

Understanding the total cost of ETF ownership

Sharpen your approach to minimizing ETF expenses

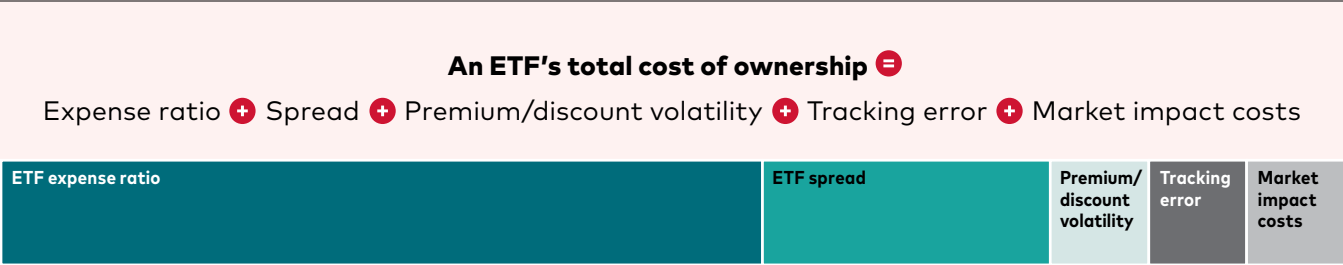
Much has changed since 2000, when investors using pooled investment products were paying fees of nearly 1% a year for equities and 0.76% for fixed income.¹ The rise of indexing—increasingly accessed through exchange-traded funds—has put lasting downward pressure on investment costs.²

Expense ratios among products in a given category frequently differed two decades ago by 10 to 20 basis points, but today these differences are often as low as 1 to 2 bps. (A basis point is one-hundredth of a percentage point.) Given such slight distinctions among competing ETFs' expense ratios, other cost-related factors have become more important when selecting an indexed ETF.

This has led to a shift from comparing ETFs on expense ratio alone to comparing them based on the total cost of ownership, which encompasses a more complete range of dimensions. Broadly, TCO includes an ETF's direct fund expenses (expense ratio), costs of trading (bid/ask spread

and premium/discount volatility), and tracking mismatch between the ETF and its benchmark. But how should investors weigh these different drivers of TCO?

This brochure aims to help investors make more carefully considered judgments as they choose among similar ETFs. We'll explore each of these costs and recommend ways to evaluate an ETF based on each cost factor. We will also make clear how each factor's relative importance depends on the investment's time horizon and portfolio construction goal as well as the size of the trade an investor wishes to make.



Sources: Vanguard, based on data from Bloomberg.

Overall, the value of owning a Vanguard ETF® is the potential advantage of benefiting from our long-term focus on keeping costs low for investors. For those costs that only investors can control, we provide guidance on how to help keep those in check.

1 Source: 2023 Investment Company Fact Book, year 2000 asset-weighted expense ratios for equity and bond mutual funds.
2 Total assets under management in U.S.-listed ETFs as of December 31, 2023, were \$8.1 trillion, based on data from Morningstar, Inc.

ETF EXPENSE RATIO

Expense ratios

We'll discuss expense ratios first because they are pivotal. They're a variable that investors can control, and throughout Vanguard's nearly 50-year history, we have been keeping downward pressure on expense ratios and helping investors to maximize returns.

Moreover, low expense ratios grow increasingly important over time, as they have proven to be a driver of long-term performance.³ Simply put, the less investors pay, the more return they keep. And the more they keep, the more that return can compound over time.

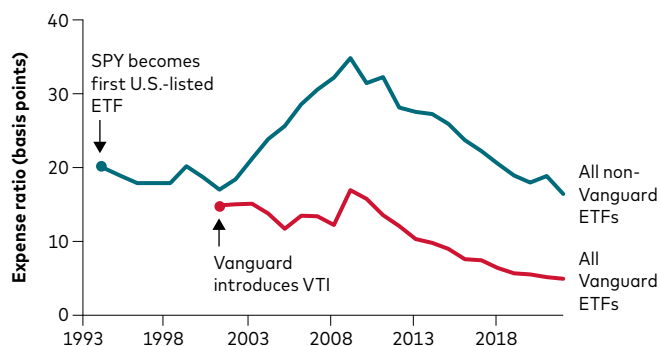
Vanguard fund expense ratios, by design, tend to decrease as a fund's assets under management increase. This in part reflects Vanguard's ownership structure. Vanguard is owned by its funds, which in turn are owned by Vanguard's fund shareholder clients. Because of declining expense ratios, aggregate expense-ratio costs to Vanguard investors will likely have fallen by \$1 billion between 2022 and 2025.⁴

Some other fund sponsors have begun lowering costs to investors, following the trail blazed by Vanguard almost five decades ago. Although some non-Vanguard investment products have expense ratios as low as—and sometimes lower than—Vanguard's, our structure requires that we seek to continue driving down costs for investors.

And as low-cost indexing has become commoditized, issuers have had increasing difficulty distinguishing themselves as the lowest-cost provider. It also shifts the attention to the other costs to consider before deciding on the right ETF to buy.

Across our entire lineup, and viewed through the lens of which products investors actually own, Vanguard remains one of the lowest-cost fund and ETF providers. The chart that follows shows an asset-weighted industrywide comparison of Vanguard ETF expense ratios and those of all other issuers.

ETFs are lowering the cost of investing year by year



Note: SPDR S&P 500 ETF Trust (SPY) launched on January 29, 1993, and Vanguard Total Stock Market ETF (VTI) launched on May 24, 2001.

Sources: Vanguard, based on data from Morningstar, Inc., from January 1993 through December 2022.



What Vanguard offers: Vanguard has a long history of aiming to lower costs, and the industry has followed suit. It's a result of more and more clients trusting their financial future to Vanguard.

³ Source: Bloomberg, based on 10-year returns of all U.S.-listed ETFs that existed within the period from November 17, 2013, through November 17, 2023.

⁴ [How Vanguard plans to return \\$1 billion to shareholders by 2025](#). Vanguard, February 1, 2022.

How bid-ask spreads can add to costs

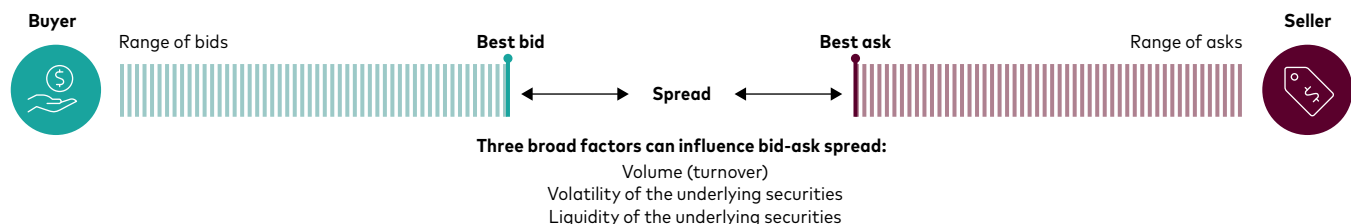
The bid-ask spread—the difference between the highest price a buyer is willing to pay and the lowest price a seller is willing to accept—is at the center of every ETF trade and is an explicit cost realized when buying or selling an ETF.

Many market forces influence the bid-ask spread. Ultimately it's set by market participants, which include the investing public as well as institutions that make markets in an ETF.

At least three broad factors go into the spread, which in turn reflects the overall characteristic of a market in a particular ETF. These factors are:

- **The ETF's volume, or turnover; lower volume often points to wider spreads.** If an ETF turns over quickly, the market maker carries less market-movement risk and can set the spread tighter. For ETFs with lower volume, the market-movement risk grows, because recycling that risk takes more time, leading to wider spreads. Wider spreads are the only way a market maker can recoup the costs of holding securities for longer.
- **Volatility of the ETF's underlying securities; broader market volatility often affects spreads.** Besides the time it takes to turn over that risk, the speed at which prices are
- changing is a crucial factor in determining where to set those bids and offers. In fast-moving markets, market makers must provide a larger range between the prices at which they're willing to buy and sell a security. That's because if they buy and the market quickly turns against them, they could end up selling for a lower price and taking a loss.
- **Liquidity of the underlying securities; lower liquidity generates wider bid-ask spreads, especially when the ETF's volume is lower.** An S&P 500 ETF, in which all the underlying stocks are readily tradable, would be relatively easy to buy or sell in any market. So we would expect such an ETF to trade with a tight spread that reflects the underlying basket of securities. But other ETFs, such as one that holds small-capitalization stocks, might see more frequent liquidity-constrained environments that make it harder to buy and sell the underlying securities at a fair price. This could affect the ETF's spreads more significantly.

What's a bid-ask spread, and what goes into one?



Source: Vanguard.



What Vanguard offers: Vanguard has some of the most liquid ETFs on the market today. Part of our goal is to offer ETFs with broad use cases, which results in greater applicability and liquidity. In many cases, investors don't have to choose between a low expense ratio or a low spread, because we aim to—and often are able to—provide both.

Expense ratios and spreads in the real world

Because both expense ratios and trading spreads are explicit costs to the investor, keeping both to a minimum is optimal. Depending on an investor's time horizon, one may matter more than the other. Specifically, for shorter holding periods, spread matters more. For longer periods, expense ratio will matter more.

But when do you cross over from a short period to a long one? It's sooner than you may think.

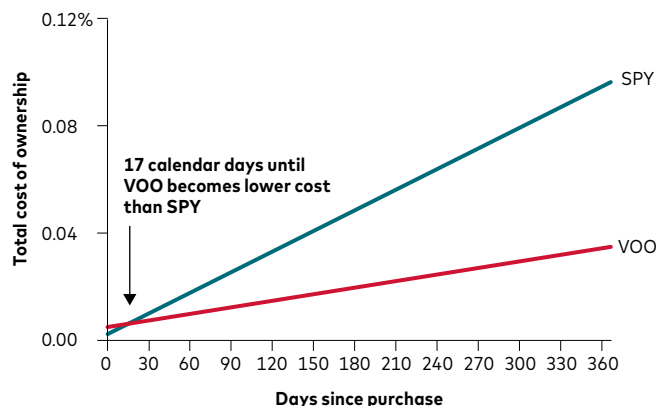
Some categories—such as credit ETFs, S&P 500 ETFs, and Treasury ETFs—tend to have high liquidity and trading volume. The high liquidity is a result of some investors, particularly institutions, using such ETFs to quickly gain exposure to a sector or sub-asset class and then get out. This liquidity can result in tighter spreads that all investors benefit from. Some ETFs with high liquidity may have higher expense ratios too, but if you must choose between two similar ETFs, when should you choose the one with the tighter spread versus the lower expense ratio?

At Vanguard, we believe that keeping both expense ratio and spread costs low is important to an ETF's viability, and we aim to keep both low. Still, if you face a choice between two similar ETFs with different spreads and expense ratios, consider their breakeven, as illustrated by the two examples on the next page.

In the first example, SPDR S&P 500 ETF Trust (SPY) trades at a lower spread than Vanguard S&P 500 ETF (VOO), and in the second example, iShares iBoxx \$ Investment Grade Corporate Bond ETF (LQD) trades at a lower spread than Vanguard Intermediate-Term Corporate Bond ETF (VCIT). So the cost to initiate ownership in VOO and VCIT is higher. However, the lower expense ratios of VOO and VCIT give investors in each of those ETFs an advantage the longer they hold it. This advantage starts at 17 days of ownership for investors in VOO compared with SPY. For investors in VCIT, the advantage starts at 13 days of ownership compared with LQD. In both cases, the savings only increase the longer that either ETF is held.

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Total cost of ownership: VOO versus SPY



ETF	Benchmark	Investment objective
VOO	Standard & Poor's 500 Index	The Fund seeks to track the performance of a benchmark index that measures the investment return of large-capitalization stocks.
SPY	Standard & Poor's 500 Index	The Trust seeks to achieve its investment objective by holding a portfolio of the common stocks that are included in the Index (the "Portfolio"), with the weight of each stock in the Portfolio substantially corresponding to the weight of such stock in the Index.

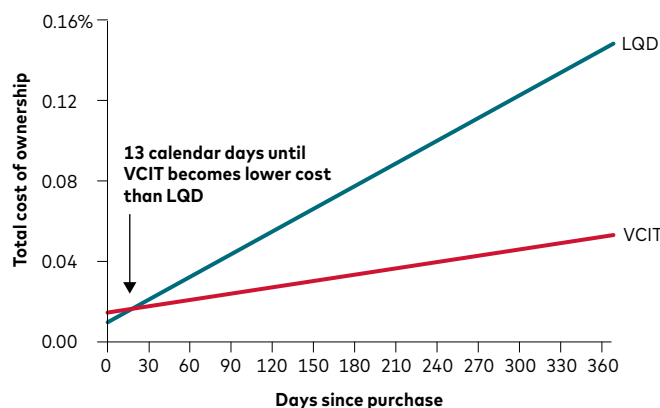
Total cost breakdown

ETF	Expense ratio	Round-trip bid-ask spread	Total cost of ownership per \$100,000		
			1-year	5-year	10-year
VOO	0.0300%	0.0051%	\$35.15	\$155.15	\$305.15
SPY	0.0945%	0.0024%	\$96.86	\$474.86	\$947.36

Notes: The figure compares Vanguard S&P 500 ETF (VOO) and SPDR S&P 500 ETF Trust (SPY). There may be other material differences between products that must be considered prior to investing. Expense ratios are as per the most recent prospectus for each ETF. Bid-ask spread totals may appear off due to rounding of displayed data. Bid-ask spreads appearing throughout this brochure are time-weighted averages for each trading day in 2022. Round-trip refers to adding the bid-ask spread at the time of purchase to the bid-ask spread at the time of sale. Spreads have historically been wider in volatile markets and relatively narrow in low-volatility markets.

Sources: Vanguard, based on data from Morningstar, Inc.

Total cost of ownership: VCIT versus LQD



ETF	Benchmark	Investment objective
VCIT	Bloomberg U.S. 5-10 Year Corporate Bond Index	The Fund seeks to track the performance of a market-weighted corporate bond index with an intermediate-term dollar-weighted average maturity.
LQD	Markit iBoxx USD Liquid Investment Grade Index	The Fund seeks to track the investment results of an index composed of U.S. dollar-denominated, investment-grade corporate bonds.

Total cost breakdown

ETF	Expense ratio	Round-trip bid-ask spread	Total cost of ownership per \$100,000		
			1-year	5-year	10-year
VCIT	0.0400%	0.0133%	\$53.25	\$213.25	\$413.25
LQD	0.1400%	0.0098%	\$149.84	\$709.84	\$1,409.84

Notes: The figure compares Vanguard Intermediate-Term Corporate Bond ETF (VCIT) and iShares iBoxx \$ Investment Grade Corporate Bond ETF (LQD). There may be other material differences between products that must be considered prior to investing. Expense ratios are as per the most recent prospectus for each ETF. Bid-ask spread totals may appear off due to rounding of displayed data. Bid-ask spreads appearing throughout this brochure are time-weighted averages for each trading day in 2022. Round-trip refers to adding the bid-ask spread at the time of purchase to the bid-ask spread at the time of sale. Spreads have historically been wider in volatile markets and relatively narrow in low-volatility markets.

Sources: Vanguard, based on data from Morningstar, Inc.

Understanding ETF premiums and discounts

ETFs sometimes trade at a value that's disconnected from their actual net asset value (NAV). When an ETF fetches a market price above NAV, it's said to be trading at a *premium*, and when it trades below NAV, it's said to be trading at a *discount*.

The price of an ETF reflects multiple factors:

- 1 Current supply and demand for that ETF.
- 2 Fair value of the ETF's current constituents.
- 3 Costs related to the underlying constituents.

The creation-redemption mechanism allows market makers and fund sponsors to keep the supply of shares in line with the demand for the ETF. Assuring that this mechanism runs smoothly is important for keeping the ETF's price and, by extension, its premium or discount in line with its fair value.

Unlike expense ratios and spreads, a premium or discount is not an explicit cost. In fact, ETF premiums and discounts don't always result in transaction costs, which makes quantifying them more difficult. Costs related to the premium or discount become more apparent when an investor sells.

The biggest risk arises when an investor buys an ETF when it's trading at a substantial premium and then sells it at a substantial discount.

This is why focusing on the *volatility* of the premium and discount is more important than looking solely at specific premiums or discounts. The volatility reflects an *uncertainty cost*, with higher volatility meaning a greater probability that an investor will realize a cost upon selling. So plan ahead by taking note of the ETF's volatility, and beware of selling during volatile market environments, when an ETF may be facing sell-side pressure.

The creation-redemption mechanism allows market makers and fund sponsors to keep the supply of shares in line with the demand for the ETF.

Premiums and discounts in the real world

To illustrate why being mindful of premiums and discounts is important, it's helpful to look at two ETFs—we'll call them A and B—for which premiums and discounts manifest in different ways.

Although the average premium of 18 basis points for ETF A might at first blush seem to be a bigger risk than the average premium of zero basis points for ETF B, this is not the case.

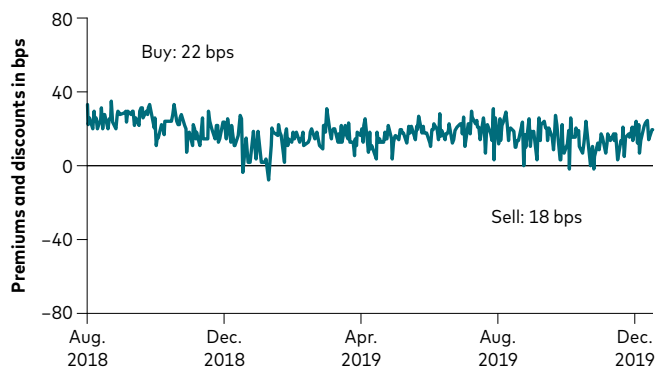
That's because the volatility that ETF B exhibits turns out to be potentially create the worst-case scenario of buying high and selling low, versus the relatively stable premium for ETF A. As the figure that follows shows, it's the difference between transaction costs of 4 bps in ETF A and 125 bps in ETF B.

Because it's tough to know where either ETF will trade on a given day, observing the volatility—as measured by standard deviation—can help an investor plan ahead. In this case, the volatility of ETF A's premium is 7 bps, versus more than double that for ETF B at 18 bps.

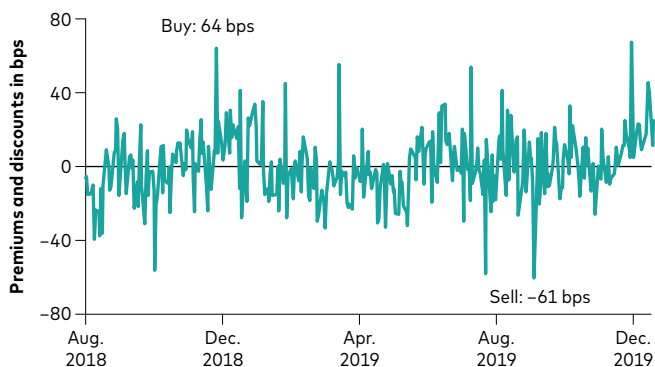
The takeaway is that a steady premium, as ETF A shows, is likely to lead to more consistently favorable trading outcomes than with the higher volatility in ETF B's premium or discount.

Comparing premiums and discounts on two ETFs

ETF A. Average premium of 18 basis points



ETF B. Average premium of zero basis points



Note: A basis point is one-hundredth of a percentage point.

Sources: Vanguard, based on data from Morningstar, Inc., from August 2018 through December 2019.



What Vanguard offers: Our experts in managing our ETFs' markets are constantly monitoring them to help ensure that supply and demand for the ETFs remain in balance. Said another way, they seek to make sure that secondary market mechanics are working as expected.

Tracking error and excess returns

To define what tracking error is, it might be best to identify what it isn't. It's not how much an ETF's performance deviates from that of its benchmark index for a given period—that's known as excess returns. It's about how much those excess returns oscillate around the portfolio's benchmark during that period.

Tracking error is measured as the standard deviation of excess returns over time, and it indicates how consistently closely (or not) an index ETF follows its benchmark's performance. Although absolute excess return is important over the longer term, we find that many investors don't pay as close attention to the volatility of excess returns.

But why should investors keep watch on that volatility? And why do we consider it a cost? For investors using index products, any doubt about performance adds an *uncertainty cost*. Depending on an investor's time horizon, that cost can be even greater than the ETF's expense ratio or trading spread.

Equity index fund managers can more easily track their benchmark's holdings by replicating the index, but fixed income presents distinct challenges for index fund managers. They must optimize their portfolios to track the index as best they can, matching key characteristics such as duration and yield—not holdings—to trace the benchmark's performance as closely as possible.

Because of this, fixed income index ETFs are more vulnerable to higher tracking error than equity index ETFs. To keep tracking error under control, this nuanced process requires sophisticated managers.

Given the distinct challenges of managing fixed income portfolios, conducting due diligence on fund sponsors is a crucial step toward ensuring an allocation to the product with the best chance of delivering the exposure and benchmark returns that investors should expect.

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Tracking error in the real world

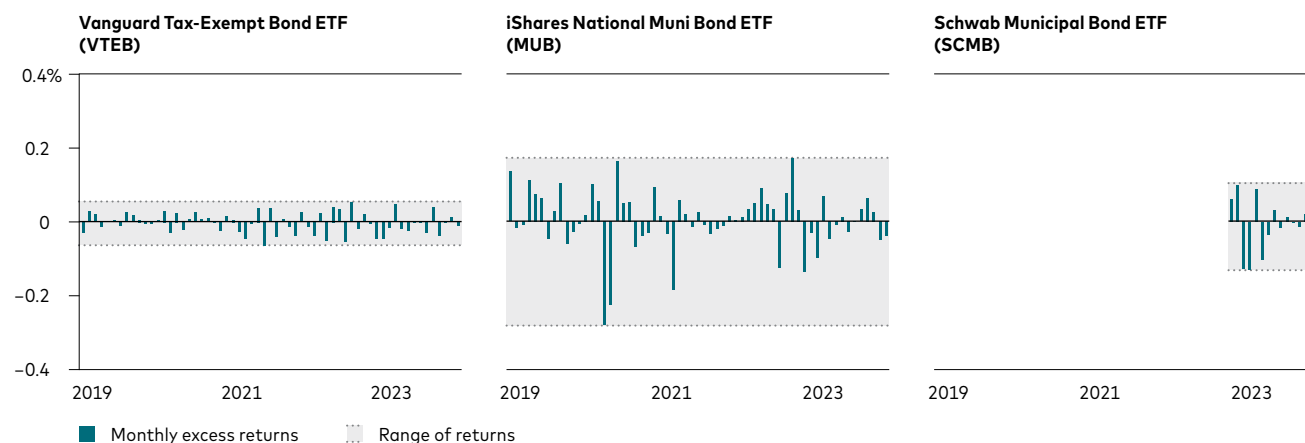
To illustrate why tracking error can have an outsize impact on potential returns, we compare three municipal bond index ETFs, each with holdings across the broad municipal bond yield curve: Vanguard Tax-Exempt Bond ETF (VTEB), iShares National Muni Bond ETF (MUB), and Schwab Municipal Bond ETF (SCMB).

While their inception dates differ significantly, their monthly excess returns and tracking error over time illustrate key differences among similar products.

Excess returns measure a straight arithmetic performance deviation over the given period. Tracking error—the more meaningful metric—

shows the consistency of keeping the fund's returns in line with its benchmark. In this case, VTEB's tracking error is 10 bps and MUB's is 28 bps. A higher tracking error means a higher risk of being out of sync with the benchmark's performance.

Comparing tracking error on three muni bond ETFs



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

Notes: Bars represent an ETF's monthly excess returns; dotted lines represent the bounds of the largest excess returns recorded during the given period; shaded areas represent the range between those bounds. For VTEB and MUB, the period shown is December 31, 2018, through December 31, 2023. For SCMB, the period shown is November 30, 2022, through December 31, 2023. Excess returns for each ETF are measured against its primary prospectus benchmark. The three ETFs are similar in that they all span the municipal bond yield curve.

Sources: Vanguard calculations, based on data from Morningstar, Inc., as of December 31, 2023.

See the Appendix on page 15 for full standardized performance data for these three ETFs.



What Vanguard offers: The main driver for our portfolio managers is to minimize tracking error within an acceptable range for each fund. Adding positive excess returns is satisfying, as long as it doesn't significantly affect tracking error. This means that our incentives are aligned with investors' peace of mind—that they're getting their intended exposure to the market.

MARKET IMPACT COSTS

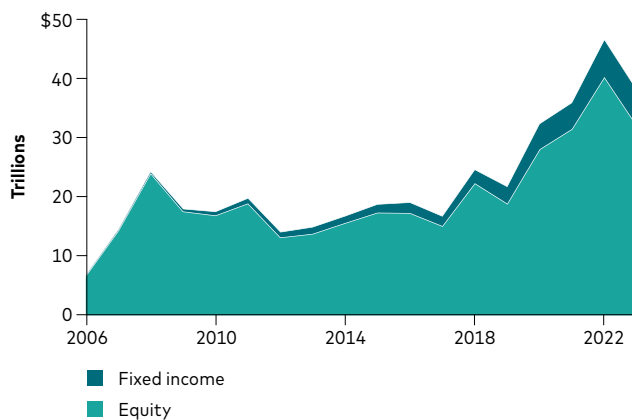
Mastering ETF liquidity to help control market impact costs

As ETF usage increases and larger trades become more frequent, advisors have an opportunity to perfect how they approach big trades, such as rebalancing trades. Advisors who weigh different trade considerations carefully to avoid any surprises and to achieve the best execution can potentially increase the chances for optimal client outcomes.

With surging interest in ETFs comes more ETF trading, and more ETF trading means that bigger trades are more frequent. As a trade grows larger, so does the risk of higher market impact costs. This is when a solid understanding of market liquidity and the people who can help find it comes in handy.

With 30-plus years of market history of ETFs, it's clear that having two robust layers of liquidity—many securities packaged inside a trading vehicle that itself is also listed on an exchange—has been crucial to the rise of ETFs.

Equity and fixed income ETF trading volumes since 2006



Source: Bloomberg, based on annual equity and fixed income ETF trading volumes, measured in dollar value, from 2006 through 2023.

Somewhere between 80% and 90% of all Vanguard ETF volume in 2022 occurred on the secondary market.⁵ That's where any investor with a brokerage account can access the universe of U.S.-listed ETFs. Average daily volume, or ADV, reflects the state of an ETF's secondary market liquidity. It is one metric that investors can use to assess the likelihood of fulfilling their trades smoothly and without excess cost.

Having so much volume staying in the secondary market means that 10% to 20% of that volume of Vanguard ETFs is linked to the primary market. That's where ETF shares are created (or redeemed) by capital market professionals called authorized participants and market makers.

Only when the secondary market demand is disconnected from the ETF's supply does the primary market for ETFs kick in, providing a crucial additional layer of liquidity. This need, as well as the cost to investors for this added liquidity, depends greatly on the liquidity of a portfolio's underlying securities.

Whenever our Capital Markets Desk takes a call to help clients smoothly execute a big or complex ETF trade, we seek to help them take advantage of the distinct features of primary and secondary market liquidity to help achieve the best trading outcomes.

⁵ Source: Vanguard, from January 2022 through December 2022.

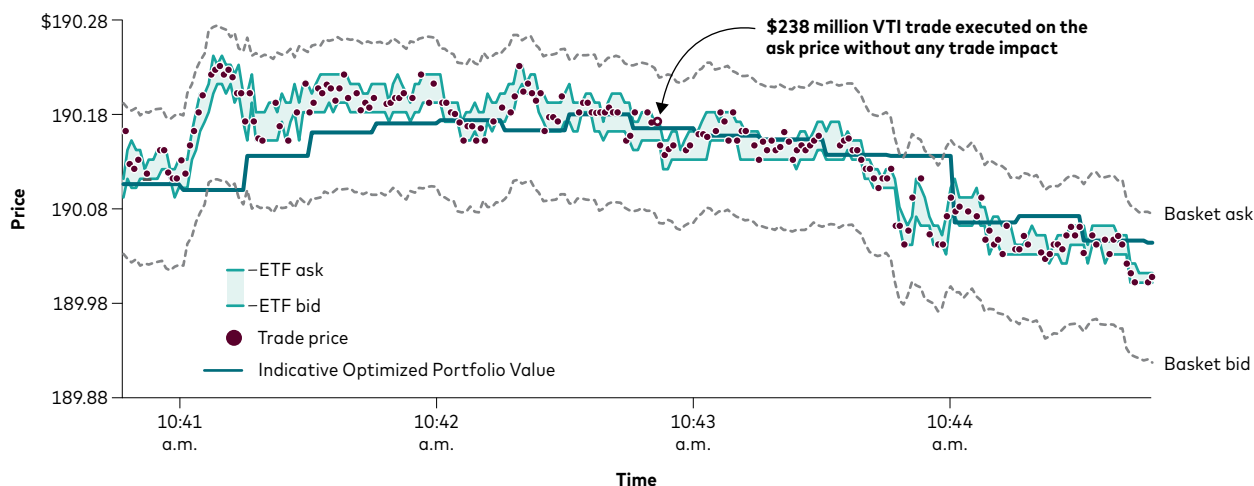
Execution costs in the real world

Contacting our ETF Capital Markets Desk can be a big help for strategizing ahead of time when you're planning a large ETF trade.

Among our successful large executions was a \$238 million trade of Vanguard Total Stock Market ETF (VTI) in December 2022. The trade amounted to 28% of VTI's ADV, so we had to source primary market liquidity in addition to secondary market liquidity. The trade got done at the ask price of the bid-ask spread—a result that qualified as a successful transaction, as the next figure shows.

The key approach in this instance was to make full use of the ETF's two liquidity sources. Using the right trading strategy and, at times, the help of our ETF Capital Markets Desk, ETFs can allow investors to take advantage of both these sources to help achieve optimal trade execution.

Anatomy of a large VTI execution



Past performance is no guarantee of future returns.

Notes: Figure illustrates a trade involving Vanguard Total Market Stock ETF (VTI) during the December 22, 2022, trading session. It includes the ETF bid and offer as well as the bid and offer on the ETF's underlying basket of securities.

Source: Vanguard.



What Vanguard offers: Vanguard has longstanding experts who have deep relationships with market makers, a deep understanding of trading strategies, and a deep commitment to helping clients get fair execution. They can guide you through those difficult trades.

Big trade, little trade

ETFs are listed on stock exchanges and can trade like individual stocks, but it's crucial for investors to understand how ETFs are unlike stocks. A look at ETF trading and market impact costs is the best way to draw the distinction.

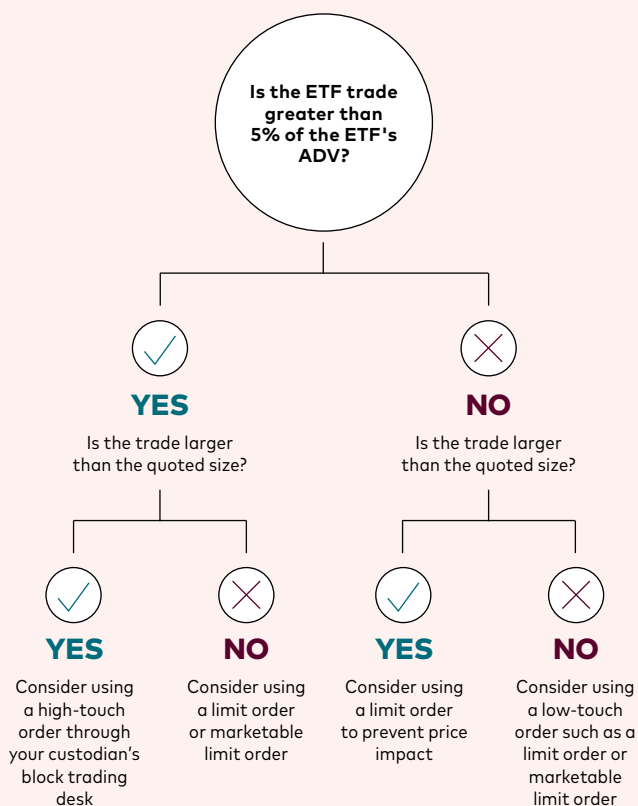
The first crucial aspect of ETF trading is to gauge the difference between small trades and big trades, or what we call low-touch and high-touch trades.⁶

Whether to use low-touch or high-touch order types depends on how big your planned trade is compared with the ETF's liquidity profile. If the trade will exceed 5% of the ETF's average daily volume, it's important to pause and reflect on a few other considerations before submitting any kind of order. You may have experience submitting low-touch orders in this scenario, but before doing so again, consider our preference for marketable limit orders. These are limit orders priced for immediate execution.⁷

If the trade size exceeds both 5% of ADV and the quoted size available on the bid/offer, you may have to consider whether your order is large enough to result in the creation or redemption of ETF shares.⁸ If your ETF trade meets these criteria, consider working with your custodian's block trading desk to execute the trade using a high-touch order type.

Vanguard's ETF Capital Markets Desk team is available to assist in the execution of trades throughout the decision-making process, increasing the likelihood of a successful outcome. If you're expanding your ETF business, consider reaching out to our Capital Markets Desk and using the ETF decision framework to avoid ETF trades that could harm client outcomes.

ETF trading decision tree



Source: Vanguard.

⁶ Low-touch orders refer to "held orders" that are held to the national best bid and offer (NBBO) price. High-touch orders give a broker time and price discretion to execute the order and aim to achieve the best price available. They are also called "not held" orders, since they are not held to the NBBO.

⁷ Vanguard's ETF Capital Markets Desk typically recommends that investors consider using limit orders or marketable limit orders to avoid any unexpected ETF executions. In our view, marketable limit orders may represent the best of both worlds in that executions are quick and include safeguards that market orders lack.

⁸ ETFs are created and redeemed in unit sizes. Generally, 25,000 ETF shares is the minimum needed to facilitate a creation or redemption; however, creation unit size can vary by product.

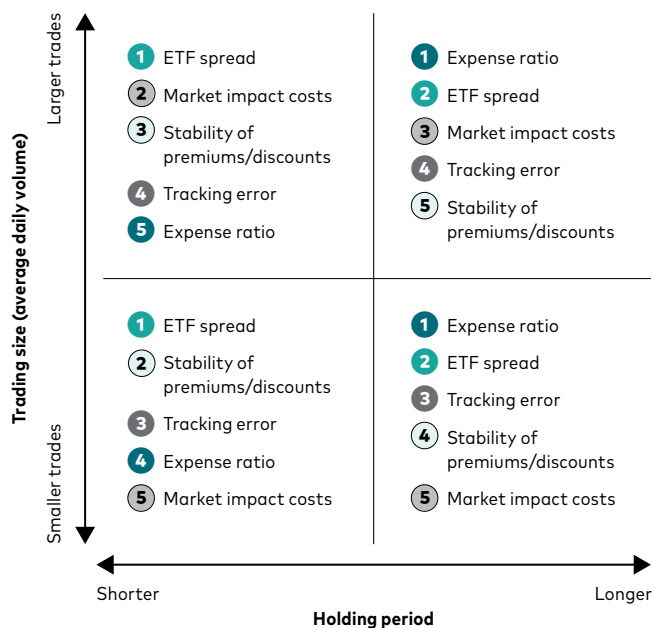
Key takeaways

There's probably no ETF that will be the lowest-cost across all five cost factors when comparing similar ETFs. And, while some factors have a greater impact on long-term investment results, the optimal ETF depends on an investor's objective.

Which cost factor matters more depends on your answers to two questions: "What's my holding period?" and "How large is my trade?"

- Expense ratio tends to most strongly affect long-term returns, no matter the trading strategy. So although the expense ratio may be a lesser consideration for short-term holdings, investors should strive to keep it low over the long term.
- Spreads have the next-largest impact on returns as long as a trade is small enough to execute within the ADV on the secondary market. Spreads can be more important than expense ratio if the holding period is short, but as the holding period increases, a lower expense ratio matters more.
- If the trade is large enough to require the primary market, the liquidity of the underlying securities within the ETF's basket—as measured by the basket spread—becomes a more important consideration.
- Like spread, premium/discount volatility is important to consider, especially in turbulent markets when liquidity is strained. Overall, premium/discount volatility can be more important to consider if the holding period is short, but it can become less important as holding periods lengthen.
- Finally, tracking error tends to be equally important across all time horizons and trade sizes. In the short term, a high tracking error means higher uncertainty in performance, thus eroding the value of a short holding period. In the long term, tracking error can be used to evaluate how consistently an index fund manager is meeting benchmark returns over time.

Importance of cost factors by holding period and trade size



Source: Vanguard.

Owning a Vanguard ETF means knowing that Vanguard strives to give investors the best chance at investment success, including minimizing the friction of investment costs at all times. This doesn't mean that all 86 Vanguard ETFs are the lowest in their cost category. But because Vanguard is owned by its funds, which in turn are owned by Vanguard's fund shareholder clients, this means that we are your partner, focusing on your long-term success.

Appendix

Standardized performance of VTEB, MUB, AND SCMB

		Vanguard Tax-Exempt Bond ETF (VTEB)	iShares National Muni Bond ETF (MUB)	Schwab Municipal Bond ETF (SCMB)
Inception date		8/21/2015	9/7/2007	10/12/2022
Expense ratio		0.05%	0.05%	0.03%
1-year returns	NAV	6.20%	5.86%	5.87%
	Market price	6.15%	5.56%	5.86%
3-year returns	NAV	-0.36%	-0.29%	—
	Market price	-0.41%	-0.40%	—
5-year returns	NAV	2.23%	2.21%	—
	Market price	2.21%	2.14%	—
10-year returns	NAV	—	2.79%	—
	Market price	—	2.82%	—
Returns since inception	NAV	2.34%	3.27%	7.29%
	Market price	2.34%	3.31%	7.52%

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 [vanguard.com/performance](https://www.vanguard.com/performance). The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index. There may be other material differences between products that must be considered prior to investing.

Sources: Returns are as per Morningstar, Inc., as of December 31, 2023; expense ratios are as per the most recent prospectus for each ETF as of December 31, 2023.

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