target-date fund investor. The two papers continue our exploration of the advice and self-directed decision framework presented in *TDFs or Financial Advice? How About Both?*

[1] GAO (United States Government Accountability Office), 2016. Better Information on Income Replacement Rates Needed to Help Workers Plan for Retirement. Available at https://www.gao.gov/products/GAO-16-242.

[2] The Vanguard Life-Cycle Investing Model, or VLCM, is a utility-based framework that accounts for investor characteristics, preferences, and constraints and incorporates market return projections from the Vanguard Capital Markets Model® (VCMM). It seeks to find an optimal glide path from a pool of potential thousands that best balances portfolio volatility due to market risk with maximizing the probability of achieving retirement spending and wealth goals over the investor's lifetime.

FIGURE 1. Baseline participant's median cumulative real wealth and probability of meeting retirement spending needs



Source: Vanguard.

Notes: Analysis results are based on the Vanguard Life-Cycle Investing Model (VLCM) using 10,000 steady-state simulations from the Vanguard Capital Markets Model (VCMM) based on market data and other information available as of December 31, 2023. Retirement spending sufficiency is based on a 79% replacement ratio of pre-retirement ending salary. Ending salary is assumed to be $75,000. Real wealth is 50th percentile of distribution of cumulative inflation-adjusted portfolio wealth across 10,000 simulations that accounts for portfolio returns, pre-retirement contributions, and post-retirement spending. **IMPORTANT: The projections and other information generated by the VCMM 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 VCMM are derived from 10,000 simulations for each modeled asset class. Simulations as of December 31, 2022, and December 31, 2023. Results from the model may vary with each use and over time. For more information, please see Appendix II.**

When participants overachieve: Even model retirement planners can benefit from advice

It can be comforting for participants to know that if they save consistently and diligently for 40 years, invest wisely with a thoughtfully constructed target-date fund, and then exercise prudence in spending in retirement, they stand an excellent chance of a successful retirement outcome.

Additionally, our research finds that—perhaps surprisingly—advice can add value for two disparate participant populations: one where participants saved well and spent below their means during their working years and one where participants chose not to save more and spent more than they should have.

Let's look at the advice options and resulting value for a retirement saver who consistently demonstrates a higher saving rate and plans to spend below the presumed levels in retirement.

Consider the hypothetical participant (Participant A) who, compared with the baseline participant who saves 8.8%–12.0% over their working career, saves an extra 4 percentage points every year. Further, imagine Participant A adheres to the mantra "Live below your means" and has a lower retirement spending goal, enabling them to meet their needs with only a 60% income replacement ratio, nearly 20 percentage points less than the baseline assumption.

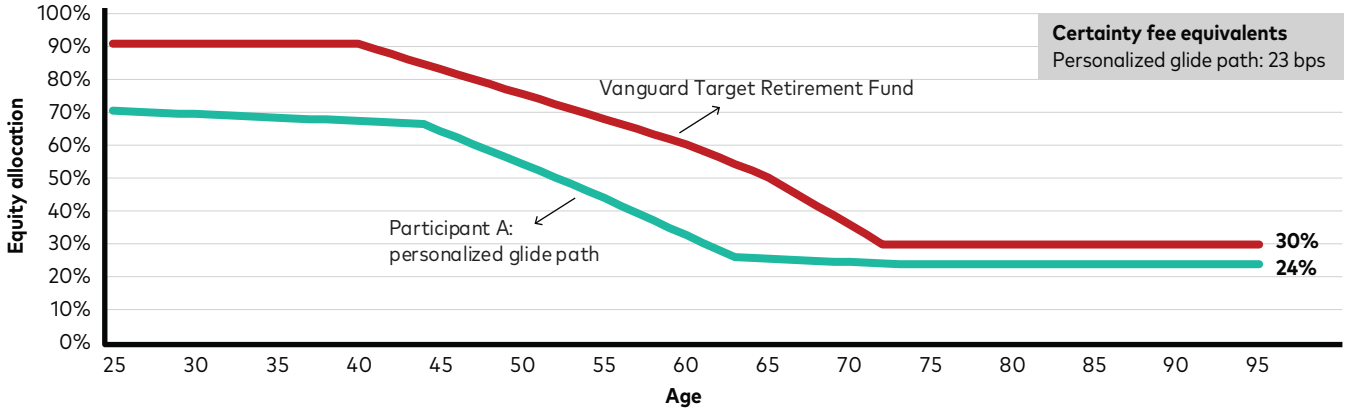
The greater wealth accumulation from healthy saving, combined with the lower spending goal, results in a 100% probability of success at age 95 (8 percentage points greater than baseline). Participant A has done an outstanding job preparing for retirement on their own as a self-directed investor, *and* advice can still help them improve their outcomes through personalized portfolio construction and goal planning.

Below we present three potential advice interventions that could offer portfolio and lifestyle options that may increase overall utility (analogous to the value, benefit, or satisfaction received) for Participant A.

Given that Participant A has a retirement outlook that shows a 100% probability of success at age 95, an advice provider could offer a personalized glide path that results in a lower equity exposure relative to the self-directed target-date fund glide path **(Figure 2a)**. Participant A can achieve an equally high 100% probability of success at age 95 while also lessening portfolio return volatility and downside risk **(Figure 2b)**.

FIGURE 2a-2b. Optimized glide path and portfolio risk for Participant A

2a. Personalized glide path for Participant A



2b. Portfolio volatility and maximum drawdown before and after retirement for Participant A

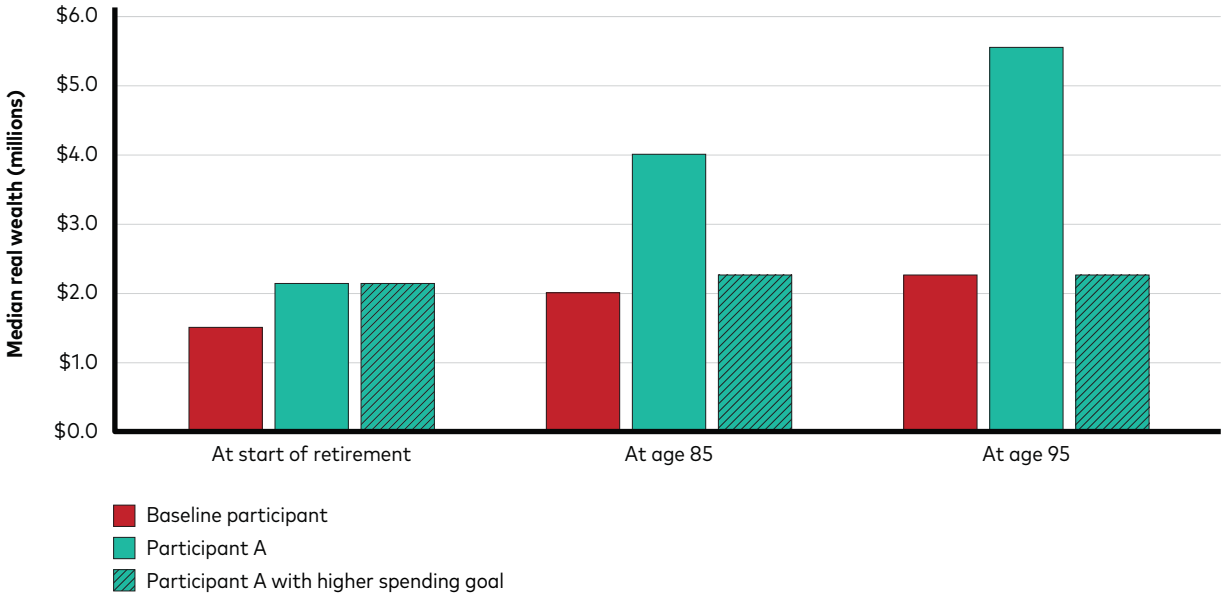
Source: Vanguard.

Notes: Analysis results are based on the VLCM using 10,000 steady-state VCMM simulations based on market data and other information available as of December 31, 2022, and December 31, 2023. Participant A's beginning and ending saving contribution is assumed to be 12.8% and 16.0%, respectively. Participant A's retirement spending sufficiency is based on a 60% replacement ratio of pre-retirement ending salary. Ending salary is assumed to be $75,000. Maximum drawdown is distribution of largest peak-to-trough cumulative portfolio return decline in the stated period across 10,000 simulations. Portfolio volatility is distribution of standard deviation of portfolio returns in the stated period across 10,000 simulations.

This gained "efficiency" is captured in the significant 23 basis points of the certainty fee equivalent (CFE), which quantifies the additional value that a personalized glide path brings over the baseline target-date glide path.[3]

Beyond glide-path personalization, a second option exists: Participant A could work with an advisor to evaluate legacy and spending goals, as shown in **Figure 3**. Saving more and spending less would accumulate approximately $3.3 million more median (expected) wealth by age 95 than the baseline participant, which could support a legacy goal such as charitable bequests. Alternatively, Participant A could use this projected excess wealth to enhance their retirement lifestyle. They could nearly double their retirement spending while maintaining a similar level of post-consumption accumulated wealth. It's important to keep in mind, however, that larger spending withdrawals can come with risks such as longevity (Participant A lives to age 100 or 105, potentially outliving their savings) and sequence of return (the portfolio suffers severe negative markets at the beginning of Participant A's retirement).

FIGURE 3. Median expected real wealth for Participant A compared with baseline participant



Source: Vanguard.

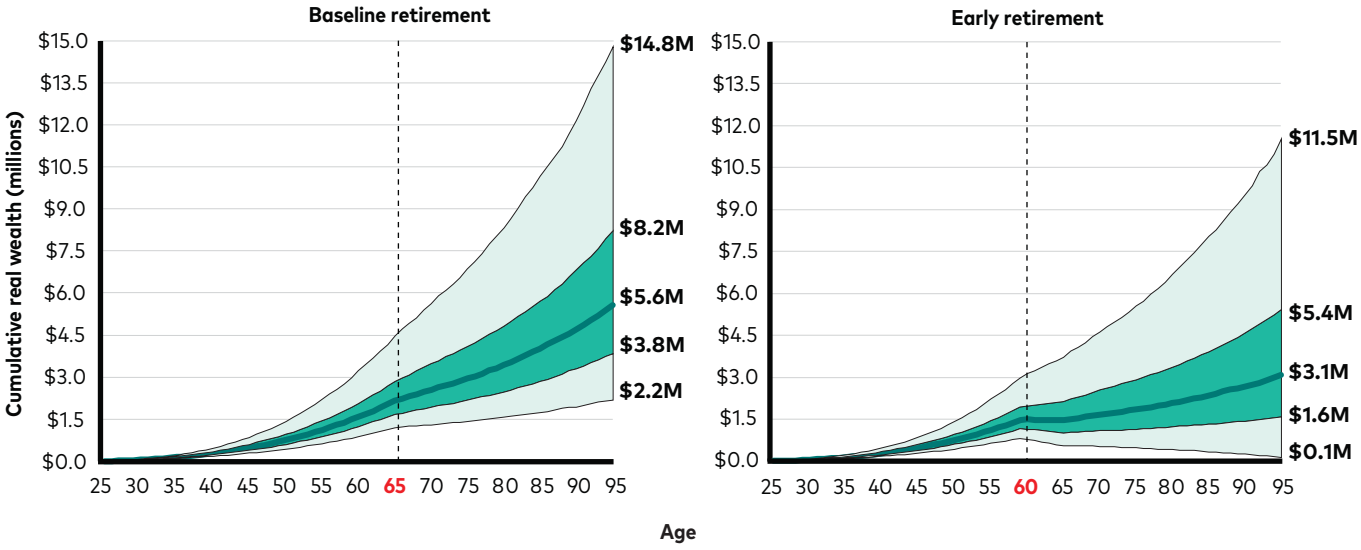
Notes: Analysis results are based on the VLCM using 10,000 steady-state VCMM simulations based on market data and other information available as of December 31, 2023. Baseline Participant is represented by Vanguard Target Retirement Fund assumptions and assumes beginning and ending saving contribution of 8.8% and 12.0 % respectively, with retirement spending sufficiency based on a 79% replacement ratio of pre-retirement ending salary. Participant A assumes beginning and ending savings contribution of 12.8% and 16.0%, respectively, with retirement spending sufficiency based on a 60% replacement ratio of pre-retirement ending salary. Participant A with higher spending goal has a retirement spending sufficiency based on a 110% replacement ratio of pre-retirement ending salary. Ending salary is assumed to be $75,000. Real wealth is 50th percentile of distribution of cumulative inflation-adjusted portfolio wealth across 10,000 simulations that accounts for portfolio returns, pre-retirement contributions, and post-retirement spending.

[3] A certainty fee equivalent, or CFE, is a metric quantifying the improvements in a participant's consumption, wealth, and portfolio stability as units of return. It can also be thought of as the additional annual fee a participant is willing to pay to be on a personalized glide path over a reference glide path, such as a traditional TDF. The higher the CFE, the greater the potential excess value or benefit of personalization.

Lastly, if higher spending is not a fit for Participant A, an advisor could help them evaluate another option afforded by greater wealth savings and lower targeted spending, that is, enjoying retirement five years earlier at age 60 compared with baseline participants.[4] Despite beginning their retirement drawdown with less wealth because of fewer years of saving (35 years instead of 40 years) and using more of their wealth sooner than the baseline participant, Participant A would likely still have assets at age 95 **(Figure 4)**. Success in this scenario is also reflected in their probability of success at age 95, which remains high at 95%.

Thus, we can see that Participant A has planning options they can explore with the assistance of a trusted advisor because of their saving and spending discipline. Participant A's overall satisfaction could be enhanced through any one of the choices, designed and customized to suit their preferences. But what about participants who haven't demonstrated such strong saving habits and may have higher spending needs or goals? Let's see how personalization and advice could help them.

FIGURE 4. Cumulative real wealth for Participant A in baseline and early retirement scenarios



Source: Vanguard.

Notes: Analysis results are based on the VLCM using 10,000 steady-state VCMM simulations based on market data and other information available as of December 31, 2023. Participant A assumes beginning and ending savings saving contribution of 12.8% and 16.0%, respectively, with retirement spending sufficiency based on a 60% replacement ratio of pre-retirement ending salary. Ending salary is assumed to be $75,000. For baseline retirement, Participant A's retirement spending and Social Security withdrawal are both assumed to begin at age 65. For early retirement, retirement spending is assumed to start at age 60, but timing of Social Security withdrawal is assumed to remain the same. Real wealth is distribution of cumulative inflation-adjusted portfolio wealth across 10,000 simulations that accounts for portfolio returns, pre-retirement contributions, and post-retirement spending. The percentiles for the distribution represent the 5, 25, 50, 75, and 95 percentiles.

[4] Social Security withdrawal age is assumed to stay the same as that of baseline participants. Only portfolio withdrawals are assumed to begin earlier to meet retirement spending needs.

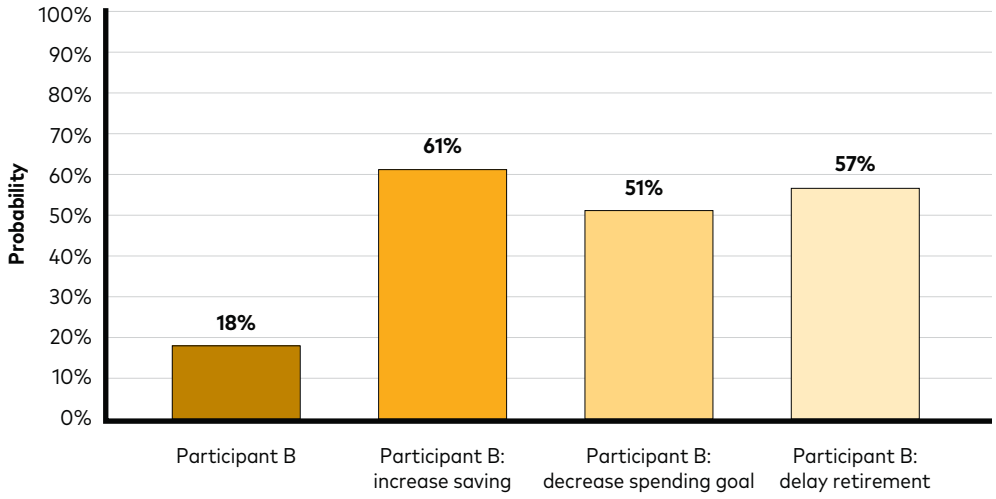
When participants fall short: Advice is critical in salvaging retirement success for the ill-prepared

Sometimes, despite reminders to save and to spend below one's means, a participant is unable to consistently save at recommended levels and/or unable to limit spending in retirement. What options exist for a participant who consistently demonstrates a lower saving rate and spends above the recommended levels in retirement?

Let's consider another hypothetical participant (Participant B), who, in contrast to Participant A and compared with the baseline participant who is presumed to save between 8.8% and 12.0% while working, instead saves 4 percentage points less every year. Further, assume that Participant B also spends lavishly and wants a higher retirement spending goal. Participant B seeks to maintain their full pre-retirement spending levels in retirement, living with a 100% replacement ratio, which is more than 20 percentage points higher than the baseline assumption. The lower wealth accumulation from saving less and the higher spending goal lead to a large income shortfall, resulting in a probability of success of just 18% at age 95, a full 74 percentage points lower than baseline **(Figure 5)**. While additional risk-taking through a personalized glide path could help in certain situations, Participant B's extremely low success rate cannot materially improve without other actions to close this gap.

Below we present three potential financial planning interventions that may make tangible improvement in expected retirement success for Participant B. Because total savings represents a key element in determining sufficient retirement wealth accumulation, one possible strategy for an advisor would be to attempt to convince Participant B to increase saving, bringing them closer to that of baseline participants. Successfully doing so would result in an additional $620,000 in median expected wealth at the start of retirement **(Figure 6)** and close some of the gap by increasing Participant B's probability of success at age 95 from 18% to 61%.

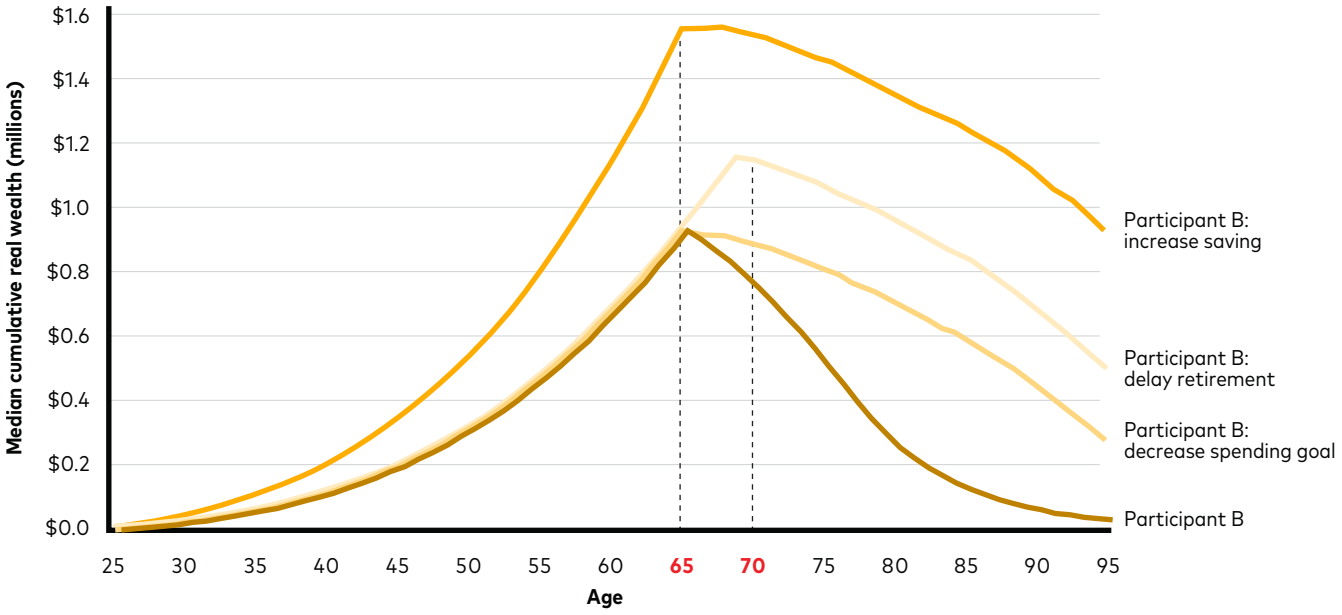
FIGURE 5. Probability of Participant B meeting retirement spending needs at age 95



Source: Vanguard.

Notes: Analysis results are based on the VLCM using 10,000 steady-state VCMM simulations based on market data and other information available as of December 31, 2023. Participant B assumes beginning and ending savings contribution of 4.8% and 8.0%, respectively, with retirement spending sufficiency based on a 100% replacement ratio of pre-retirement ending salary. Both retirement spending and Social Security withdrawal are assumed to begin at age 65, with a Social Security benefits ratio of 37% of pre-retirement ending salary. For Participant B with increased saving, beginning and ending savings contribution is assumed to be 8.8% and 12.0%, respectively. For Participant B with decreased spending goal, retirement spending sufficiency is based on a 79% replacement ratio of pre-retirement ending salary. For Participant B with delayed retirement, both retirement spending and Social Security withdrawal are assumed to start at age 70, with a Social Security benefit ratio of 44% of pre-retirement ending salary. Ending salary is assumed to be $75,000.

FIGURE 6. Median cumulative real wealth for Participant B



Source: Vanguard.

Notes: Analysis results are based on the VLCM using 10,000 steady-state VCMM simulations based on market data and other information available as of December 31, 2023. Participant B assumes beginning and ending savings contribution of 4.8% and 8.0%, respectively, with retirement spending sufficiency based on a 100% replacement ratio of pre-retirement ending salary. Both retirement spending and Social Security withdrawal are assumed to begin at age 65, with a Social Security benefits ratio of 37% of pre-retirement ending salary. For Participant B with increased saving, beginning and ending savings contribution is assumed to be 8.8% and 12.0%, respectively. For Participant B with decreased spending goal, retirement spending sufficiency is based on a 79% replacement ratio of pre-retirement ending salary. For Participant B with delayed retirement, both retirement spending and Social Security withdrawal are assumed to start at age 70, with a Social Security benefit ratio of 44% of pre-retirement ending salary. Ending salary is assumed to be $75,000. Real wealth is 50th percentile of distribution of cumulative inflation-adjusted portfolio wealth across 10,000 simulations that accounts for portfolio returns, pre-retirement contributions, and post-retirement spending.

If Participant B is unwilling or unable to increase saving, a second option is for an advisor to coach Participant B on lowering their post-retirement lifestyle expectations and spending goal to one that more closely aligns to typical retirement spending needs. If Participant B can bring their replacement ratio to the baseline level of 79%, wealth depletion would be significantly slowed during the decumulation phase **(Figure 6)**, narrowing the gap and sharply improving the probability of success at age 95 to 51% **(Figure 5)**.

Lastly, if Participant B is reluctant to adjust either saving or spending behavior, then an advisor could suggest delaying both retirement and Social Security benefits withdrawal until age 70.[5] The advisor could demonstrate that by postponing Social Security to the maximum benefit age of 70, the delayed retirement credits would increase the expected benefit amount, so more of Participant B's retirement spending would be covered by Social Security instead of portfolio assets.

Working longer, in this case by five more years, might increase wealth through additional contributions and return compounding, thus shortening the time where Participant B's retirement savings must fully support spending needs. Both strategies work together to reduce the gap, building an approximate $220,000 cushion at the start of retirement **(Figure 6)** and nearly tripling Participant B's success rate at age 95 to 57% **(Figure 5)**. Keep in mind that a participant may have less control over certain actions such as delaying retirement because of unforeseen life events or specific circumstances related to their employment.

[5] There's no increase to Social Security benefits when withdrawing after age 70.

Of the three advice interventions highlighted for Participant B, increasing the saving rate as early as possible while working would result in the largest material impact on outcome improvement.

We're examining these interventions individually in this paper to better illustrate their impact, but in practice, Participant B could work with their advisor to take a multifaceted and more holistic approach to retirement planning, potentially incorporating multiple strategies simultaneously. With tools and/or models to help evaluate the impact of multiple interventions together, an advisor could add value beyond single strategies by guiding solutions that improve Participant B's probability of a successful retirement.

Opportunities abound for improving participant outcomes

Participants may face a staggering assortment of challenges to achieving a successful retirement outcome. These include evolving personal circumstances; competing priorities; conflicting information found online, in the media, and even among asset managers; changing regulations; and investment innovations.

Whether participants opt to implement their own retirement strategy via a self-directed approach or choose to partner with an advice provider, there are pathways to a successful retirement. Continuing our exploration of the advice and self-directed decision framework, we demonstrated in this paper that participants, whether they find themselves on or off track on their journey toward retirement, can benefit from guidance on portfolio construction, goal setting, and financial planning. For participants who are well on track, an advice provider can help them evaluate risk-taking and see possibilities beyond just maintaining their pre-retirement lifestyle. For participants who are way off track, an advice provider can help them increase their chance of achieving an acceptable retirement outcome.

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Appendix I

Life-cycle assumptions for Vanguard Target Retirement Funds

Input	Assumption	Notes
Starting age	25	—
Horizon age	111	—
Retirement age	65	—
Social Security withdrawal age	65	—
Risk aversion	Moderately conservative	—
Saving rate (as % of salary)	8.8%–12.0%	Saving rate increases over time because of the expectation of saving escalation for retirement plan enrollees as the investor approaches their retirement date.
Starting real salary	$52,000	For investor in the workforce at age 25.
Ending real salary	$75,000	For investor starting at age 25 and retiring at age 65. We add productivity growth and inflation to this over time.
Wage scale	Social Security Administration	—
Average Wage Index		—
Total replacement ratio	79%	For ending salary of $75,000 and saving rate of 15%. Single earner – RR = 79%*
Social Security replacement ratio	37%	Based on real monthly Social Security benefit estimates for ending salary of about $75,000 and saving rate of 15%.
Single earner – SS RR = 37%		—
DB replacement ratio	None (0%)	—
TDF replacement ratio	42%	Total replacement ratio – Social Security replacement ratio – DB replacement ratio
Spending rule	Fixed real dollar with sustainability adjustment	Withdrawal amounts bounded on higher end by replacement ratio and on lower end by determining sustainable withdrawal amount given years of spending the portfolio is expected to support.

***Source:** Lobel, Jaconetti, and Cuff (2019).

Appendix II

Asset returns: Vanguard Capital Markets Model®

IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model (VCMM) 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 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 VCMM 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.

The Vanguard Life-Cycle Investing 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 sets 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, saving 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.

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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 workforce. 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.

Vanguard is responsible only for selecting the underlying funds and periodically rebalancing the holdings of target-date investments. The asset allocations Vanguard has selected for the Target Retirement Funds are based on our 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.

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