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A case study:

Using active funds to enhance portfolio personalization in workplace advice

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Introduction

For employees in defined contribution (DC) plans, a personalized financial advice portfolio can be key in helping improve their retirement outcomes. A plan's fund lineup—carefully structured with plan sponsor and consultant expertise and designed to maximize value for participants—provides the critical ingredients.

While index funds remain an appropriate choice in DC plans, for good reason, active funds can be a successful part of the ingredient mix. Since our inception, Vanguard has embraced active management as an opportunity to outperform market benchmarks—albeit with additional risks. We believe that incorporating actively managed funds in a retirement portfolio is best accomplished with an investment framework that considers the investor's unique goals, the balance between the investor's risk-return preferences, investing costs, and the investor's ability to adhere to the strategy over the long term.[1]

With the right combination of manager talent, risk awareness, low costs, and investor discipline, active management can complement passive fund strategies, increasing an investor's chance for investment success. Our workplace advice methodology considers a blend of active- and passive-based funds that is tailored to a participant's risk preference. Our goal is to apply a rigorous active-passive optimization process while also including as much of the plan fund lineup as is appropriate in our advice recommendations. Those recommendations adhere to our personalized glide-path methodology, which sets the strategic asset allocation and automatically derisks over time.

From a participant perspective, the experience of selecting from a menu of active funds on your own versus working with an advice provider is akin to being handed a menu by a server who says "I'll be back to take your order" versus one who stays at the table to gather your preferences and make a recommendation. Both modes of service will get you dinner, but the latter is more likely to deliver what you're looking for.

In the sections that follow, we review the methodology for our "active in advice" offer. As part of this highly collaborative four-step onboarding process, our team works closely with the plan sponsor and/or consultant to build a tailored, plan-specific offer. This paper then presents a hypothetical case study to highlight how we apply the methodology—starting with evaluating the plan's active funds for suitability, then bundling active funds to create risk-optimized strategies across asset classes, sizing the active allocation, and, finally, integrating the active recommendation in the participant's portfolio **(Figure 1)**.

FIGURE 1: Optimizing the plan and participant active allocation

What active funds can we use? →	How do we optimally combine active funds? →	How do we size active for different levels of active risk tolerance? →	How do we implement the participant's recommendation?
Vanguard provides additional due diligence to ensure the active funds are suitable for inclusion in advised participants' portfolios.	Vanguard determines individual fund weights to form active equity and fixed income bundles.	The Vanguard Asset Allocation Model sizes the plan's active bundles for high, medium, and low active risk tolerance.	Vanguard assesses the participant's active risk tolerance and matches to the appropriate level of active exposure.

[1] See Patterson et al. (2024).

Recommendation methodology for active in advice

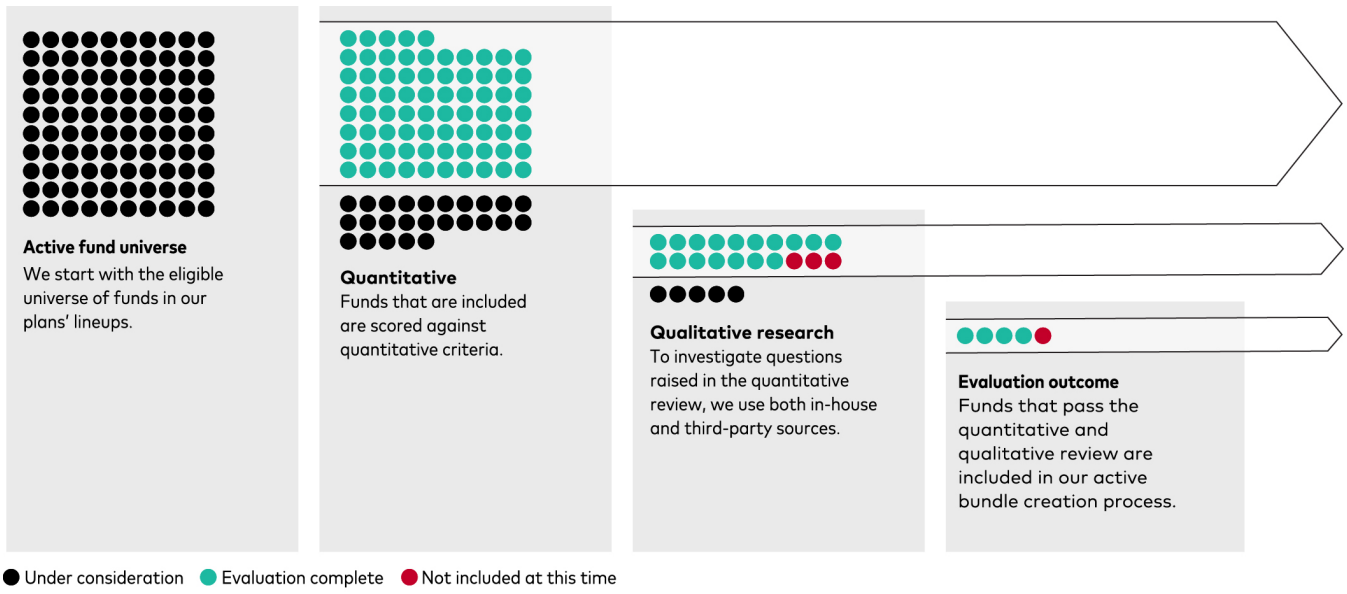
1. Evaluating the funds. To construct the active advice portfolio, we use the actively managed funds within a plan sponsor's lineup. We recognize that plan sponsors and consultants spend considerable time evaluating funds for suitability within their plan. As the participant's advice provider, we have a dedicated team of investment specialists who work with the sponsor to provide an additional layer of due diligence to ensure that the active funds are suitable for inclusion within a participant's advised portfolio. Our approach to evaluating active funds for our managed account offer is both quantitative and qualitative **(Figure 2)**.

Empirical studies conducted by our research teams[2] suggest there are certain quantitative factors important in assessing the odds that a given active fund will outperform. Based on this research, we look at attributes such as cost as a function of a fund's expense ratio and turnover ratio. We found that lower costs are a consistent and effective quantitative factor in improving an investor's odds of higher relative performance because lower costs allow investors to keep more of the returns they earn.

We also consider overall capture ratio, which measures how a portfolio manager has managed the fund during different market conditions. The lower the ratio, the less consistent the manager is in outperforming their benchmark across bull and bear markets. For active fixed income funds, we consider expense ratio and information ratio.[3] Funds with low information ratio, because they either generate low excess returns or take on relatively large amounts of active risk for the excess returns they do generate, are less likely to outperform their benchmarks over time.

While we're confident in the design of our quantitative screen, it can produce false positives in some cases. Thus, we overlay our quantitative approach with qualitative judgment focused on identifying material risk factors that our research suggests are important for improving a fund's odds of outperformance. We'll exclude a fund that we believe doesn't satisfy these quantitative and/or qualitative criteria from our advice recommendations. Our ongoing oversight process involves an annual evaluation of the funds within the plan lineup and takes into account any fund changes made by the plan sponsor.

FIGURE 2. Our active fund evaluation process uses in-house and third-party resources



For illustrative purposes only.

As we scale active funds in Advice from Vanguard, we will encounter more funds that we've previously evaluated in another plan.

[2] See Liu et al. (2024).

[3] Information ratio measures a portfolio manager's ability to generate excess returns relative to a given benchmark on a risk-adjusted basis.

2. Constructing the active bundle. A second team of specialists uses the funds that pass the quantitative and qualitative review described above to create the active bundles. While there are many acceptable ways to optimize the combination of active managers, the method chosen should align with the investor's objectives and the advice provider's conviction in the robustness of available data. A considerable amount of work is necessary to prepare for optimization, including the evaluation of the active funds' risk-return profile. This upfront work provides transparency into each fund's market and factor exposures, relationships between the funds, and any shifts in investment approach over time.[4]

Using risk-based optimization techniques, we create a weighted combination of active funds within each sub-asset class.[5] For example, a domestic equity bundle, an ex-U.S. equity bundle, and a U.S. fixed income bundle are all constructed independently. When necessary, we may apply constraints on maximum or minimum participation of the funds to consider manager diversification. We use historical analysis to form active risk and return expectations for each bundle and combine those with forward-looking assumptions to determine an appropriate allocation to active, as described in the next section.

While we use the bundle construction process to combine multiple active funds, in some cases, "bundles" may comprise a single fund, contingent upon the plan lineup and coverage across asset classes. The degree of concentration within a bundle may influence its active allocation. In other words, there may be a lower recommended active allocation to a riskier, more concentrated portfolio when compared with a bundle that is more broadly diversified across active managers and markets. The inputs into the process are time varying, so we reevaluate the bundle on an annual basis.

3. Creating the active-passive allocation at the plan level. We use the Vanguard Asset Allocation Model (VAAM) and the Vanguard Capital Markets Model® (VCMM) forecasts to identify a suitable active allocation for varying levels of investor risk tolerance, given bundle-specific expected net alpha and tracking error assumptions.[6] VAAM is a proprietary model[7] that optimizes the allocation between active and passive investments based on an alpha and tracking error estimate for the active bundle(s), VCMM's return forecasts for the passive asset classes, and active risk tolerance.[8] In the section below, we describe how we match participants to active-passive portfolios based on their level of active risk tolerance.

More on alpha and tracking error estimation

Together, alpha and tracking error estimates form an active bundle's information ratio expectation—a measure of active return to active risk commonly used to assess manager skill. To estimate the information ratio, we sample from a universe of peer active bundles to form a distribution of information ratios. From that distribution, we select a value that is above the peer-group median in recognition of the rigorous selection process that the funds have undergone. We use this estimated information ratio to inform the bundle's alpha expectation. The bundle's historical tracking error is the basis for its expected active risk.

[4] See Shtekhman et al. (2024) and Appendix for further details.
[5] For the scope of this paper, when referenced, asset class refers to equity and fixed income, where sub-asset class is representative of the U.S. and ex-U.S. exposures within those asset classes.
[6] Net alpha here is defined as an active bundle's expected return, adjusted for costs and investment factors, above that of its benchmark. Tracking error is the factor-adjusted volatility of a bundle's excess returns relative to the benchmark.
[7] See Aliaga-Díaz et al. (2024).
[8] To mitigate model risk and extreme active allocations, we place guardrails around the recommended allocation to each active sub-asset class.

4. Implementing the plan-specific active recommendation in participant portfolios. Vanguard assesses the active risk tolerance of each participant in the Advice from Vanguard offer. A standard measuring stick is used to gauge tolerance for active risk, and then participants can be matched to a plan-specific active recommendation. After this assessment and matchmaking process, Vanguard presents participants with a recommendation for high, medium, low, or no amount of active funds in their portfolio. Because the risk of active funds varies among plans, the active percentage recommended will vary from plan to plan, even when comparing the same level of active risk tolerance.

Applying the framework to a defined contribution plan: A case study

To demonstrate the methodology in practice, we have applied this framework to a hypothetical defined contribution plan and a hypothetical plan participant. For our analysis, we assumed a hypothetical 401(k) plan with a fund lineup of investment options ranging from single-fund solutions, such as target-date funds, to core building-block investments across asset classes, sub-asset classes, and styles.

Additionally, to accommodate participants with a goal of outperformance, the lineup includes actively managed funds to complement the passive options.

Part 1. Evaluating the funds

To fulfill our fiduciary responsibility and ensure the appropriateness of the funds we recommend, we first evaluate the plan's fund lineup to determine which of the actively managed funds meet our quantitative and qualitative criteria for inclusion in advised participant portfolios **(Figure 3)**.

Example of quantitative assessment: U.S. large-cap value fund

This hypothetical domestic equity fund in the plan lineup scored favorably across all attributes in our quantitative screen:

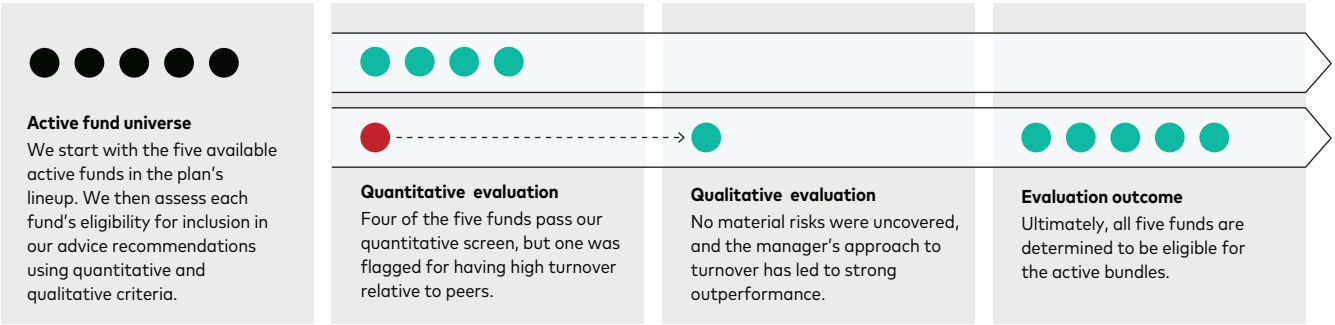
- Expense ratio: The fund's expense ratio is 41 basis points, cheaper than 95% of peers.
- Turnover: The fund exhibits an average five-year turnover of 15%, lower than 89% of peers.
- Capture ratio: The fund's five-year overall capture ratio is high at 1.08, better than 78% of peers.

Example of qualitative assessment: International strategies fund

The international equity fund in the plan lineup scored favorably across most attributes in our quantitative screen. Although it was flagged on turnover criteria, the fund was ultimately included in the portfolio following our qualitative assessment. While the manager employs a higher turnover approach, turnover is a by-product of adds and trims as opposed to new names in the portfolio. This approach generated meaningful returns, as demonstrated by the fund's strong capture ratio figures:

- Expense ratio: The fund's expense ratio is 74 basis points, cheaper than 79% of peers.
- Turnover: The fund exhibits an average five-year turnover of 84%, higher than 88% of peers.
- Capture ratio: The fund's five-year overall capture ratio is high at 1.51, better than 100% of peers.

FIGURE 3. Process map for fund evaluation



Fund evaluation results

All active funds in the plan lineup satisfied our quantitative and/or qualitative evaluation. Now they move to the bundle construction process. We summarize the funds and their respective sub-asset classes and styles in **Figure 4**.

FIGURE 4. Summary of active funds to be included in bundles

Fund	Sub-asset class	Style
U.S. large-cap value fund	U.S. equity	Large value
U.S. large-cap growth fund	U.S. equity	Large growth
U.S. small- and mid-cap core fund	U.S. equity	Mid core growth
International strategies fund	Ex-U.S. equity	Foreign large growth
Total return bond fund	U.S. fixed income	Intermediate core

Sources: Vanguard; Morningstar.

Note: All metrics used in the fund evaluation were determined as of March 2024 using data from Morningstar.

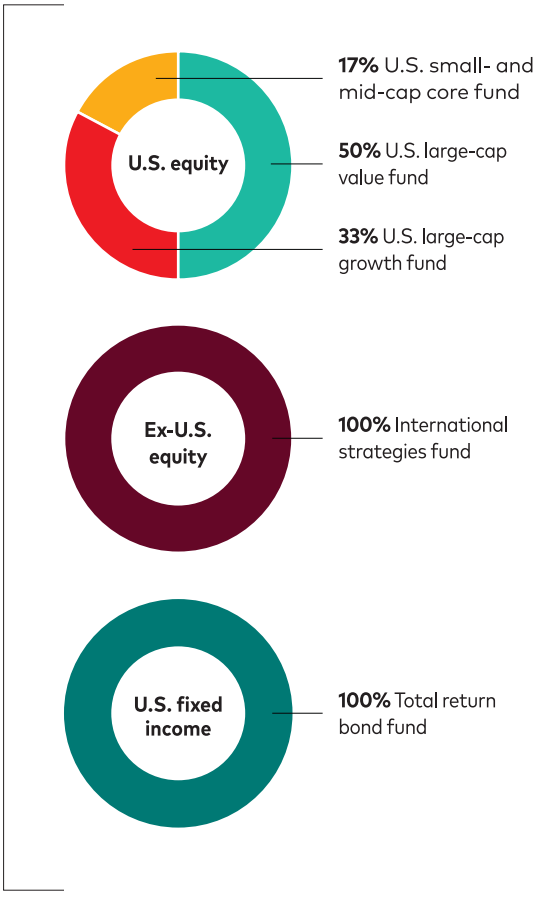
Part 2. Constructing the active bundle

Next, we create active bundles for each sub-asset class in the plan's lineup—in this case, U.S. equity, ex-U.S. equity, and U.S. fixed income. As shown in **Figure 5**, the latter two bundles are each 100% allocated to the single active fund available in their respective asset category. The U.S. equity category, on the other hand, has three active funds, requiring optimization to determine appropriate bundle weights.

FIGURE 5. Summary of active bundle composition

Fund	Sub-asset class	Bundle weight
U.S. small- and mid-cap core fund	U.S. equity	17%
U.S. large-cap value fund	U.S. equity	50%
U.S. large-cap growth fund	U.S. equity	33%
International strategies fund	Ex-U.S. equity	100%
Total return bond fund	U.S. fixed income	100%

Source: Vanguard.



Given the risk-based quantitative techniques we used to combine managers, the U.S. equity bundle composition reflects diversification across market factors. There is limited overlap in the funds' strategies, which is evidenced by the balanced allocations.

- The largest allocation in the U.S. equity bundle is to the U.S. large-cap value fund. While it may not be initially intuitive that a value fund has the largest weighting, a deeper look into the risk-return analytics shows that the fund has mid-cap, growth, and style-neutral exposures as well as a lower expected level of active risk compared with the benchmark.
- The U.S. large-cap growth and U.S. small- and mid-cap core funds employ a more targeted strategy and provide balance to the other factors.

Part 3. Creating the active-passive allocation at the plan level

We determine the active-passive allocation by first estimating alpha and tracking error expectations for each bundle. Then, by using VAAM and VCMM forecasts, we determine an optimal mix of active and passive funds within each asset class for the three levels of active risk tolerance. This optimal mix is what we recommend in advised participants' portfolios **(Figure 6)**.

Looking at the results, we see how VAAM considers both estimated risk (tracking error) and excess return (alpha). For example, while the ex-U.S. equity bundle has a relatively high alpha estimate at 4%, it has a commensurately higher tracking error estimate at 7.9%, leading to a lower allocation compared with U.S. equity.

> VAAM's utility model penalizes tracking error by differing amounts for the three levels of active risk tolerance, leading to the three active risk tolerance allocations for each bundle.

Part 4. Implementing the plan-specific active recommendation in participant portfolios

Assessing participants' active risk tolerance helps evaluate their comfort with including active funds in the advised portfolio. An active risk tolerance score of high, medium, or low enables Vanguard to match the participant to a tailored active recommendation.

FIGURE 6. Active recommendation

			Recommended active allocation (% of sub-asset class)		
Bundles	**Alpha estimation**	**Tracking error estimation**	**High active risk tolerance**	**Medium active risk tolerance**	**Low active risk tolerance**
U.S. equity bundle	0.3%	2.0%	75%	50%	25%
Ex-U.S. equity bundle	4.0%	7.9%	45%	30%	15%
U.S. fixed income bundle	1.4%	3.3%	40%	25%	15%

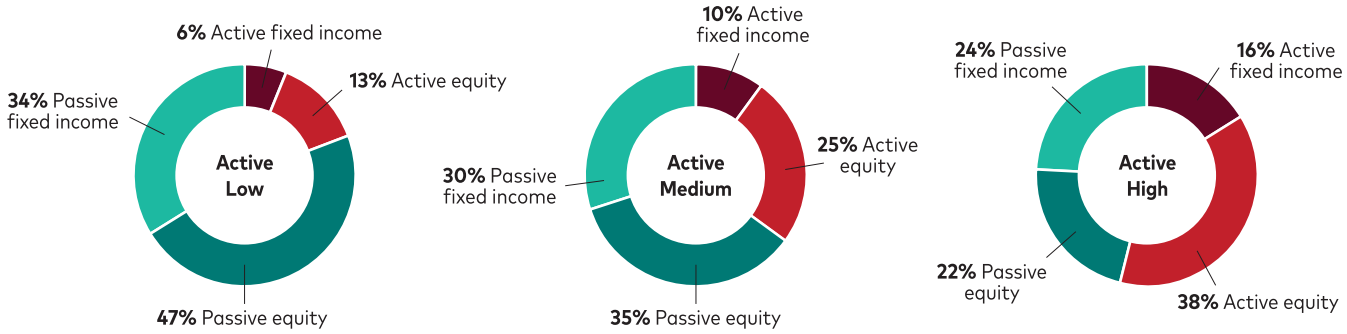
Source: Vanguard.

Consider a participant with a strategic asset allocation target of 60% stocks and 40% bonds at this point along their personalized glide path. The charts below show the implemented active and passive portfolio allocations for each of the three potential levels of active risk. We see how the allocation to active increases from low to medium and medium to high active risk tolerance, while the stock-to-bond mix remains constant at 60%/40% **(Figure 7)**.

FIGURE 7. Participant portfolio view

	Asset class allocation assigned to active	
Active risk tolerance	**Equity**	**Fixed income**
Low	21%	15%
Medium	42%	25%
High	63%	40%

Source: Vanguard.



Note: This sample participant portfolio construction is guided by the market capitalization for the equity home bias recommendation: 60% domestic equity, 40% non-U.S. equity. We display the overall equity and fixed income allocations here for simplicity.

Conclusion

Defined contribution plan sponsors and consultants offer a valuable benefit by selecting funds for the retirement plan that have participants' best interests in mind. From that curated menu, teams of investment specialists from Vanguard advice work with sponsors and consultants in a highly collaborative process. Our active capability goes beyond simply offering active fund options; we aim to deliver active-passive portfolios tailored to participants' tolerance for active risk that enhance their chances for outperformance relative to fund benchmarks and help give them the best chance for retirement success.

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Appendix

Comparing optimization techniques based on inputs and ease of implementation

		Inputs			
Optimization technique	**Ease of implementation**	**Return**	**Volatility**	**Correlations**	**Considerations/ Dependencies**
Input-free (1/N) approach	**Simple**	—	—	—	—
Market capitalization		—	—	—	• Map into style box
Inverse volatility		—	✓	—	• Volatility estimation
Minimum tracking error		—	✓	✓	• Benchmark • Risk estimation • Optimization
Risk parity		—	✓	✓	• Benchmark (if relative) • Risk estimation • Optimization
Outcome risk parity		✓	✓	✓	• Benchmark • Risk estimation • Optimization • Total return • Return autocorrelation
Mean-variance		✓	✓	✓	• Benchmark (if relative) • Risk estimation • Optimization • Risk aversion • Alpha or total return
Maximum information or Sharpe ratio	**Complex**	✓	✓	✓	• Benchmark (if relative) • Risk estimation • Optimization • Alpha or total return

Source: Vanguard.

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