

Vanguard Target Retirement Funds and Trusts

Quarterly Review | March 31, 2024



Contents



Quarterly spotlight

Quarterly perspective	3
Vanguard's approach to target-date fund rebalancing	4
About the SAAC	11



TDF industry and market overview

Industry growth and market share	13
Market environment	14



Vanguard fund construction and performance

Purposeful design and evolution	16
Vanguard fund performance and attribution	17



Competitor fund construction and performance

Beyond the glide path	23
12-month return attribution	25



Appendix

Absolute performance results	29
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Quarterly perspective

Constant debate but not constant change

In the first quarter of 2024, global stock markets continued their climb on the back of data showing a resilient economy. U.S. stocks returned 10.00%, and non-U.S. stocks returned 4.32%. Bond markets, on the other hand, faced a more challenging macroeconomic backdrop, with U.S. bonds down -0.79% and non-U.S. bonds performing slightly positive at 0.10% over the quarter. With this backdrop, returns for the Target Retirement Funds were positive across all vintages in the first quarter, with performance ranging from 2.09% for the Income vintage to 6.88% for the 2070 vintage.*

Through our Target Retirement Fund series, we strive to maintain a consistent approach in meeting the needs of our target-date fund (TDF) investors. While this is predominately driven by the purposeful design of the funds' glide path and sub-asset allocation, it also extends to how we approach changes to the series over time. As we have previously expressed, we believe that TDFs require a high bar for change given their use as a qualified default investment alternative (QDIA).

Guided by the governance of the [Strategic Asset Allocation Committee](#), we engage in robust debates on a variety of topics within the target-date space to ensure that any proposed change we make meets the following criteria: a consistent net-of-fees value and a meaningful increase in the

Brian M. Miller, CFA
Senior Investment Specialist



probability of improving an investor's chance of achieving retirement success. In other words, we aim to make changes that are [meaningful and not simply marketing](#). That is why we like to say there is constant debate but not constant change.

An example of this concept in action is the recent enhancements we've made to our TDF rebalancing policies. Vanguard takes a unique approach to TDF rebalancing compared with others in the industry, but our research has shown that this approach can deliver a consistent value-add for our investors by reducing transaction costs. Over time, lower transaction costs can lead to better overall returns and improved investor outcomes.

In this edition of the Quarterly Spotlight, we dive deeper into our rebalancing philosophy and highlight the additional enhancements to our methodology that we believe will result in further transaction cost savings and improved performance measurement.

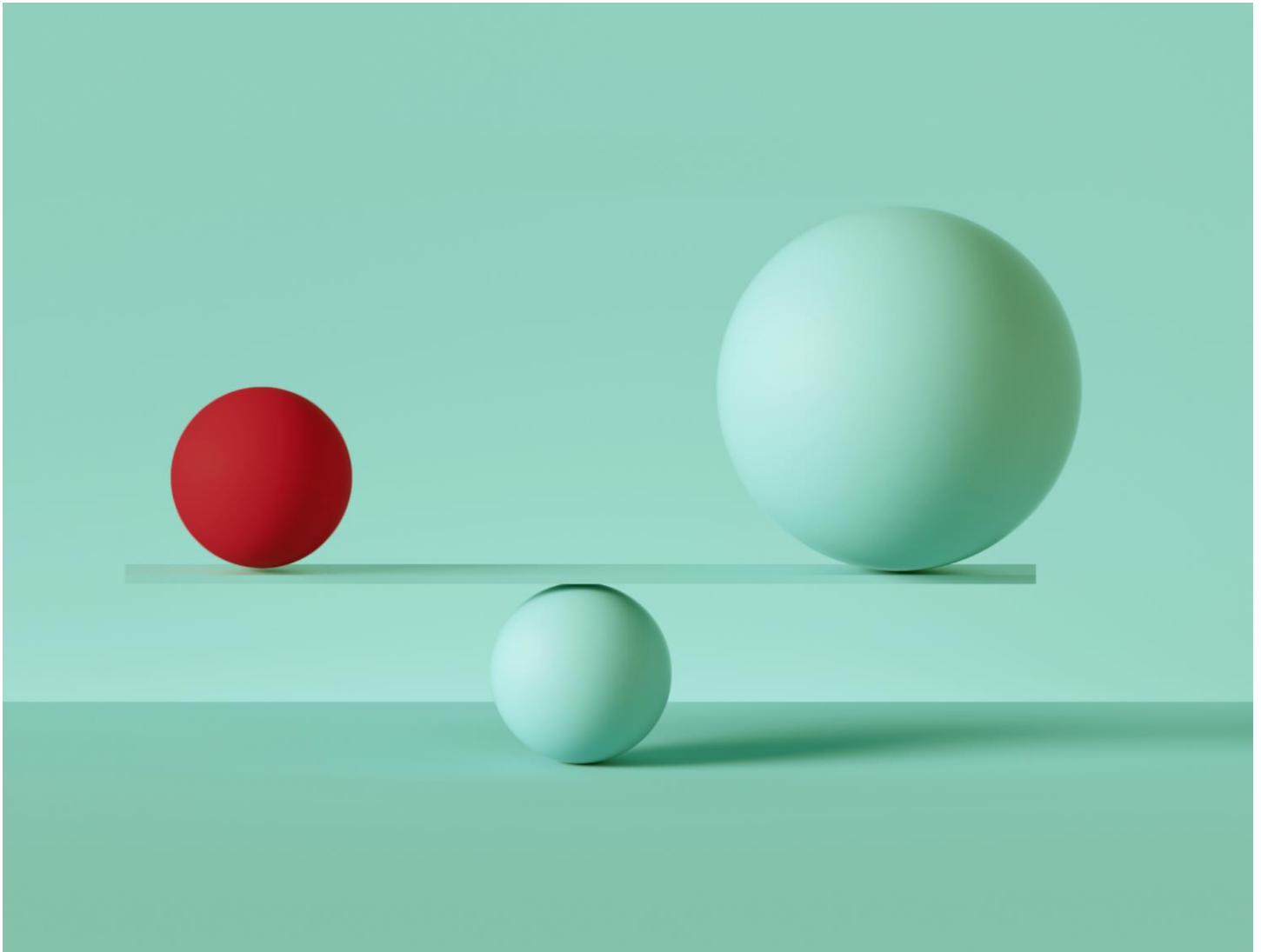
Performance of key Vanguard index funds

Fund name (inception date)	2Q 2023	3Q 2023	4Q 2023	1Q 2024	1-year
Vanguard Total Stock Market Index Fund (07/07/1997)	8.42%	-3.30%	12.17%	10.00%	29.37%
Vanguard Total International Stock Index Fund (11/29/2010)	2.61%	-4.01%	9.98%	4.32%	13.00%
Vanguard Total Bond Market Index Fund (09/18/1995)	-0.90%	-3.08%	6.69%	-0.79%	1.67%
Vanguard Total International Bond Index Fund (05/31/2013)	0.18%	-1.50%	6.54%	0.10%	5.23%
Vanguard Short-Term Inflation-Protected Securities Index Fund (10/17/2012)	-0.69%	0.43%	2.55%	0.85%	3.16%

Source of performance figures: Vanguard, Institutional share class, as of March 31, 2024.

The performance data shown represent past performance, which is not a guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at institutional.vanguard.com. Standard performance of the funds can be located on page 31 of the Quarterly Review.

* Percentages derived from returns table on this page.



Vanguard's approach to target-date fund rebalancing

Assessing whether a target-date fund (TDF) series is performing as expected can be a difficult undertaking. Each TDF series features multiple vintages, each with its own asset allocation. And each TDF provider can take a different approach to glide-path construction, sub-asset allocation, implementation, rebalancing methodology, and benchmarking. Furthermore, the investment time horizon of a TDF is measured not in months or years but in decades. This means that there is simply no single metric that can definitively answer the question, "Is my TDF doing its job?"



For this reason, to adequately gauge TDF success and compare providers, a mosaic of different metrics is needed to see the full performance story. These can include long-term success metrics, such as risk-adjusted returns and retirement readiness outcomes, and peer-relative returns, as well as benchmark-relative returns and tracking error. While many of these metrics are straightforward, interpreting benchmark-relative returns and tracking error can be more challenging than it may seem on the surface. The results need to be paired with an understanding of how the TDF provider approaches rebalancing methodology, as well as benchmark selection and implementation. Because there is no industry standard, there can be considerable differences across providers resulting in different trade-offs.

Here we present considerations for assessing TDF benchmark-relative returns and tracking error and an overview of Vanguard's methodology and rationale for our rebalancing approach, benchmark selection, and implementation. We also highlight several enhancements to our methodology that are focused on improving investor outcomes and increasing the usefulness of benchmark-relative returns as a performance measurement tool.

Assessing TDF benchmark-relative returns and tracking error

Benchmark-relative returns, or excess returns, are simply the difference (positive or negative) between the performance of a fund and its benchmark, while tracking error is the annualized standard deviation of this difference. While both are commonly used to evaluate index funds, assessing and comparing TDF providers using these two metrics requires an understanding of not only the performance and attribution data but also the methodology associated with rebalancing and benchmark selection and implementation.

Before taking a deeper dive into this methodology, there are certain foundational considerations to keep in mind:

Index-based TDFs are not index funds. While index-based TDFs are constructed with index funds, they themselves are not index funds and, thus, are not managed like index funds. Most index-based TDFs maintain strategic allocations to varying asset classes that gradually adjust over time as they roll down their glide path to an eventual landing point. Therefore, if one asset class, such as stocks, significantly underperforms another asset class (bonds), and if cash flows are not sufficient to rebalance back to desired weights, the manager needs to sell the outperforming bonds and purchase the underperforming stocks to realign the portfolio back to target weights. Large market swings can result in more substantial trading between asset classes and typically coincide with increased transaction costs. To keep transaction costs reasonable in volatile markets, TDF providers tend to have higher tolerances for excess return and tracking error than most index funds.

Separating out the noise is key. It is important to distinguish the return drivers tied to the actual portfolio management of a TDF from the return drivers that fall outside of portfolio management control, namely, those attributed to accounting and pricing policies. For example, fair-value pricing can be a large driver of benchmark-relative results over short-term periods. Fair-value pricing refers to the adjustments to the price of securities as of 4 p.m., Eastern time, when Vanguard strikes fund NAVs to account for after-hours movement in those securities' prices. While this can lead to large positive or negative short-term dislocations, particularly during periods of heightened market volatility, these differences are artificial and temporary.

With these foundational considerations as a baseline, we can then move on to rebalancing methodology. Currently, there is no standard or consistent rebalancing methodology or benchmarking across the TDF industry. Each TDF manager defines their own rebalancing policy for their funds and the associated benchmarks. We find that having a deeper understanding of a provider's approach can make benchmark-relative returns and tracking error more useful performance measurement tools.



Selecting a TDF rebalancing approach

The primary function of portfolio rebalancing is to keep portfolio risk in alignment with the fund's target risk exposure. Without rebalancing, portfolio allocations will drift from their intended target as the returns of its assets diverge. As highlighted in previous [Vanguard research](#), there are numerous rebalancing strategies that can be implemented, but we find that two approaches are common in the TDF industry, each with its own set of trade-offs:

1. Calendar-based rebalancing: Portfolios are rebalanced at predetermined time intervals, such as monthly or quarterly. This approach is easy to implement and, when aligned with the rebalancing methodology of the benchmark, can lead to lower tracking error. However, it may require large trades to be made on a regular cadence, which may result in higher transaction costs. Additionally, for monthly or quarterly calendar-based approaches, the actual TDF asset allocation may differ significantly from the target asset allocation in between rebalance periods when market volatility is high.

2. Threshold-based rebalancing: Portfolios are rebalanced if the portfolio's asset allocation has drifted from its target asset allocation by a predetermined tolerance threshold, for example, a threshold of 1% or 2%. Portfolio allocations are then rebalanced to a set destination, which can be the midpoint between the threshold and the target, fully back to target, or another point in between. This approach requires greater monitoring compared with a calendar-based approach, but it can also limit the extent to which the portfolio drifts from the target asset allocation. In addition, a threshold-based rebalancing approach has the potential to have lower transaction costs as portfolios are rebalanced only when they breach the tolerance threshold rather than on a pre-defined date such as month-end.

Given the different rebalancing approaches that could be implemented, which approach is best suited for a TDF?

Vanguard's approach to TDF rebalancing

The goal of Vanguard's TDF rebalancing policy is to provide our investors with the best long-term investment outcomes. Therefore, our approach seeks to strike a balance between transaction costs, which are a drag on absolute performance and erode returns, and alignment with the funds' strategic asset allocation. To accomplish this goal, our research consistently indicates that a threshold-based approach produces better long-term performance results than a calendar-based approach while maintaining close alignment to the strategic asset allocation.

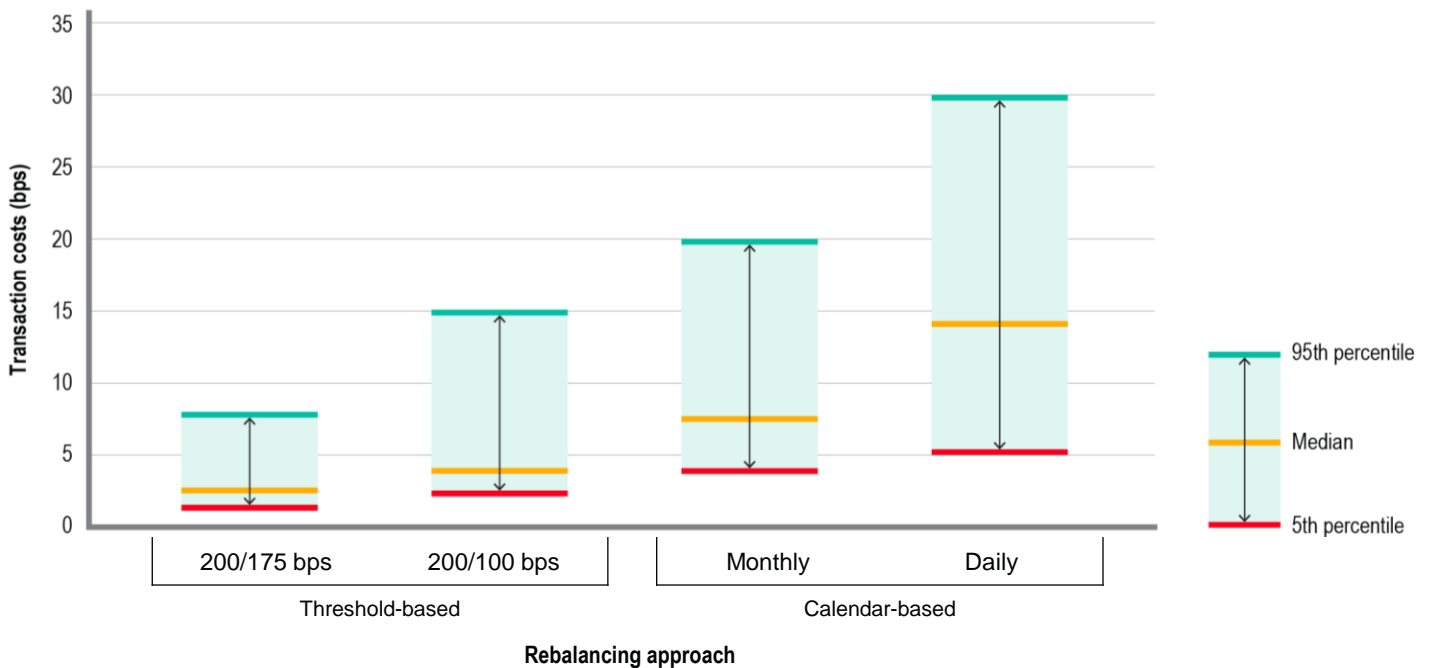
Enhancing our fund rebalancing policy:

While there can be a range of potential thresholds for different TDF vintages, our research has revalidated that a threshold of 200 bps is suitable across vintages. This research also determined that a destination of 175 bps (relative to the current destination of 100 bps) should result in further transaction cost savings.

Minimizing transaction costs: Over the long term, different rebalancing approaches tend to produce similar returns before costs. But once transaction costs are factored in, a threshold-based approach consistently leads to better long-term outcomes. **Figure 1** highlights a subset of commonly used threshold-based and calendar-based approaches and the estimated annual transaction cost impact of each approach. Transaction cost estimates include explicit costs (commissions and ticket charges) and implicit costs due to market impact for normal and stressed environments. As shown, all else being equal, a threshold-based approach typically has lower associated transaction costs, which results in greater absolute returns.



FIGURE 1. Estimated annual transaction cost ranges across various rebalancing approaches



Notes: Based on a hypothetical 60% global equity and 40% global fixed income portfolio using the actual historical returns of the underlying indexes for the 10 years ending March 2023. The back test uses a daily return series under each rebalancing approach, assuming no cash flows or use of futures. Equities allocation based on performance of CRSP US Total Market Index (36%) and FTSE Global All Cap ex US Index (24%). Bond allocation based on Bloomberg US Aggregate Index (28%) and Bloomberg Global Aggregate ex-USD (12%). Transaction costs are a function of the underlying market regime and transaction size. Transaction costs also account for simultaneous rebalancing across all target-date vintages.

Source: Vanguard.

Strategic asset allocation alignment: A TDF’s glide path and associated strategic asset allocation are intended to provide age-appropriate levels of risk throughout an investor’s life cycle. We believe that an appropriate TDF rebalancing policy should aim to maintain close alignment to the strategic asset allocation—while accounting for transaction costs—each day, as that is the investment experience and risk-return profile the TDF holder expects. During normal market environments, both calendar-based and threshold-based approaches should stay reasonably close to the strategic asset allocation, but during periods of heightened market volatility, the two approaches can have significantly different outcomes. **Figure 2** illustrates a hypothetical 50% stock and 50% bond portfolio and the associated strategic asset allocation drift using a monthly calendar-based

approach and a 200 bps (threshold)/175 bps (destination) threshold-based approach during the COVID-driven market volatility experienced in March 2020. As shown, under a monthly calendar-based approach, the portfolio could have drifted by a deviation of 7% away from the strategic asset allocation, whereas, under the threshold-based approach, the same portfolio never drifted more than +/- 2% away.

Overall, while a threshold-based approach requires additional monitoring from the portfolio managers of the strategy, the ability to effectively balance transaction costs and close alignment to the strategic asset allocation makes it the more suitable choice for a TDF that may lead to better long-term outcomes for investors.

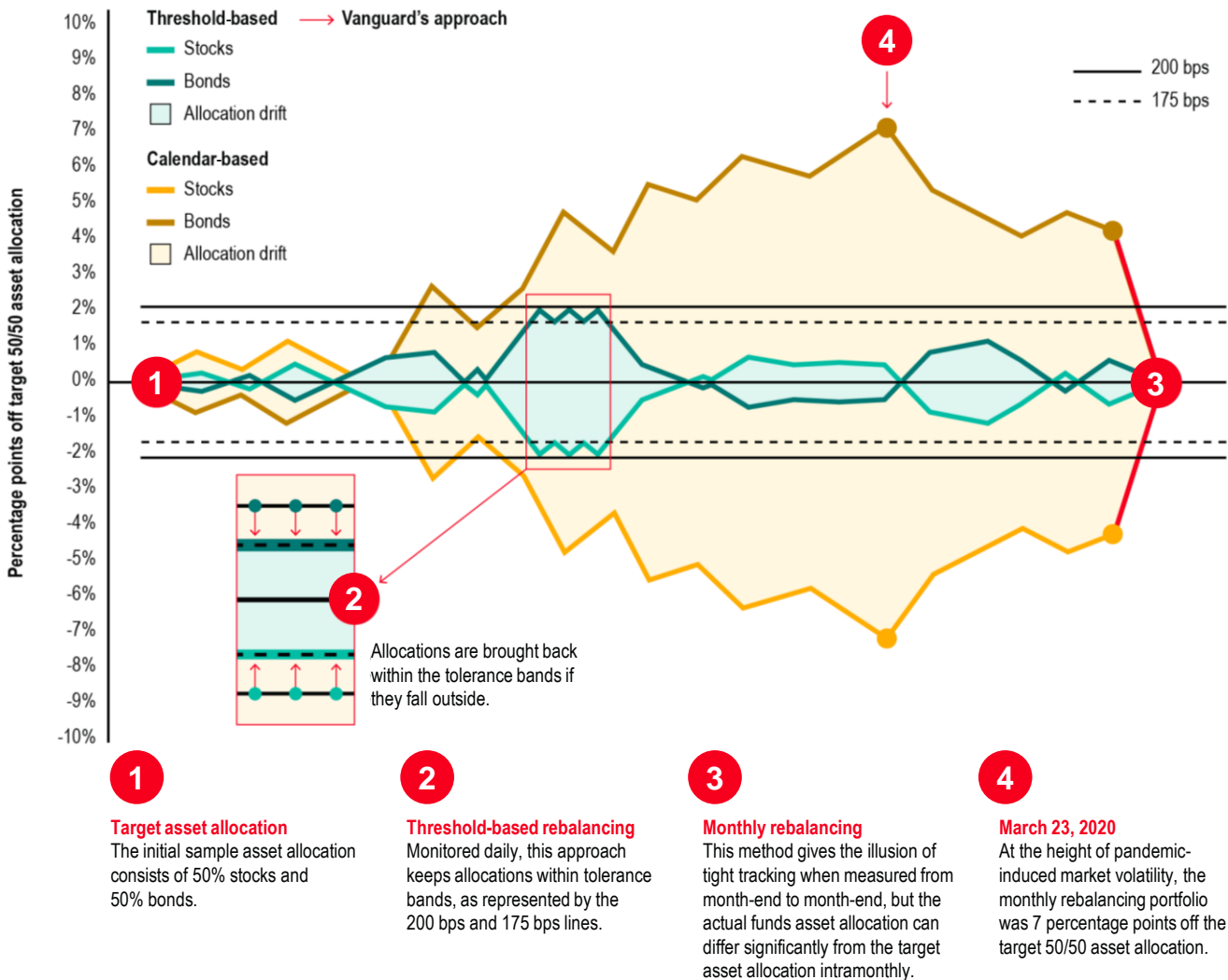


TDF benchmark selection and implementation

Beyond the rebalancing approach, the final piece of the puzzle involves understanding the TDF provider's benchmark selection, construction, and implementation. As previously stated, there is no industry standard, and selection and construction of a custom benchmark varies

across TDF products. Some providers construct composite benchmarks that represent each underlying asset class (the strategic glide path), while others construct benchmarks with only broad asset classes represented. In addition, outside of composite or custom benchmarks, certain providers utilize broad market indices, such as the S&P 500 Index or the Bloomberg US Aggregate Bond, as their primary benchmark.

FIGURE 2. Calendar-based versus threshold-based rebalancing methods in March 2020



Notes: This chart is for illustrative purposes only and is not indicative of any specific investment. Bond returns are represented by the Bloomberg US Aggregate Float Adjusted Index (70% allocation) and the Bloomberg Global Aggregate ex-USO Float-Adjusted RIC Capped USO Hedged Index (30%). Stock returns are represented by the performance of the CRSP US Total Market Index (60% allocation) and the FTSE Global All Cap ex US Index (40%). **Past performance is not a guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.**

Source: Vanguard.



Vanguard Target Retirement Funds utilize a [composite benchmark](#) that is a weighted representation of the strategic glide path and underlying asset allocation for each TDF vintage. For example, Target Retirement Funds designed for investors in the early phases of their careers typically have an asset allocation of 90% stocks and 10% bonds. Within those broad asset classes, the funds maintain allocations of 60% U.S. stocks and 40% non-U.S. stocks and 70% U.S. bonds and 30% non-U.S. bonds. The composite benchmark then represents each of these allocations at a weight that corresponds to the strategic glide path. By including each component of the strategic asset allocation in the composite benchmarks, we can provide a clear representation of theoretical target investment experience for a TDF investor.

While the selection of the appropriate composite benchmark is based on the theoretical strategic asset allocation, when it comes to implementation, practical considerations should also be layered in to provide an accurate and measurable representation of the investment process. As it is not possible to invest in a frictionless theoretical composite benchmark, all TDFs must incur some level of transaction costs to invest contributions and to rebalance portfolios back to target allocations.

Improving performance measurement: The Target Retirement Fund composite benchmark previously utilized a daily static rebalancing methodology. While this methodology provided a theoretical representation of strategic glide path, it was less useful as a performance measurement tool. Moving forward, the rebalancing methodology for the Target Retirement Funds and their corresponding composite benchmarks will utilize the same threshold-based approach, which we believe will further aid in evaluating return drivers tied to portfolio management-related activities.

To provide a more useful performance measurement tool, Vanguard aligns the rebalancing policies of the TDFs and their composite benchmarks. That is, both the Target Retirement Funds and their corresponding composite benchmarks rebalance using the same threshold-based approach. We find that this implementation method allows investors and other observers to evaluate the efficacy of the funds' portfolio management teams, as well as utilize benchmark-relative returns and tracking error as part of the overall performance mosaic.

Conclusion

To see the full TDF performance story, a mosaic of different metrics is required. Benchmark-relative returns and tracking error are an important part of this mosaic, but utilizing these metrics also requires an understanding of the TDF provider's approach to rebalancing methodology, benchmark selection, and implementation.

The policies that we have put in place for Vanguard Target Retirement Funds are designed to help us emphasize investor outcomes by reducing costs and delivering the expected asset allocation experience, thereby increasing the investor's chance of achieving retirement success. At Vanguard, we are committed to improving outcomes for clients, whether through lower costs, investments in portfolio management capabilities, innovative approaches to rebalancing, or other enhancements. Investors should not only expect that Vanguard will continually improve our products but also demand it.



About the SAAC

The Vanguard Strategic Asset Allocation Committee (SAAC) is a multiasset oversight committee composed of global investment leaders from across the firm.

The members of the SAAC are responsible for the investment methodology behind our single-fund solutions, including Vanguard LifeStrategy® Funds, Target Retirement Funds, 529 plans, and model portfolios.

The SAAC meets regularly to review its investment methodology, debate investment strategies, and coordinate any changes with the Vanguard Advice Policy Committee, thereby ensuring a consistent approach in our single-fund solutions and advice offers.

Additional perspectives from the SAAC

A primary responsibility of the SAAC is to oversee the policy allocation of Vanguard's suite of multiasset portfolios, including a formal annual review. The SAAC has also been tasked with establishing the investment methodology and portfolio construction approaches that are most appropriate for various objectives. Since its founding in 2013, the SAAC has held research meetings to discuss investment topics, seeking the best outcomes for our clients through constant debate. These meetings, often showcasing the latest research by Vanguard Investment Strategy Group, have centered on a wide range of subjects. A summary of past topics is provided below.

2013

- Hedging currency exposure in a multiasset portfolio
- Role of commodity futures
- Minimum-volatility equity strategies

2014

- Equity home bias by country
- Glide-path construction methodology
- Inflation protection

2015

- Approaches to retirement income
- Factors and strategic asset allocation
- Fixed income glide-path allocations

2016

- Time-varying risk premia and asset allocation
- Expansion of the Vanguard Capital Markets Model®
- Inflation-hedging strategies over multiyear horizons

2017

- Long-run equilibrium risk-free rates and the equity risk premia
- Diversified versus concentrated active equity portfolios
- Global methodology for non-market-cap-weighted ETF model portfolios

2018

- Role of private real estate in portfolios
- Vanguard Life-Cycle Model (VLCM) and glide-path outcomes
- Inflation protection in a 529 college savings plan



Top row, left to right

- Joseph Davis, Ph.D.**, (Committee Chair)
Global Chief Economist and Global Head of Investment Strategy Group
- Roger Aliaga-Diaz, Ph.D.**, (Committee Vice-Chair)
Chief Economist, Americas, Global Head of Portfolio Construction
- Greg Davis, CFA**, (Ex-Officio) Global Chief Investment Officer
- Kaitlyn Caughlin, CFA, CFP®**, Global Head of IMG Risk Management
- Geoff Parrish**, Principal, Global Head of Fixed Income Indexing (New Member)

Middle row

- Duncan Burns**, Head of Investments, Asia-Pacific, and of Investment Strategy Group, Asia-Pacific
- Matthew Brancato, CFA, CPA**, Chief Client Officer, Institutional Investor Group
- Qian Wang, Ph.D.**, Chief Economist, Asia-Pacific, Investment Strategy Group
- Dan Reyes, CFA**, Head of Portfolio Review Department
- Brian Wimmer, CFA**, Head of Multi-Asset Solutions (Nonvoting Member)

Bottom row

- Joel Dickson, Ph.D.**, Head of Enterprise Advice Methodology
- Michael Roach, CFA**, Senior Manager, Head of Multi-Asset Portfolio
- Brent Beardsley**, Head of Strategy and Development (New Member)
- Yan Pu, CFA**, Principal, Head of Advice Methodology (Nonvoting Member)
- Ian Kresnak, CFA**, Chief of Staff, Investment Strategy Group (Nonvoting Member)

2019

- Vanguard Asset Allocation Model (VAAM) and optimal allocations to active and passive strategies
- VAAM-based investment methodology for ETF-model portfolios
- Return-targeting and time-varying asset allocation

2020

- VLCM-derived glide paths for 529 college savings plans
- Role of private equity in multiasset portfolios

2021

- A systematic framework for validating TDF glide paths

2022

- *Vanguard's Approach to Target-Date Funds*
- *Revalidating the Case for International Bonds*

2023

- *Hybrid annuity target date funds: A new class of target-date funds incorporating annuities*
- Multiasset rebalancing strategies



TDF industry and market overview

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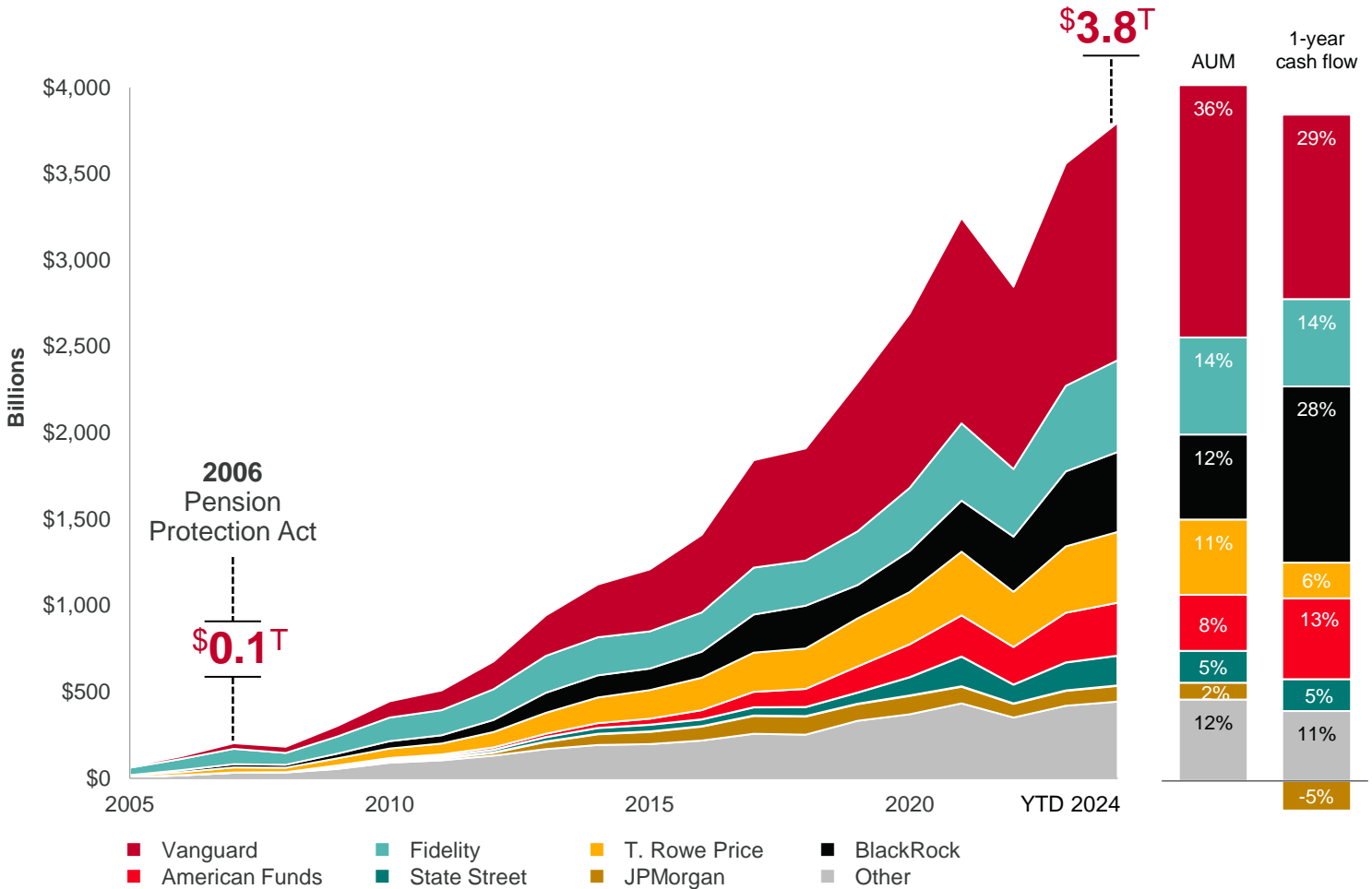
Industry growth and market share

Market environment



Industry growth and market share

Figure 12.1 Growth of target-date fund industry assets and market share



According to data from Morningstar combined with Vanguard’s funds and trusts data, TDF industry assets exceeded \$3.80 trillion as of the end of Q1 2024. Vanguard continued to lead the industry in cash flow and assets under management, receiving more than one-quarter of every dollar invested in a TDF.

The industry’s top providers, Vanguard, Fidelity, BlackRock, T. Rowe Price, JPMorgan, American Funds, and State Street, hold a cumulative 88% share of all industry assets, or more than \$3.35 trillion, as of March 31, 2024.

We estimate that as of the end of December, the target-date fund industry experienced a 4.02% organic growth rate over the last 12 months.*

Sources: Vanguard, Morningstar, as of March 31, 2024. Industry estimates are based on mutual fund and CIT data reported in Morningstar. CIT data is self-reported and is updated in Morningstar as it is received. Public company data also used prior to 2020.

* Organic growth measured as current period’s net new flows divided by prior period’s ending assets.



Market environment

Figure 13.1 Index returns ranked by performance

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2Q 2023	3Q 2023	4Q 2023	1Q 2024
REIT 30.4	REIT 2.5	HYB 17.1	FTSE 27.4	IAGG 3.2	CRSP 30.8	CRSP 21.0	REIT 43.1	COM 16.1	CRSP 26	CRSP 8.4	COM 4.7	REIT 16.0	CRSP 10.0
CRSP 12.6	IAGG 1.3	CRSP 12.7	CRSP 21.2	CASH 1.9	REIT 25.8	FTSE 11.2	COM 27.1	CASH 1.5	FTSE 15.8	REIT 2.7	CASH 1.4	CRSP 12.1	FTSE 4.3
IAGG 9.1	EMB 1.3	COM 11.4	EMB 9.2	STPS 0.6	FTSE 21.8	AGG 7.5	CRSP 25.7	STPS -2.7	REIT 13.7	FTSE 2.5	HYB 0.5	EMB 9.8	COM 2.2
EMB 7.1	AGG 0.5	EMB 9.2	HYB 7.5	AGG 0.0	HYB 14.3	HYB 7.1	FTSE 8.8	HYB -11.2	HYB 13.4	HYB 1.8	STPS 0.4	FTSE 9.8	HYB 1.5
AGG 6.0	CRSP 0.4	REIT 8.6	REIT 5.1	HYB -2.1	EMB 14.1	EMB 5.6	STPS 5.3	IAGG -12.7	EMB 10.5	EMB 1.4	IAGG -1.3	HYB 7.2	CASH 1.4
HYB 2.5	CASH 0.0	IAGG 4.9	AGG 3.5	EMB -3.9	AGG 8.7	STPS 5.1	HYB 5.3	AGG -13.0	IAGG 8.8	CASH 1.3	EMB -2.9	AGG 6.8	EMB 1.2
CASH 0.0	STPS 0.0	FTSE 4.7	IAGG 2.6	REIT -4.6	IAGG 8.1	IAGG 4.7	CASH 0.1	FTSE -16.1	AGG 5.5	IAGG 0.4	AGG -3.2	IAGG 6.4	STPS 0.9
STPS -1.1	FTSE -4.3	STPS 2.8	STPS 0.9	CRSP -5.2	COM 5.4	CASH 0.6	AGG -1.5	EMB -17.1	CASH 5.3	STPS -0.7	CRSP -3.3	STPS 2.6	IAGG 0.1
FTSE -3.4	HYB -4.5	AGG 2.6	CASH 0.8	COM -13.0	STPS 4.9	COM -3.5	EMB -1.8	CRSP -19.5	STPS 4.5	AGG -0.8	FTSE -3.3	CASH 1.4	REIT -0.3
COM -17.0	COM -24.7	CASH 0.3	COM 0.7	FTSE -14.6	CASH 2.3	REIT -7.6	IAGG -2.1	REIT -24.5	COM -7.9	COM -2.6	REIT -7.0	COM -4.6	AGG -0.8

Average annualized returns

Index returns		3 months	1 year	3 years	5 years	10 years	
Target Retirement Fund building blocks	CRSP	CRSP U.S. Total Market Index	10.01	29.33	9.64	14.25	12.28
	FTSE	FTSE Global All Cap ex U.S. Index	4.34	13.53	2.05	6.29	4.55
	AGG	Bloomberg U.S. Aggregate Bond Index	-0.78	1.70	-2.46	0.36	1.54
	IAGG	Bloomberg Global Agg ex U.S. Float Adj RIC Cap Index (Hedged)	0.09	5.49	-1.65	0.41	2.37
	STPS	Bloomberg U.S. 0-5 Year TIPS Index	0.85	3.20	2.25	3.20	2.05
Other indexes	CASH	3-Month T-Bill	1.37	5.52	2.70	2.06	1.39
	HYB	Bloomberg U.S. Corporate High Yield Index	1.47	11.15	2.19	4.21	4.44
	EMB	Bloomberg USD Emerging Market Gov RIC Cap Index	1.24	9.52	-1.34	0.80	2.84
	REIT	MSCI U.S. REIT Index	-0.32	10.37	4.03	4.14	6.54
	COM	Bloomberg Commodity Index	2.19	-0.56	9.11	6.38	-1.56

Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Sources: Vanguard, Bloomberg Live, and Morningstar, as of March 31, 2024.

Note: Beginning 3Q 2021, the benchmark shown for the EMB category changed from Bloomberg Emerging Markets Sovereign Index USD to Bloomberg USD Emerging Market Gov RIC Cap Index.



Vanguard fund construction and performance

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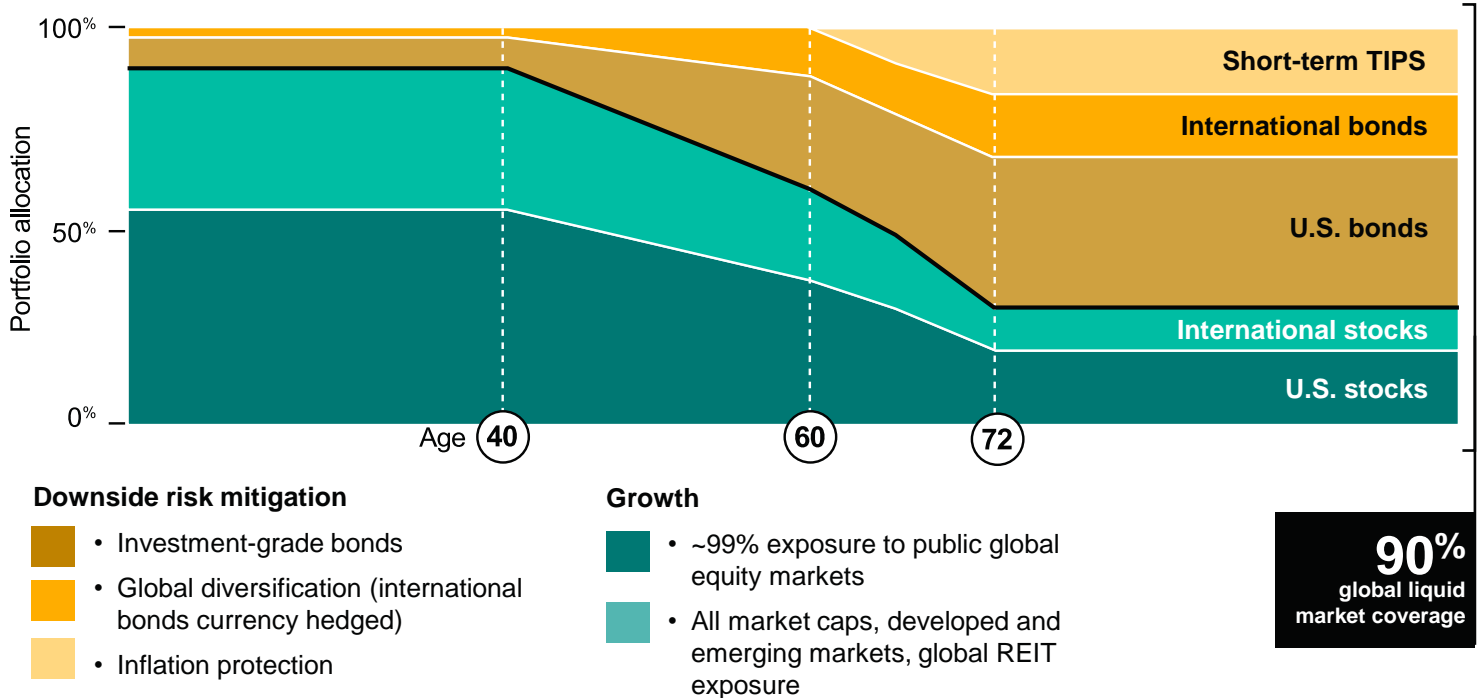
Evolution of Vanguard's glide-path design

Vanguard fund performance and attribution

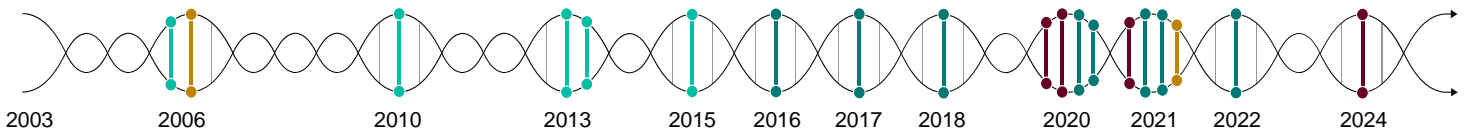


Purposeful design and evolution

Strategic asset allocation using high-quality building blocks



Meaningfully improving investor outcomes since inception



Enhanced asset allocation

- Increased equity weight in Income fund (2006)
- Added emerging markets stocks (2006)
- Added Canada and more international equity exposure (including small-caps) through Total International Stock Index replacing three regional funds (2010)
- Added international bonds (2013)
- Replaced broad TIPS fund with short-term TIPS for better responsiveness to inflation and removed money market fund (2013)
- Increased international allocations for both stocks and bonds (2015)

Lowered fees, increased access

- Lowered expense ratios (2016, 2017, 2018, 2020, and 2021)
 - Reduced minimum for Institutional Target Retirement Funds (2020)
 - Reduced minimum for Target Retirement Trusts (2021)
 - Merging Institutional Target Retirement Funds into Target Retirement Funds (2022)
- Improved fund/trust lineup**
- Launched five-year vintage increments (2006)
 - Added optional trust with a 50/50 allocation landing point and added enhanced retirement income services (2021)

Reduced implementation costs and tax drag

- Moved from quarterly to monthly glide path roll down (2020)
- Across trust vintages, replaced underlying international fund with an international trust, minimizing foreign tax withholdings (2021)
- Enhanced rebalancing policies to reduce transaction costs and improve performance measurement (2024)

Sources: FactSet, Fidelity, BlackRock. Stock market measured by FactSet data derived from MSCI US Broad Market Free Float and MSCI ACWI ex USA IMI Indexes. Bond market measured by FactSet data derived from Bloomberg Global Aggregate ex-USD, U.S. Aggregate Float Adjusted, Global High Yield, and EM Hard Currency Aggregate indexes. Commodities market measured by FactSet data. Data as of December 31, 2023.



Fund performance through March 31, 2024

Vanguard Target Retirement Fund and Trust performance

Portfolio/Benchmark	Average annualized return as of March 31, 2024					Since inception	Inception date
	3 months	1 year	3 years	5 years	10 years		
Vanguard Target Retirement Income Vintage							
Fund	2.09	8.47	1.23	4.14	4.14	4.91	10/27/2003
Trust II	2.13	8.43	1.25	4.17	4.18	4.63	2/29/2008
<i>Target Retirement Income Composite Index</i>	2.15	8.70	1.44	4.44	4.37	—	—
Vanguard Target Retirement 2020 Vintage							
Fund	2.83	10.42	1.98	5.60	5.63	5.99	6/7/2006
Trust II	2.85	10.44	2.02	5.64	5.68	5.87	2/29/2008
<i>Target Retirement 2020 Composite Index</i>	2.86	10.70	2.26	5.96	5.91	—	—
Vanguard Target Retirement 2025 Vintage							
Fund	3.81	12.95	2.68	6.55	6.31	6.64	10/27/2003
Trust II	3.83	12.93	2.77	6.64	6.39	6.35	2/29/2008
<i>Target Retirement 2025 Composite Index</i>	3.84	13.24	3.04	6.99	6.63	—	—
Vanguard Target Retirement 2030 Vintage							
Fund	4.57	14.81	3.35	7.37	6.88	6.74	6/7/2006
Trust II	4.55	14.82	3.43	7.44	6.95	6.72	2/29/2008
<i>Target Retirement 2030 Composite Index</i>	4.52	15.09	3.71	7.80	7.20	—	—
Vanguard Target Retirement 2035 Vintage							
Fund	5.24	16.37	4.02	8.17	7.43	7.50	10/27/2003
Trust II	5.19	16.37	4.11	8.25	7.51	7.16	2/29/2008
<i>Target Retirement 2035 Composite Index</i>	5.14	16.61	4.36	8.59	7.75	—	—
Vanguard Target Retirement 2040 Vintage							
Fund	5.85	17.94	4.69	8.96	7.95	7.46	6/7/2006
Trust II	5.83	17.95	4.75	9.02	8.02	7.58	2/29/2008
<i>Target Retirement 2040 Composite Index</i>	5.76	18.15	5.02	9.37	8.28	—	—

The performance data shown represent past performance. Past performance is no guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at vanguard.com/performance. Some funds assess purchase, redemption, and/or account maintenance fees. The performance data shown do not reflect deduction of these fees. If they did, performance would be lower. Details on these fees and adjusted performance figures can be found in the fund detail section.

Sources: Vanguard and Morningstar, as of March 31, 2024.



Fund performance through March 31, 2024

Vanguard Target Retirement Fund and Trust performance (continued)

Portfolio/Benchmark	Average annualized return as of March 31, 2024					Since inception	Inception date
	3 months	1 year	3 years	5 years	10 years		
Vanguard Target Retirement 2045 Vintage							
Fund	6.45	19.45	5.34	9.74	8.40	8.20	10/27/2003
Trust II	6.41	19.44	5.40	9.78	8.46	7.84	2/29/2008
<i>Target Retirement 2045 Composite Index</i>	<i>6.38</i>	<i>19.70</i>	<i>5.66</i>	<i>10.14</i>	<i>8.73</i>	—	—
Vanguard Target Retirement 2050 Vintage							
Fund	6.89	20.44	5.69	9.99	8.53	7.81	6/7/2006
Trust II	6.87	20.50	5.75	10.06	8.59	7.93	2/29/2008
<i>Target Retirement 2050 Composite Index</i>	<i>6.84</i>	<i>20.76</i>	<i>6.02</i>	<i>10.41</i>	<i>8.87</i>	—	—
Vanguard Target Retirement 2055 Vintage							
Fund	6.88	20.43	5.69	9.98	8.51	10.12	8/18/2010
Trust II	6.88	20.49	5.76	10.06	8.58	10.49	8/31/2010
<i>Target Retirement 2055 Composite Index</i>	<i>6.84</i>	<i>20.76</i>	<i>6.02</i>	<i>10.41</i>	<i>8.87</i>	—	—
Vanguard Target Retirement 2060 Vintage							
Fund	6.87	20.44	5.70	9.99	8.51	9.91	1/19/2012
Trust II	6.86	20.46	5.77	10.07	8.59	9.63	3/1/2012
<i>Target Retirement 2060 Composite Index</i>	<i>6.84</i>	<i>20.76</i>	<i>6.02</i>	<i>10.41</i>	<i>8.87</i>	—	—
Vanguard Target Retirement 2065 Vintage							
Fund	6.88	20.41	5.72	9.98	—	9.19	7/12/2017
Trust II	6.86	20.46	5.76	10.07	—	9.78	7/17/2017
<i>Target Retirement 2065 Composite Index</i>	<i>6.84</i>	<i>20.76</i>	<i>6.02</i>	<i>10.41</i>	—	—	—
Vanguard Target Retirement 2070 Vintage							
Fund	6.88	20.51	—	—	—	16.00	6/8/2022
Trust II	6.89	20.56	—	—	—	6.85	4/7/2022
<i>Target Retirement 2070 Composite Index</i>	<i>6.84</i>	<i>20.76</i>	<i>6.02</i>	<i>10.41</i>	<i>8.76</i>	—	—

The performance data shown represent past performance. Past performance is no guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at vanguard.com/performance. Some funds assess purchase, redemption, and/or account maintenance fees. The performance data shown do not reflect deduction of these fees. If they did, performance would be lower. Details on these fees and adjusted performance figures can be found in the fund detail section.

Sources: Vanguard and Morningstar, as of March 31, 2024.



Underlying fund performance contribution

Figure 18.1 3-month return contribution by underlying funds

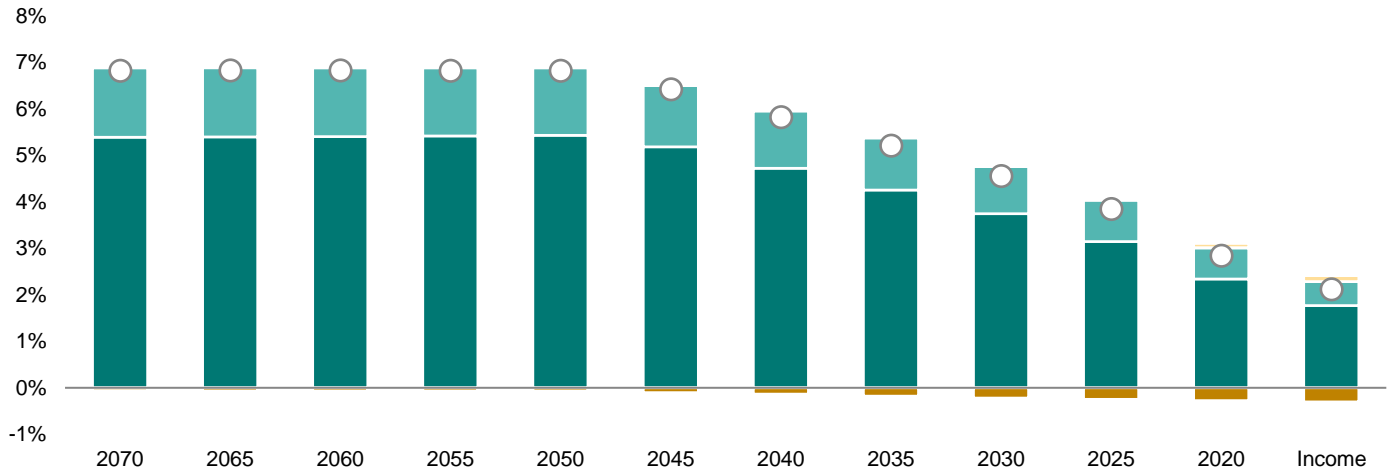
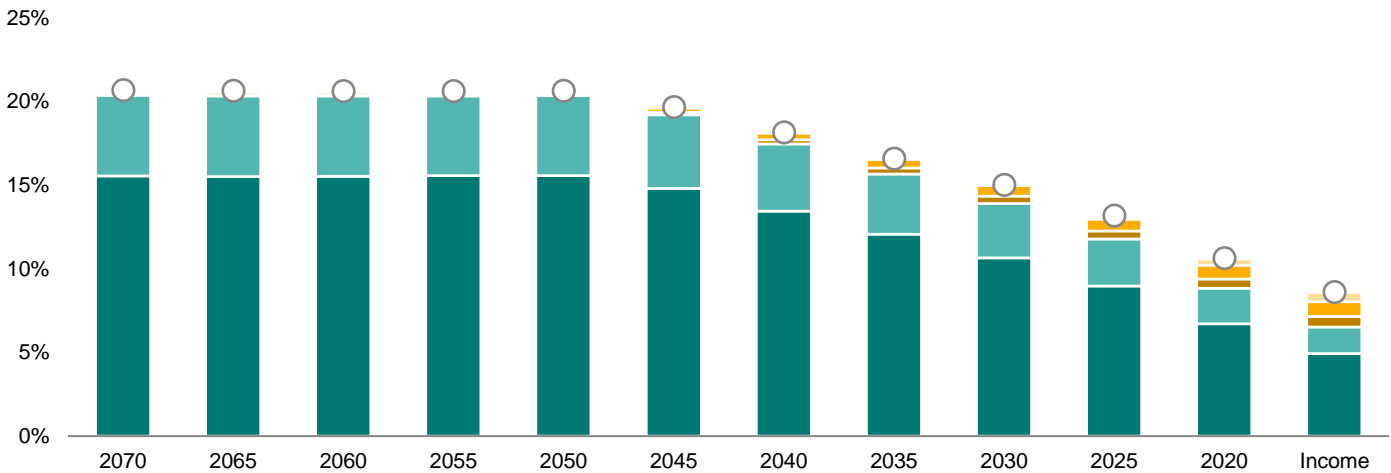


Figure 18.2 1-year return contribution by underlying funds



- Total Stock Market Index
- Total Bond Market II Index
- Cash
- Total International Stock Index
- Total International Bond Index
- Short-Term Inflation-Protected Securities Index
- Total return

Past performance is not a guarantee of future results.

Sources: Vanguard and Morningstar, as of March 31, 2024.





Excess return attribution

Figure 19.1 3-month return attribution

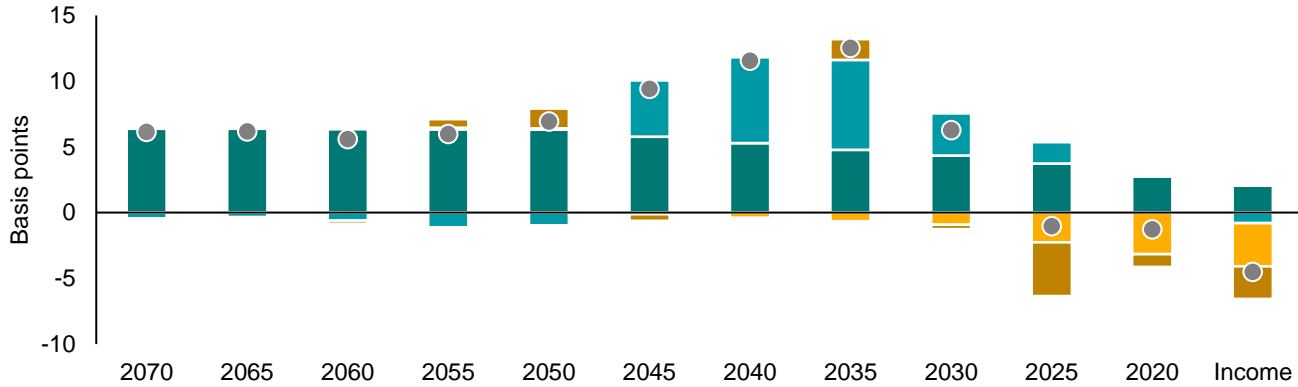
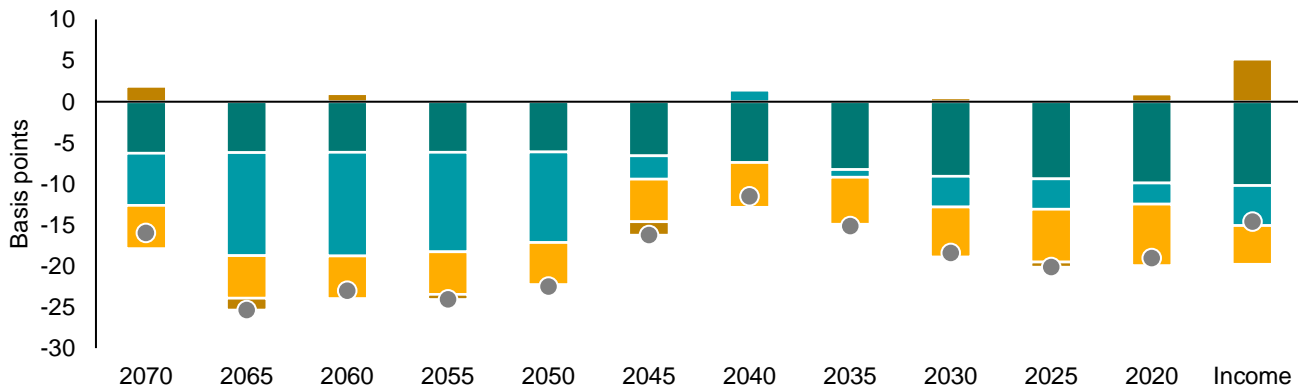


Figure 19.2 1-year return attribution



■ Allocation impact	Out/Underperformance due to differences in the strategic asset allocation of the funds versus their benchmarks. These differences can be particularly notable at times of significant market volatility as portfolio managers work to balance transaction costs against a daily rebalanced benchmark.
■ Fair-value pricing	Out/Underperformance due to the adjustment of the prices of non-U.S. equities for changes in their fair value that occur after the close of their local market but before the net asset value is calculated for each U.S. mutual fund as of 4 p.m., Eastern time. This impact is attributed to accounting and pricing policies that are outside of portfolio management control and is generally artificial and temporary.
■ Underlying fund tracking differences ex-FV	Out/Underperformance of the underlying portfolios versus their relative benchmarks. Figure is shown after controlling for fair-value pricing but is inclusive of the securities lending impact, transaction costs associated with rebalancing the fund-of-funds portfolio, and pricing difference driven by Bloomberg (BB) indexes pricing at 4 p.m., Eastern time.*
■ Residual	Out/Underperformance due to factors outside of those captured above.
● Total excess return	Indicates the total amount of fund returns that were higher or lower than benchmark returns. Calculated as the sum of the individual impacts of each of the five above drivers of benchmark-related excess return. Effect of expense ratios not included.

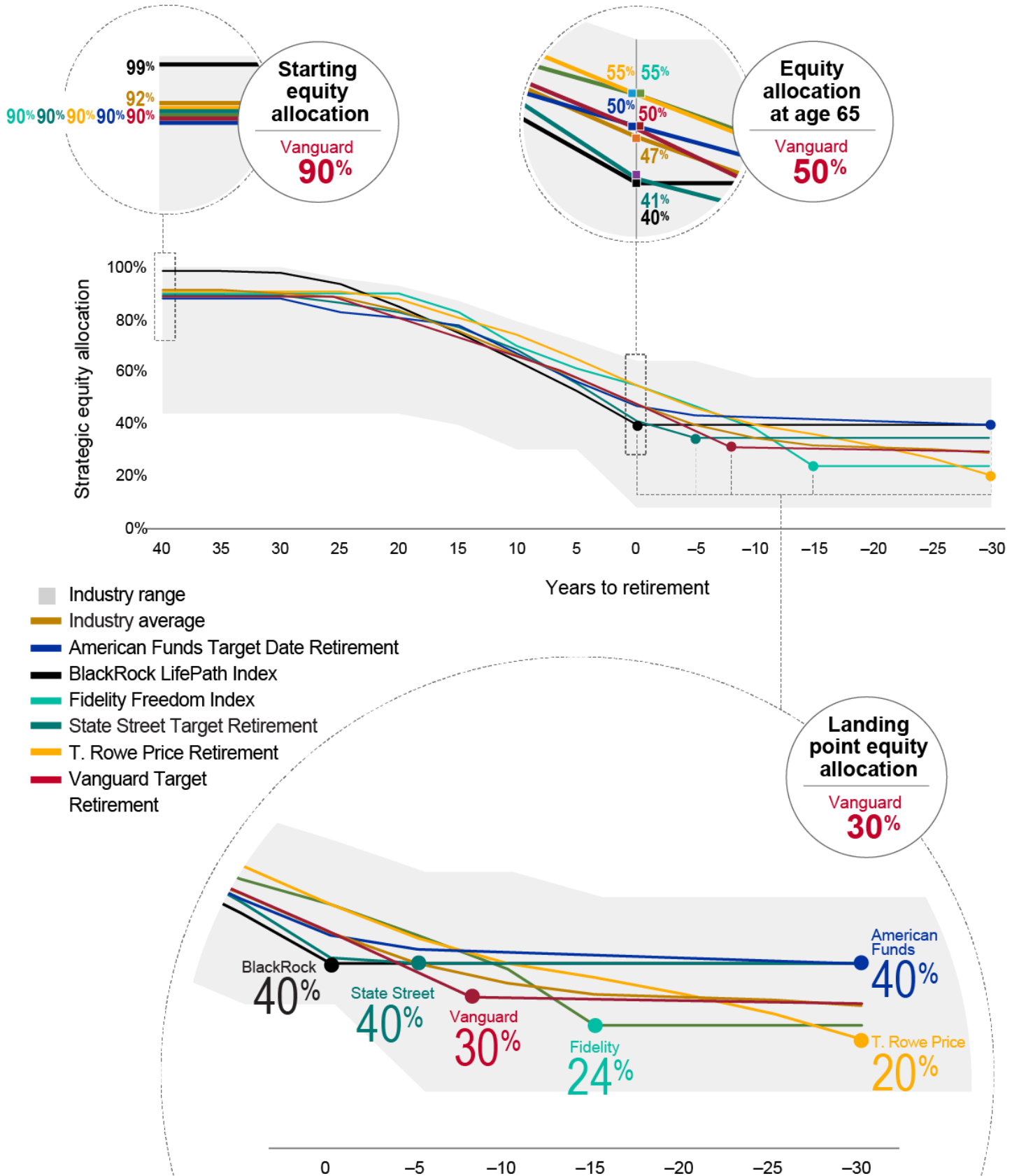
Past performance is not a guarantee of future results.

Sources: Vanguard and Morningstar, as of March 31, 2024.

* On January 14, 2021, Bloomberg changed its index pricing time from 3 p.m., Eastern time, to 4 p.m., Eastern time. The time change affects the 1- and 3-year figures.



Glide path comparison



Sources: Morningstar; data as of March 31, 2024; Vanguard calculation for industry average.



Competitor fund construction and performance

IN THIS SECTION:

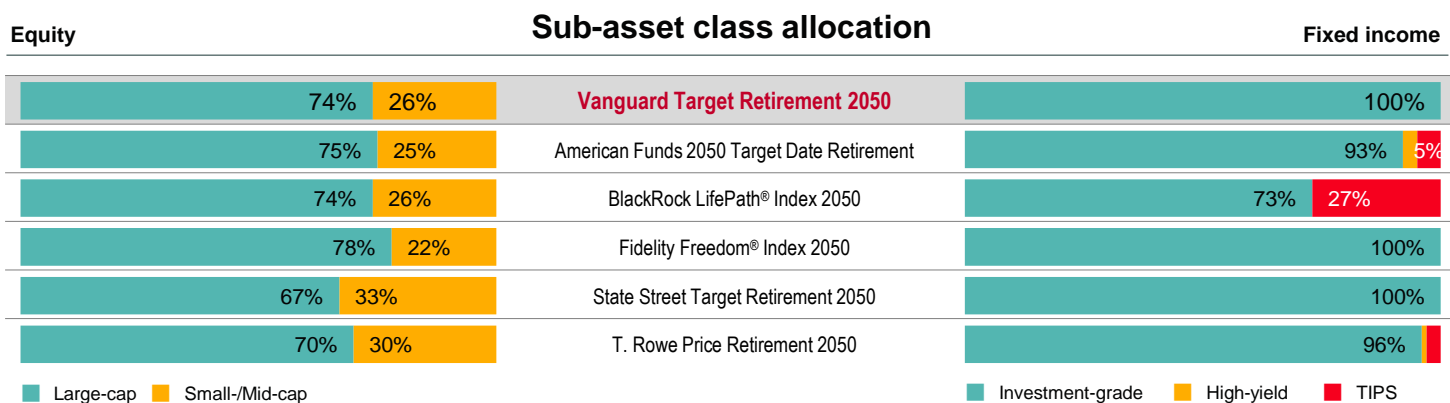
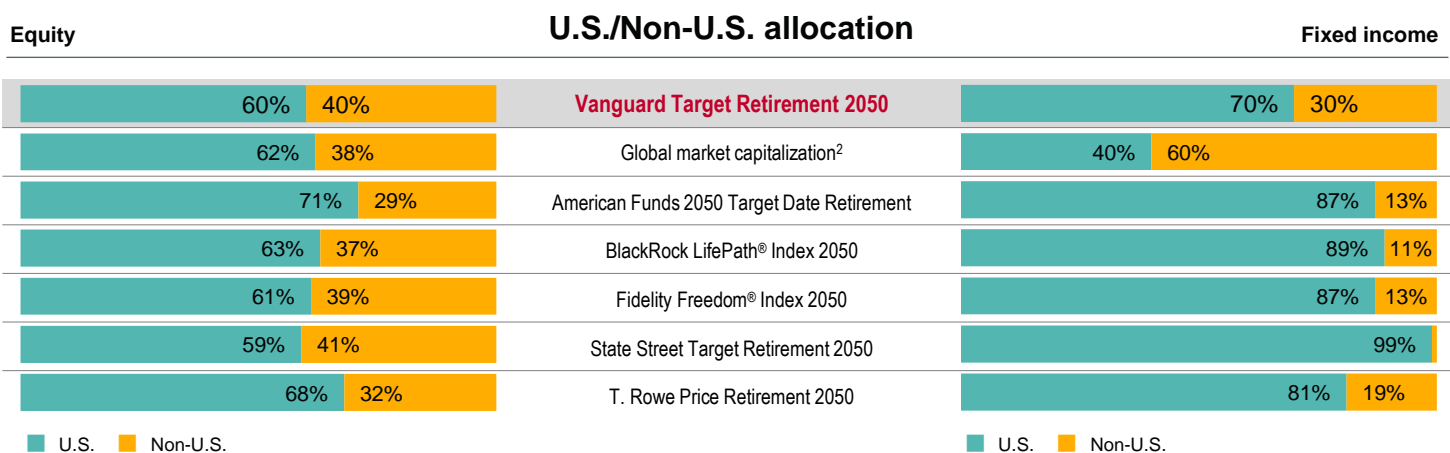
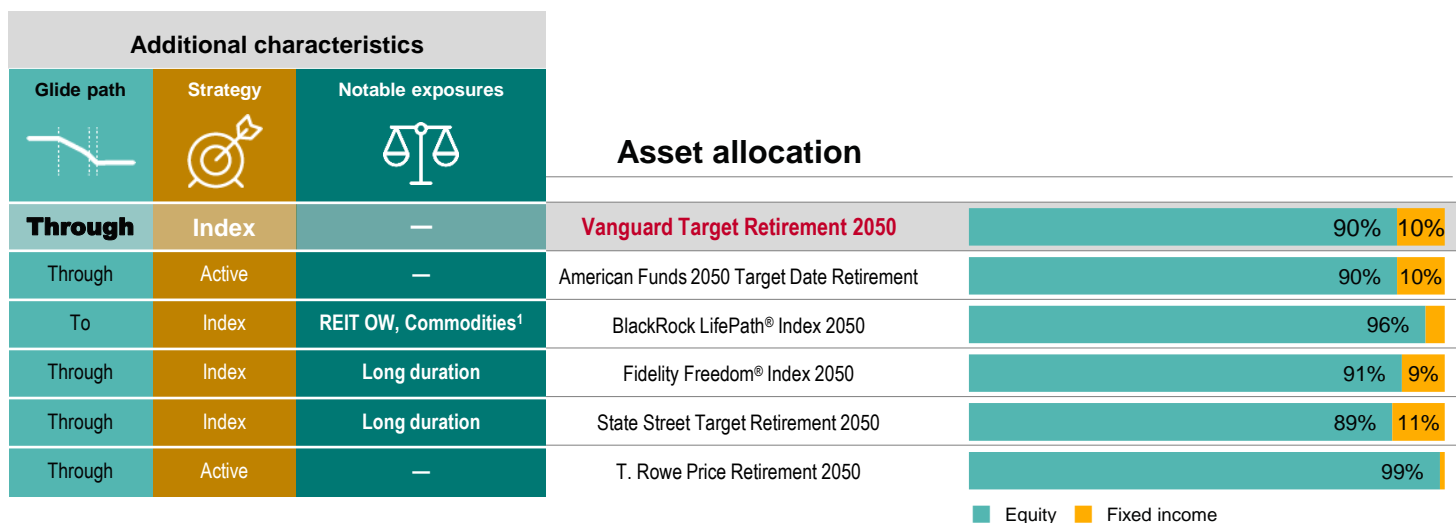
Beyond the glide path

12-month return attribution



2050 vintage: Beyond the glide path

Figure 22.1 Industry peer group asset allocation comparison



Sources: Morningstar data, based on most recent holdings disclosure for each fund included in the calculation. As-of dates may vary depending on the timing and frequency of data made available to Morningstar. Data as of March 31, 2024.

¹Commodity exposure is present in CIT product only. Mutual fund product does not include commodity exposure.

²Global market capitalization calculated using FTSE All Country Equity Index and Bloomberg Barclays Global Aggregate Bond Index.

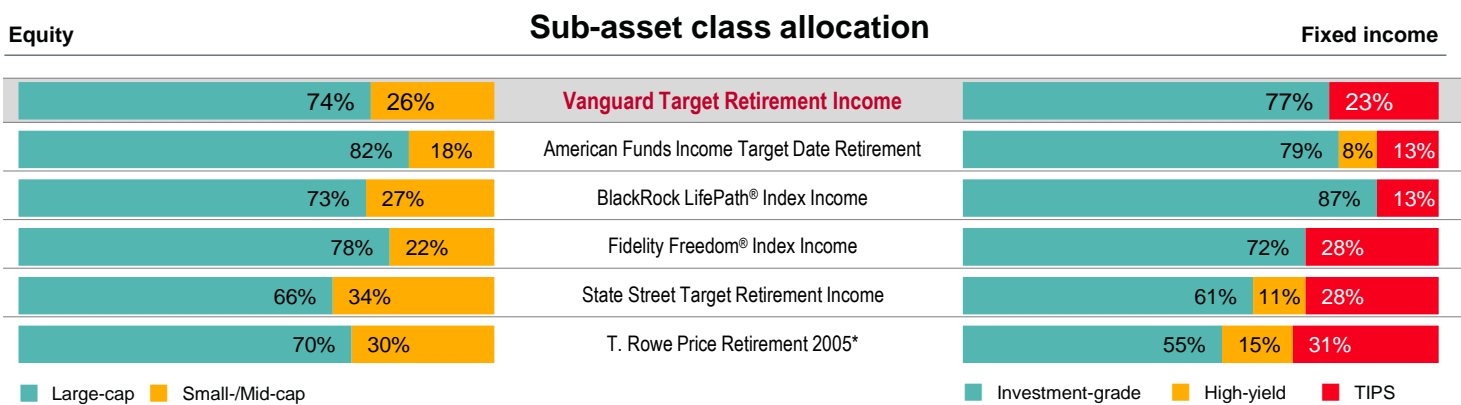
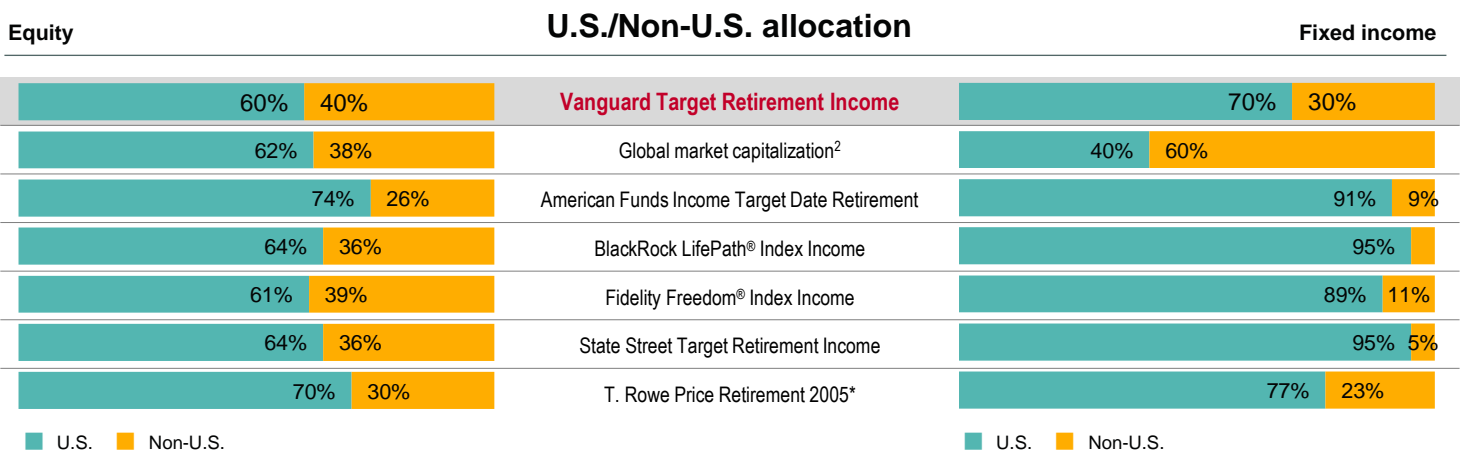
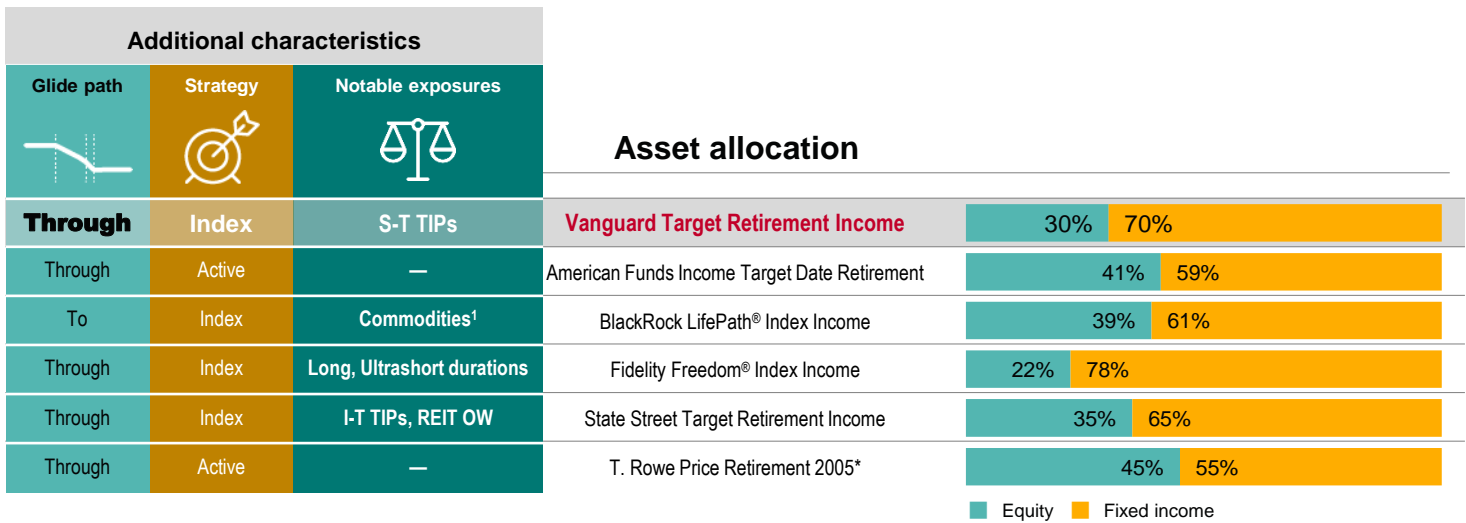
Note: Due to spacing issues, data labels below 7% are not displayed. Due to rounding, may not total to 100%.

There may be other material differences between products that must be considered prior to investing.



Income vintage: Beyond the glide path

Figure 23.1 Industry peer group asset allocation comparison



Sources: Morningstar data, based on most recent holdings disclosure for each fund included in the calculation. As-of dates may vary depending on the timing and frequency of data made available to Morningstar. Data as of March 31, 2024.

¹Commodity exposure is present in CIT product only. Mutual fund product does not include commodity exposure.

²Global market capitalization calculated using FTSE All Country Equity Index and Bloomberg Barclays Global Aggregate Bond Index.

* No explicit income vintage in lineup. 2005 represents the most conservative asset allocation, as a proxy.

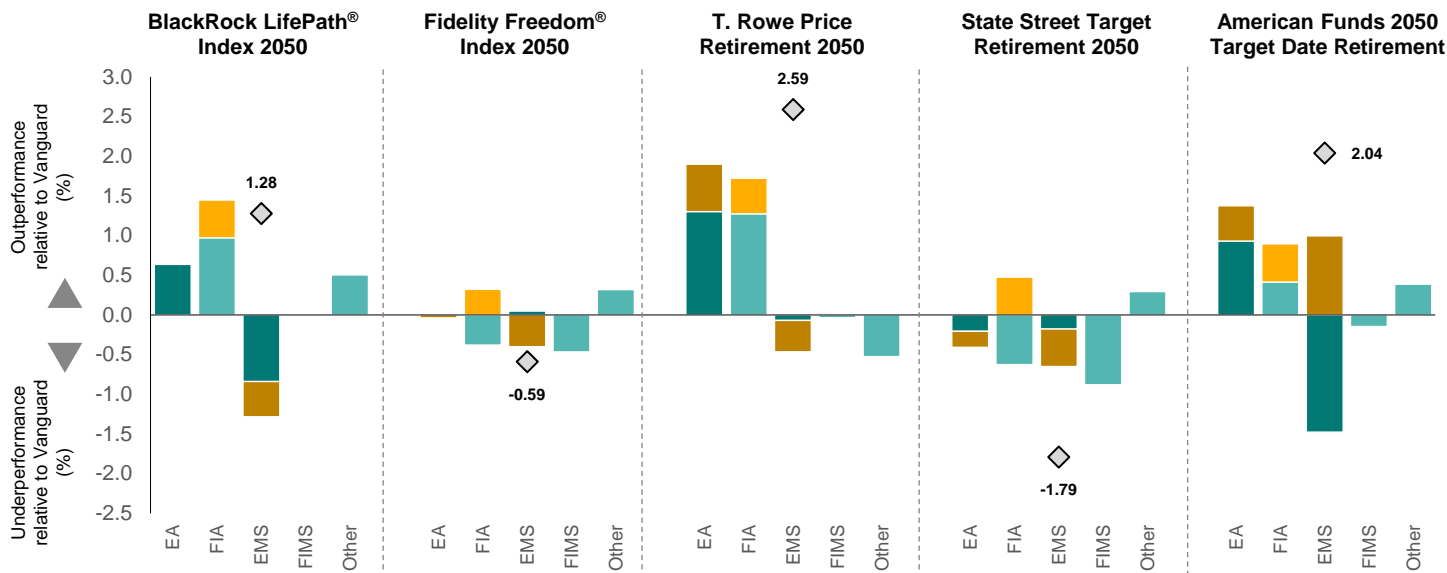
Note: Due to spacing issues, data labels below 7% are not displayed. Due to rounding, may not total to 100%.

There may be other material differences between products that must be considered prior to investing.



12-month return attribution

Figure 24.1 Relative to top five industry 2050 funds



Element	Description
Equity allocation (EA)	Vintage allocation to asset classes and sub-asset allocation to U.S. vs. non-U.S.
Fixed income allocation (FIA)	
Equity manager selection (EMS)	Benchmark construction differences (cap and/or style tilts), securities lending, fair-value pricing, building block expense ratios
Fixed income manager selection (FIMS)	
Other	Compounding effect (residual) due to nondaily holdings availability
Total excess return	The sum of the above relative performance differences between Vanguard Target Retirement Fund and competitors' similar vintage

■ U.S. equity
 ■ Foreign equity
 ◇ Total relative return
■ U.S. fixed income
 ■ Foreign fixed income

- **BlackRock's** outperformance relative to Vanguard was driven by a higher allocation to U.S. equity relative to Vanguard.
- **Fidelity's** underperformance was primarily driven by an overweight to long duration Treasury securities within the U.S. fixed income portion of the portfolio.
- **T. Rowe Price's** outperformance relative to Vanguard was driven by a higher allocation to U.S. equity and security selection within the U.S. equity portion of the portfolio.
- **State Street's** underperformance was driven by an overweight to long duration fixed income in relation to Vanguard.
- **American Funds'** outperformance relative to Vanguard was driven by an underweight to fixed income broadly in favor of U.S. equity.

Past performance is not a guarantee of future results.

Sources: Vanguard and Morningstar, as of March 31, 2024.





12-month return attribution (continued)

Figure 25.1 Relative to top five industry income (or equivalent) funds*



- **BlackRock's** outperformance over the period was driven by a higher allocation to U.S. equity.
- **Fidelity's** underperformance was driven by a significant underweight to equity securities relative to Vanguard and a large exposure to cash equivalents.
- **T. Rowe Price's** outperformance was driven by a higher allocation to U.S. equity relative to Vanguard.
- **State Street's** outperformance was driven by an overweight to U.S. equity and a lower overall allocation to fixed income.
- **American Funds'** outperformance was driven by a higher allocation to U.S. equity relative to Vanguard, which made up for poor security selection in the equity portions of the portfolio.

Past performance is not a guarantee of future results.

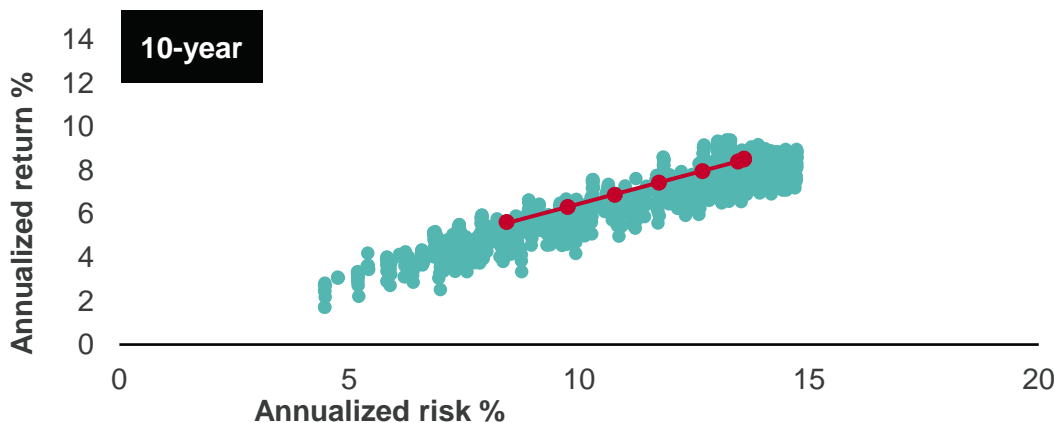
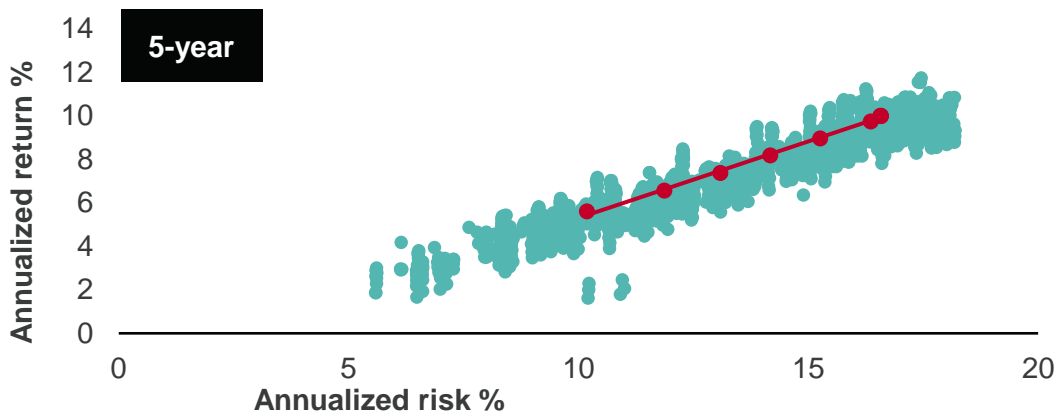
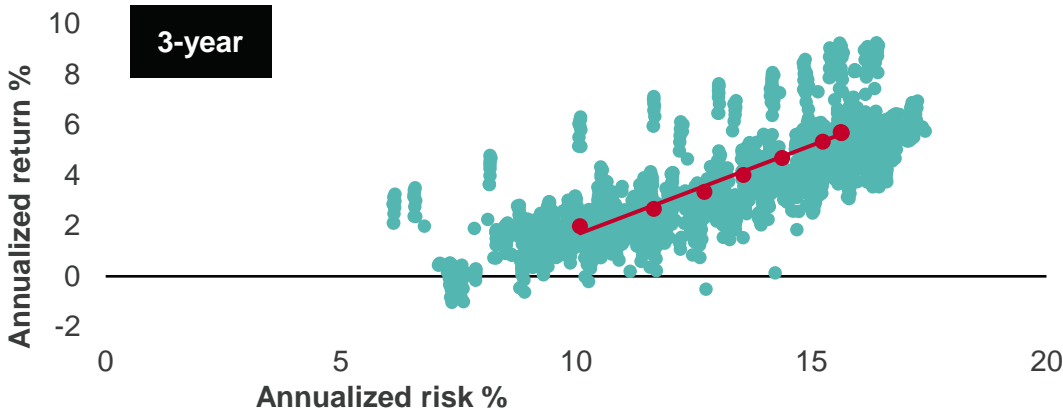
Sources: Morningstar and Vanguard calculations; data as of March 31, 2024.

* The 2005 fund is used as a proxy for T. Rowe Price and the 2010 fund is used as a proxy for American Funds, as there is no terminal income fund currently.



A history of consistently strong risk-adjusted performance

● TDF peers in Morningstar universe ● Vanguard Target Retirement Funds



Investors may be in TDFs for decades.

Consistent performance across all market environments is critical.

*Standard deviation was used for annualized risk. Results will vary for other time periods. All funds in the Morningstar peer group with a minimum 3-, 5-, or 10-year history, respectively, were included in the comparison. There may be other material differences between products that must be considered before investing. **Note that the competitive performance data shown represent past performance, which is not a guarantee of future results, and that all investments are subject to risks. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For the most recent performance, visit our website at vanguard.com/performance.***

Sources: Vanguard and Morningstar, Inc., as of March 31, 2024. Vanguard Target Retirement Funds highlighted.



Appendix

IN THIS SECTION:

Absolute performance results



Appendix: Absolute performance results

Average annualized return as of
March 31, 2024

Fund	3 months	Year-to-date	1 year	3 years	5 years	10 years	Since inception	Inception date
Vanguard Target Retirement Income Fund	2.09	2.09	8.47	1.23	4.14	4.14	4.91	10/27/2003
Target Retirement Income Composite Index	2.15	2.15	8.70	1.44	4.44	4.37	—	—
Lipper Target Target Consvr Funds Average	2.55	2.55	8.57	1.19	3.83	3.65	—	—
Fidelity Freedom Income	1.39	1.39	5.85	0.22	2.99	3.28	4.42	10/17/1996
Fidelity Freedom Index Income Investor	1.38	1.38	5.98	0.44	2.92	3.06	3.47	10/2/2009
T. Rowe Price Retirement 2005	3.65	3.65	11.36	2.03	5.39	4.93	5.56	2/27/2004
American Funds 2010 Trgt Date Retire R5	2.72	2.72	8.84	2.75	5.36	5.13	4.97	2/1/2007
BlackRock LifePath Index Retire K	2.57	2.57	9.31	1.05	4.75	4.69	5.04	5/31/2011
State Street Target Retirement K	2.36	2.36	9.06	2.03	4.91	—	4.46	9/30/2014
JPMorgan SmartRetirement® Income R5	3.45	3.45	10.68	1.65	4.50	4.27	4.89	5/15/2006
JPMorgan SmartRetirement® Blend IncomeR5	3.18	3.18	10.32	1.55	4.40	4.24	4.72	7/2/2012
TIAA-CREF Lifecycle Retire Income Instl	3.37	3.37	10.35	2.05	5.17	4.96	4.97	11/30/2007
Vanguard Target Retirement 2020 Fund	2.83	2.83	10.42	1.98	5.60	5.63	5.99	6/7/2006
Target Retirement 2020 Composite Index	2.86	2.86	10.70	2.26	5.96	5.91	—	—
Lipper Target 2020 Funds Average	3.39	3.39	10.47	1.89	5.05	4.64	—	—
Fidelity Freedom 2020	3.71	3.71	11.11	1.56	5.88	5.77	6.53	10/17/1996
Fidelity Freedom Index 2020 Investor	3.16	3.16	10.42	1.60	5.49	5.49	6.61	10/2/2009
T. Rowe Price Retirement 2020	4.44	4.44	13.29	2.76	6.75	6.34	8.00	9/30/2002
American Funds 2020 Trgt Date Retire R5	3.44	3.44	10.73	3.12	6.14	5.90	5.60	2/1/2007
State Street Target Retirement 2020 K	2.54	2.54	9.66	2.22	5.68	—	5.52	9/30/2014
JPMorgan SmartRetirement 2020 R5	3.41	3.41	10.64	1.61	4.67	4.87	5.50	5/15/2006
JPMorgan SmartRetirement® Blend 2020 R5	3.16	3.16	10.44	1.61	4.65	4.87	5.86	7/2/2012
TIAA-CREF Lifecycle 2020 Institutional	3.95	3.95	11.85	2.46	5.96	5.80	5.53	1/17/2007
Vanguard Target Retirement 2025 Fund	3.81	3.81	12.95	2.68	6.55	6.31	6.64	10/27/2003
Target Retirement 2025 Composite Index	3.84	3.84	13.24	3.04	6.99	6.63	—	—
Lipper Target 2025 Funds Average	3.68	3.68	11.12	2.08	5.50	5.20	—	—
Fidelity Freedom 2025	4.43	4.43	12.80	2.11	6.64	6.30	6.40	11/6/2003
Fidelity Freedom Index 2025 Investor	3.73	3.73	11.88	2.10	6.16	6.02	7.32	10/2/2009
T. Rowe Price Retirement 2025	4.90	4.90	14.62	3.09	7.46	6.93	7.15	2/27/2004
American Funds 2025 Trgt Date Retire R5	3.74	3.74	11.98	3.28	6.95	6.59	6.26	2/1/2007
JPMorgan SmartRetirement 2025 R5	3.86	3.86	12.01	2.10	5.66	5.64	5.66	7/31/2007
JPMorgan SmartRetirement® Blend 2025 R5	3.53	3.53	11.61	2.05	5.59	5.62	6.76	7/2/2012
TIAA-CREF Lifecycle 2025 Institutional	4.41	4.41	13.20	2.86	6.68	6.34	5.81	1/17/2007
BlackRock Lifepath Index 2025 K	2.82	2.82	10.04	1.51	5.48	5.57	6.02	5/31/2011
State Street Target Retirement 2025 K	3.50	3.50	11.95	2.72	6.91	—	6.54	9/30/2014

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Data from Vanguard and Morningstar.





Appendix: Absolute performance results *(continued)*

Fund	Average annualized return as of March 31, 2024						Since inception	Inception date
	3 months	Year- to-date	1 year	3 years	5 years	10 years		
Vanguard Target Retirement 2030 Fund	4.57	4.57	14.81	3.35	7.37	6.88	6.74	6/7/2006
Target Retirement 2030 Composite Index	4.52	4.52	15.09	3.71	7.80	7.20	—	—
Lipper Target 2030 Funds Average	4.49	4.49	13.22	2.85	6.57	5.96	—	—
Fidelity Freedom 2030	5.13	5.13	14.56	2.81	7.58	7.11	6.97	10/17/1996
Fidelity Freedom Index 2030 Investor	4.28	4.28	13.42	2.75	7.03	6.83	8.02	10/2/2009
T. Rowe Price Retirement 2030	5.76	5.76	16.81	3.62	8.27	7.56	8.94	9/30/2002
American Funds 2030 Trgt Date Retire R5	4.85	4.85	14.84	4.06	8.00	7.53	6.96	2/1/2007
JPMorgan SmartRetirement 2030 R5	4.81	4.81	14.59	3.06	6.74	6.40	6.53	5/15/2006
JPMorgan SmartRetirement® Blend 2030 R5	4.46	4.46	14.06	2.97	6.69	6.41	7.66	7/2/2012
TIAA-CREF Lifecycle 2030 Institutional	5.23	5.23	15.08	3.49	7.50	6.93	6.10	1/17/2007
BlackRock Lifepath Index 2030 K	3.80	3.80	12.72	2.65	6.67	6.43	6.79	5/31/2011
State Street Target Retirement 2030 K	4.32	4.32	14.15	3.10	7.80	—	7.19	9/30/2014
Vanguard Target Retirement 2035 Fund	5.24	5.24	16.37	4.02	8.17	7.43	7.50	10/27/2003
Target Retirement 2035 Composite Index	5.14	5.14	16.61	4.36	8.59	7.75	—	—
Lipper Target 2035 Funds Average	5.69	5.69	16.16	3.85	7.88	6.90	—	—
Fidelity Freedom 2035	6.26	6.26	17.48	3.97	9.12	8.08	7.33	11/6/2003
Fidelity Freedom Index 2035 Investor	5.25	5.25	16.10	3.87	8.41	7.78	8.92	10/2/2009
T. Rowe Price Retirement 2035	6.80	6.80	19.27	4.28	9.12	8.13	7.89	2/27/2004
American Funds 2035 Trgt Date Retire R5	6.03	6.03	17.84	4.95	9.41	8.55	7.55	2/1/2007
JPMorgan SmartRetirement 2035 R5	6.21	6.21	17.71	4.20	8.33	7.27	6.73	7/31/2007
JPMorgan SmartRetirement® Blend 2035 R5	5.40	5.40	16.33	4.04	7.83	7.15	8.48	7/2/2012
TIAA-CREF Lifecycle 2035 Institutional	6.08	6.08	17.24	4.20	8.39	7.54	6.51	1/17/2007
BlackRock Lifepath Index 2035 K	4.82	4.82	15.29	3.74	7.83	7.24	7.51	5/31/2011
State Street Target Retirement 2035 K	4.92	4.92	15.52	3.39	8.30	—	7.60	9/30/2014
Vanguard Target Retirement 2040 Fund	5.85	5.85	17.94	4.69	8.96	7.95	7.46	6/7/2006
Target Retirement 2040 Composite Index	5.76	5.76	18.15	5.02	9.37	8.28	—	—
Lipper Target 2040 Funds Average	6.75	6.75	18.74	4.70	8.76	7.39	—	—
Fidelity Freedom 2040	7.72	7.72	20.90	5.18	10.34	8.69	5.38	9/6/2000
Fidelity Freedom Index 2040 Investor	6.44	6.44	18.91	5.01	9.58	8.38	9.37	10/2/2009
T. Rowe Price Retirement 2040	7.67	7.67	21.34	4.82	9.84	8.61	9.52	9/30/2002
American Funds 2040 Trgt Date Retire R5	7.18	7.18	20.96	5.79	10.31	9.11	7.91	2/1/2007
JPMorgan SmartRetirement 2040 R5	6.99	6.99	19.72	4.96	9.24	7.87	7.48	5/15/2006
JPMorgan SmartRetirement® Blend 2040 R5	6.17	6.17	18.22	4.80	8.65	7.73	9.06	7/2/2012
TIAA-CREF Lifecycle 2040 Institutional	7.08	7.08	19.83	5.13	9.40	8.18	6.99	1/17/2007
BlackRock Lifepath Index 2040 K	5.70	5.70	17.81	4.74	8.86	7.95	8.16	5/31/2011
State Street Target Retirement 2040 K	5.42	5.42	16.64	3.74	8.80	—	7.93	9/30/2014

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Data from Vanguard and Morningstar.



Appendix: Absolute performance results *(continued)*

Fund	Average annualized return as of March 31, 2024						Since inception	Inception date
	3 months	Year- to-date	1 year	3 years	5 years	10 years		
Vanguard Target Retirement 2045 Fund	6.45	6.45	19.45	5.34	9.74	8.40	8.20	10/27/2003
Target Retirement 2045 Composite Index	6.38	6.38	19.70	5.66	10.14	8.73	—	—
Lipper Target 2045 Funds Average	7.33	7.33	20.00	5.20	9.38	7.85	—	—
Fidelity Freedom 2045	8.28	8.28	21.94	5.53	10.57	8.80	7.15	6/1/2006
Fidelity Freedom Index 2045 Investor	6.86	6.86	19.80	5.29	9.75	8.46	9.48	10/2/2009
T. Rowe Price Retirement 2045	8.18	8.18	22.64	5.27	10.36	8.92	8.42	5/31/2005
American Funds 2045 Trgt Date Retire R5	7.52	7.52	21.94	5.92	10.53	9.29	8.01	2/1/2007
JPMorgan SmartRetirement 2045 R5	7.65	7.65	21.28	5.59	9.92	8.23	7.42	7/31/2007
JPMorgan SmartRetirement® Blend 2045 R5	6.73	6.73	19.69	5.42	9.30	8.06	9.34	7/2/2012
TIAA-CREF Lifecycle 2045 Institutional	7.87	7.87	21.56	5.67	10.14	8.63	6.94	11/30/2007
BlackRock Lifepath Index 2045 K	6.60	6.60	20.16	5.64	9.77	8.55	8.68	5/31/2011
State Street Target Retirement 2045 K	5.82	5.82	17.72	4.00	9.19	—	8.22	9/30/2014
Vanguard Target Retirement 2050 Fund	6.89	6.89	20.44	5.69	9.99	8.53	7.81	6/7/2006
Target Retirement 2050 Composite Index	6.84	6.84	20.76	6.02	10.41	8.87	—	—
Lipper Target 2050 Funds Average	7.67	7.67	20.80	5.43	9.58	7.95	—	—
Fidelity Freedom 2050	8.35	8.35	21.90	5.52	10.56	8.80	7.04	6/1/2006
Fidelity Freedom Index 2050 Investor	6.89	6.89	19.85	5.29	9.77	8.46	9.51	10/2/2009
T. Rowe Price Retirement 2050	8.34	8.34	23.03	5.43	10.47	8.97	7.74	12/29/2006
American Funds 2050 Trgt Date Retire R5	7.70	7.70	22.48	5.86	10.58	9.35	8.04	2/1/2007
JPMorgan SmartRetirement 2050 R5	7.98	7.98	22.03	5.74	10.02	8.28	7.46	7/31/2007
JPMorgan SmartRetirement® Blend 2050 R5	7.03	7.03	20.24	5.57	9.43	8.13	9.41	7/2/2012
TIAA-CREF Lifecycle 2050 Institutional	8.18	8.18	22.43	5.89	10.38	8.78	7.02	11/30/2007
BlackRock Lifepath Index 2050 K	7.24	7.24	21.72	6.22	10.30	8.87	8.99	5/31/2011
State Street Target Retirement 2050 K	6.16	6.16	18.65	4.26	9.53	—	8.36	9/30/2014
Vanguard Target Retirement 2055 Fund	6.88	6.88	20.43	5.69	9.98	8.51	10.12	8/18/2010
Target Retirement 2055 Composite Index	6.84	6.84	20.76	6.02	10.41	8.87	—	—
Lipper Target 2055+ Funds Average	7.79	7.79	21.09	5.54	9.75	8.14	—	—
Fidelity Freedom 2055	8.27	8.27	21.87	5.52	10.56	8.80	8.90	6/1/2011
Fidelity Freedom Index 2055 Investor	6.86	6.86	19.83	5.29	9.76	8.46	8.63	6/1/2011
T. Rowe Price Retirement 2055	8.41	8.41	23.22	5.41	10.44	8.94	7.72	12/29/2006
American Funds 2055 Trgt Date Retire R5	7.83	7.83	23.05	5.81	10.56	9.34	10.56	2/1/2010
JPMorgan SmartRetirement 2055 R5	7.99	7.99	21.98	5.74	10.03	8.29	9.71	1/31/2012
JPMorgan SmartRetirement® Blend 2055 R5	7.07	7.07	20.25	5.61	9.44	8.14	9.37	7/2/2012
TIAA-CREF Lifecycle 2055 Institutional	8.30	8.30	22.65	5.97	10.48	8.86	9.15	4/29/2011
BlackRock Lifepath Index 2055 K	7.55	7.55	22.34	6.42	10.45	8.97	9.14	5/31/2011
State Street Target Retirement 2055 K	6.22	6.22	18.80	4.30	9.52	—	8.37	9/30/2014

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Data from Vanguard and Morningstar.





Appendix: Absolute performance results *(continued)*

Fund	Average annualized return as of March 31, 2024						Since inception	Inception date
	3 months	Year- to-date	1 year	3 years	5 years	10 years		
Vanguard Target Retirement 2060 Fund	6.87	6.87	20.44	5.70	9.99	8.51	9.91	1/19/2012
Target Retirement 2060 Composite Index	6.84	6.84	20.76	6.02	10.41	8.87	—	—
Lipper Target 2055+ Funds Average	7.86	7.86	21.41	5.65	—	—	—	—
Fidelity Freedom 2060	8.23	8.23	21.90	5.50	10.54	—	8.93	8/5/2014
Fidelity Freedom Index 2060 Investor	6.86	6.86	19.85	5.29	9.76	—	8.52	8/5/2014
T. Rowe Price Retirement 2060	8.40	8.40	23.16	5.40	10.44	—	8.68	6/23/2014
American Funds 2060 Trgt Date Retire R5	7.88	7.88	23.21	5.80	10.53	—	9.48	3/27/2015
JPMorgan SmartRetirement 2060 R5	8.06	8.06	21.98	5.75	10.01	—	9.71	8/31/2016
JPMorgan SmartRetirement® Blend 2060 R5	7.05	7.05	20.30	5.66	9.44	—	9.32	8/31/2016
TIAA-CREF Lifecycle 2060 Institutional	8.33	8.33	22.88	6.07	10.61	—	9.17	9/26/2014
BlackRock Lifepath Index 2060 K	7.51	7.51	22.32	6.40	10.43	—	11.42	2/29/2016
State Street Target Retirement 2060 K	6.20	6.20	18.78	4.29	9.56	—	8.36	9/30/2014
Vanguard Target Retirement 2065 Fund	6.88	6.88	20.41	5.72	9.98	—	9.19	7/12/2017
Target Retirement 2065 Composite Index	6.84	6.84	20.76	6.02	10.41	—	—	—
Lipper Target 2055+ Funds Average	7.86	7.86	21.41	5.65	—	—	—	—
Fidelity Freedom 2065	8.24	8.24	21.89	5.52	—	—	10.36	6/28/2019
Fidelity Freedom Index 2065 Investor	6.88	6.88	19.87	5.30	—	—	9.44	6/28/2019
T. Rowe Price Retirement 2065	8.46	8.46	23.21	5.53	—	—	9.93	10/14/2020
American Funds 2065 Trgt Date Retire R5	7.26	7.26	20.26	—	—	—	21.46	3/27/2020
JPMorgan SmartRetirement® Blend 2065 R5	7.86	7.86	23.22	5.81	—	—	16.01	11/1/2022
TIAA-CREF Lifecycle 2065 Institutional	8.54	8.54	23.15	6.26	—	—	11.16	9/30/2020
BlackRock Lifepath Index 2065 K	7.52	7.52	22.26	6.42	—	—	10.43	10/30/2019
State Street Target Retirement 2065 K	6.23	6.23	18.73	4.31	—	—	13.94	3/30/2020
Vanguard Target Retirement 2070 Fund	6.88	6.88	20.51	—	—	—	16.00	6/28/2022
Target Retirement 2070 Composite Index	6.84	6.84	20.76	6.02	10.41	8.76	—	—
Lipper Target 2060+ Funds Average	7.86	7.86	21.41	5.65	—	—	—	—

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Data from Vanguard and Morningstar.



Appendix: Standardized returns

Fund	Average annualized return as of March 31, 2024						Since inception	Inception date
	3 months	Year- to-date	1 year	3 years	5 years	10 years		
Vanguard Total Stock Market Index Fund Institutional Shares	10.00	29.37	9.64	14.25	12.28	8.91	878.51	7/7/1997
Vanguard Total International Stock Index Fund Institutional Shares	4.32	13.00	1.91	6.19	4.48	5.13	94.81	11/29/2010
Vanguard Total Bond Market Index Fund Institutional Shares	-0.79	1.67	-2.41	0.39	1.53	4.21	224.41	9/18/1995
Vanguard Total International Bond Index Fund Institutional Shares	0.10	5.23	-1.68	0.32	2.23	2.26	27.40	5/31/2013
Vanguard Short-Term Inflation-Protected Securities Index Fund Institutional Shares	0.85	3.16	2.23	3.16	2.01	1.68	21.07	10/17/2012

The performance data shown represent past performance. Past performance is no guarantee of future results. Investment returns and principal value will fluctuate, so investors' shares, when sold, may be worth more or less than their original cost. Current performance may be lower or higher than the performance data cited. For performance data current to the most recent month-end, visit our website at vanguard.com/performance. Some funds assess purchase, redemption, and/or account maintenance fees. The performance data shown do not reflect deduction of these fees. If they did, performance would be lower. Details on these fees and adjusted performance figures can be found in the fund detail section.

Data from Vanguard and Morningstar.



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Important information

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Target 2015 Composite Index: An index derived by applying the fund's target asset allocation to the results of the following benchmarks: for international stocks of developed markets, the MSCI EAFE Index through December 15, 2010, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for emerging-market stocks, the Select Emerging Markets Index through August 23, 2006, the MSCI Emerging Markets Index through December 15, 2010, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for U.S. bonds, the Bloomberg U.S. Aggregate Bond Index through December 31, 2009, and the Bloomberg U.S. Aggregate Float Adjusted Index thereafter, as well as the Bloomberg U.S. Treasury Inflation-Protected Securities Index through June 2, 2013, and the Bloomberg U.S. Treasury Inflation-Protected Securities (TIPS) 0-5 Year Index thereafter; for international bonds, the Bloomberg Global Aggregate ex-USD Float Adjusted RIC Capped Index; and for U.S. stocks, the Dow Jones U.S. Total Stock Market Index (formerly known as the Dow Jones Wilshire 5000 Index) through April 22, 2005, the MSCI U.S. Broad Market Index through June 2, 2013, and the CRSP U.S. Total Market Index thereafter.

Target 2020, 2030, 2040, and 2050 Composite Indexes: Indexes derived by applying the fund's target asset allocation to the results of the following benchmarks: for international stocks of developed markets, the MSCI EAFE Index through December 15, 2010, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for emerging-market stocks, the Select Emerging Markets Index through August 23, 2006, the MSCI Emerging Markets Index through December 15, 2010, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for U.S. bonds, the Bloomberg U.S. Aggregate Bond Index through December 31, 2009, and the Bloomberg U.S. Aggregate Float Adjusted Index thereafter; for international bonds, the Bloomberg Global Aggregate ex-USD Float Adjusted RIC Capped Index; and for U.S. stocks, the MSCI U.S. Broad Market Index through June 2, 2013, and the CRSP U.S. Total Market Index thereafter. International stock benchmark returns are adjusted for withholding taxes.

Target 2025, 2035, and 2045 Composite Indexes: Indexes derived by applying the fund's target asset allocation to the results of the following benchmarks: for international stocks of developed markets, the MSCI EAFE Index through December 15, 2010, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for emerging-market stocks, the Select Emerging Markets Index through August 23, 2006, the MSCI Emerging Markets Index through December 15, 2010, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for U.S. bonds, the Bloomberg U.S. Aggregate Bond Index through December 31, 2009, and the Bloomberg U.S. Aggregate Float Adjusted Index thereafter; for international bonds, the Bloomberg Global Aggregate ex-USD Float Adjusted RIC Capped Index; and for U.S. stocks, the Dow Jones U.S. Total Stock Market Index (formerly known as the Dow Jones Wilshire 5000 Index) through April 22, 2005, the MSCI U.S. Broad Market Index through June 2, 2013, and the CRSP U.S. Total Market Index thereafter. International stock benchmark returns are adjusted for withholding taxes.

Important information

Target 2055 Composite Index: An index derived by applying the fund's target asset allocation to the results of the following benchmarks: for international stocks of developed markets, the MSCI EAFE Index through December 15, 2010, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for emerging-market stocks, the MSCI Emerging Markets Index through December 15, 2010, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for U.S. bonds, the Bloomberg U.S. Aggregate Float Adjusted Index; for international bonds, the Bloomberg Global Aggregate ex-USD Float Adjusted RIC Capped Index beginning June 3, 2013; and for U.S. stocks, the MSCI U.S. Broad Market Index through June 2, 2013, and the CRSP U.S. Total Market Index thereafter. International stock benchmark returns are adjusted for withholding taxes.

Target 2060 Composite Index: An index derived by applying the fund's target asset allocation to the results of the following benchmarks: for international stocks of developed markets, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for emerging market stocks, the MSCI ACWI ex USA IMI Index through June 2, 2013, and the FTSE Global All Cap ex U.S. Index thereafter; for U.S. bonds, the Bloomberg U.S. Aggregate Float Adjusted Index; for international bonds, the Bloomberg Global Aggregate ex-USD Float Adjusted RIC Capped Index beginning June 3, 2013; and for U.S. stocks, the MSCI U.S. Broad Market Index through June 2, 2013, and the CRSP U.S. Total Market Index thereafter. International stock benchmark returns are adjusted for withholding taxes.

Target 2065 Composite Index: An index derived by applying the fund's target asset allocation to the results of the following benchmarks: the FTSE Global All Cap ex U.S. Index for international stocks, the Bloomberg U.S. Aggregate Float Adjusted Index for U.S. bonds, the Bloomberg Global Aggregate ex-USD Float Adjusted RIC Capped Index for international bonds, and the CRSP U.S. Total Market Index for U.S. stocks. International stock benchmark returns are adjusted for withholding taxes.

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Immediate variable annuities contain underlying investment portfolios that are subject to investment risk, including possible loss of principal.

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 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.

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