



Choosing between ETFs and mutual funds: Strategy, then structure

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- An investor's decision to use an exchange-traded fund (ETF) versus a conventional mutual fund is a portfolio-implementation decision, rather than a choice of investment strategy.
- In terms of product structure, ETFs are more similar to mutual funds than they are different. Both vehicles offer the benefits of pooled investing, primary regulation under the same laws, and an ability to issue new shares and redeem existing shares that allows investors to transact at a fair price.
- Four key factors should be considered when deciding between using ETFs and mutual funds: investment strategy, trading flexibility, accessibility, and costs.
- For investors who prefer a greater variety of index-based strategies, the ability to trade intraday with various order types, and more open fund access, ETFs may be the better choice. However, for investors who want a greater variety of traditional actively managed strategies, the trading convenience of mutual funds, and the breadth of mutual funds available on their trading platform, mutual funds may be preferable. Costs are a function of both ongoing costs and transaction costs, and may depend largely on the time horizon of the investment.

Mutual funds and exchange-traded funds (ETFs) have become popular options for investors around the world. As of June 30, 2015, total ETF assets stood at \$2.9 trillion globally, representing 11% of overall fund assets. In the United States, ETFs have recently grown at a more rapid pace than mutual funds. For the ten years ended June 30, U.S.-listed ETF assets expanded at an annual rate of 24%, to \$2.1 trillion—increasing from just 4% to 14% of overall fund assets. Today, investors can select from more than 1,500 ETFs and close to 8,000 mutual funds in the United States alone.¹

This paper focuses on helping investors make an informed decision between mutual funds and ETFs as product vehicles. We reiterate that although the product-vehicle decision is clearly important, research has shown that the asset allocation decision is the crucial determinant of portfolio performance, since it explains the vast majority of the variability of investors' returns² and is the starting point for the portfolio-construction process.³

Similarities between mutual funds and ETFs

Mutual funds and ETFs share many key characteristics. Both are pooled vehicles that provide exposure to various markets, diversification, and generally reasonable investment costs; they are primarily regulated by the same laws; and they issue new shares and redeem existing shares to meet investor demand. Both structures have conveniently enabled investors to implement asset allocation decisions when building diversified investment portfolios. **Figure 1** shows how similarly mutual fund and ETF investors have allocated assets across broad categories.

As of June 30, 2015, 96% of ETF assets were invested in ETFs organized and regulated as registered investment companies under the U.S. Investment Company Act of 1940 (1940 Act), the same regulatory regime that governs U.S. mutual funds. The 1940 Act provides for a host of investor protections, including requiring a fund to hold at least 85% of its net assets in liquid assets, constraining

Notes about risk and performance data: Investments are subject to market risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. Be aware that fluctuations in the financial markets and other factors may cause declines in the value of your account. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. We recommend that you consult a tax or financial advisor about your individual situation.

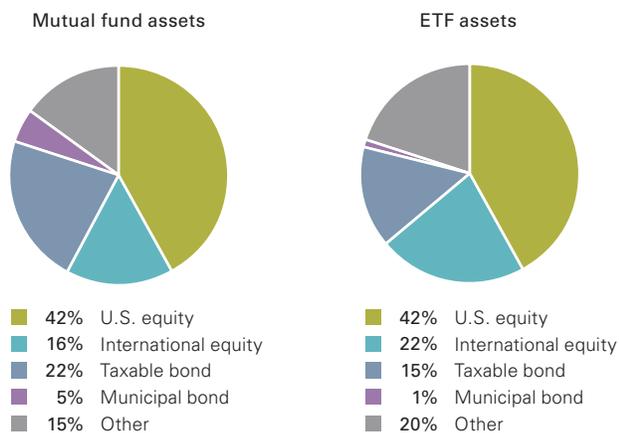
Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. U.S. government backing of Treasury or agency securities applies only to the underlying securities and does not prevent share-price fluctuations. Because high-yield bonds are considered speculative, investors should be prepared to assume a substantially greater level of credit risk than with other types of bonds. Diversification does not ensure a profit or protect against a loss in a declining market.

¹ Unless otherwise stated, all data points in this paper are derived from Vanguard calculations using Morningstar, Inc., as of June 30, 2015. The data include mutual funds (open-end funds) and what are sometimes referred to as exchange-traded products such as open-end ETFs, unit investment trust ETFs, grantor-trust ETFs, and partnership ETFs. We have excluded exchange-traded notes (ETNs) from this universe of exchange-traded products, as well as from the text discussion here, because ETNs actually are debt instruments and not true investment funds.

² See Brinson, Hood, and Beebower (1986), for further discussion of asset allocation.

³ See Donaldson et al. (2013), for further discussion of top-down portfolio construction.

Figure 1. Mutual fund and ETF investors display similar allocations



Notes: Asset classes are represented by Morningstar’s “U.S. Category Group” designation. Data reflect funds that existed as of June 30, 2015.

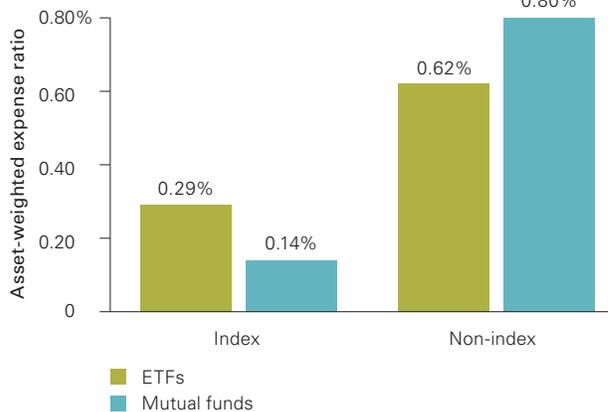
Sources: Vanguard calculations, based on data from Morningstar Direct.

a fund’s use of leverage, and mandating that a fund’s assets be held by a custodian (typically a U.S. bank), but segregated from the asset manager and the bank’s assets. To the extent the management firm or bank were to go bankrupt, ETF and mutual fund investors have a legal right to the fund’s assets. In addition, all mutual funds and ETFs must comply with the disclosure-based provisions of the 1940 Act, the U.S. Securities Act of 1933, and associated Securities Exchange Commission Rules.⁴ These provisions require ETFs and mutual funds to disclose material information via fund prospectuses and annual reports to help investors make informed investment decisions.

Perceived differences: Mutual funds and ETFs

Differences between mutual funds and ETFs are often exaggerated by the investment community. For example, ETFs are often promoted as costing significantly less than mutual funds. On its face, such a claim appears to be true, since ETFs have an expense-ratio advantage relative to mutual funds both in terms of a simple cost average (0.57% versus 1.24%, respectively) and an asset-weighted cost average (0.29% versus 0.69%). However, this advantage is due largely to the investment strategy of most ETFs, rather than to their product structure. Ninety-nine percent of ETF assets as of June 30, 2015, were index-based, while 84% of mutual fund assets were actively managed. Given that expense ratios of index vehicles tend to be lower than those of actively managed strategies, **Figure 2** confirms that ETFs’ cost advantage has more to do with whether or not the underlying strategy is indexed rather than whether the structure is an ETF or mutual fund.

Figure 2. Underlying investment strategy drives costs



Notes: Data as of June 30, 2015. According to Morningstar, index mutual funds and index ETFs are defined as vehicles that track a particular index and attempt to match the returns of that index. Non-index vehicles include actively managed vehicles.

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

⁴ The SEC is the primary regulator of U.S. mutual funds and ETFs subject to the 1940 Act. Among other oversight functions, the SEC conducts both periodic and special examinations of funds’ compliance controls, operations, and compliance with regulatory requirements.

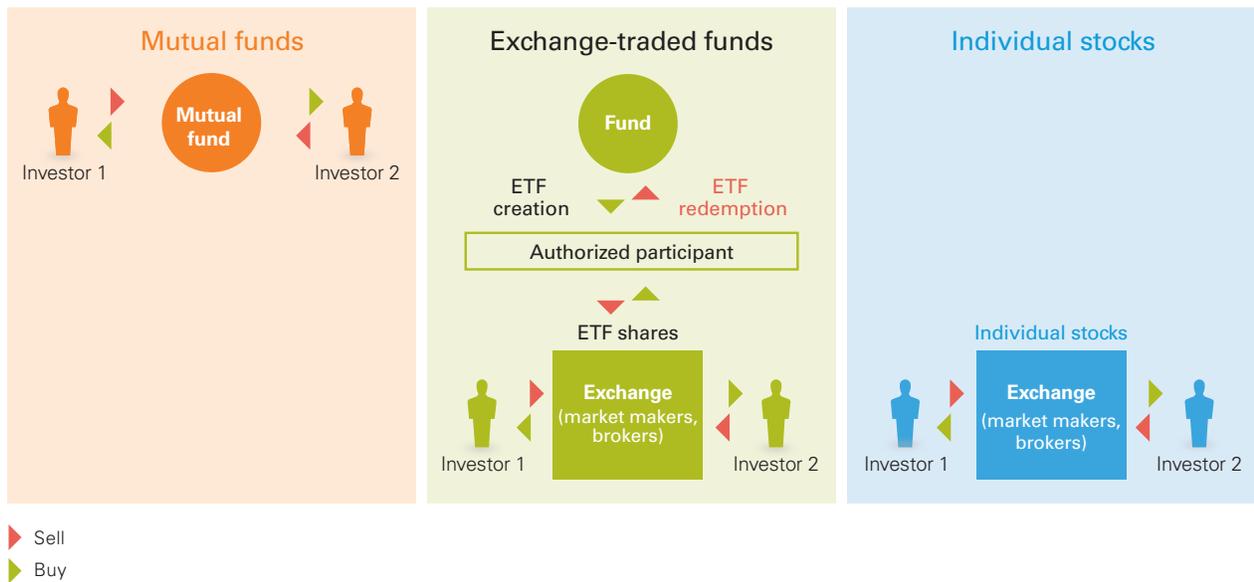
Actual differences: Mutual funds and ETFs

Most of the differences between mutual funds and ETFs relate to the way investors transact in fund shares. Investors buy and sell mutual fund shares directly from the fund (sometimes through a financial advisor or other intermediary) at a net asset value (NAV) that is calculated by the fund once a day. In contrast, ETF investors typically buy and sell ETF shares from each other throughout the day on an exchange at a traded market price. **Figure 3** illustrates these transaction methods.

Only certain large institutional investors called “authorized participants” (APs) transact with the ETF directly at NAV in a process known as creation/redemption (see the box, “Creation and redemption of ETF shares,” on page 5). This mechanism enables ETFs to issue new shares and redeem existing shares. During the course of the trading

day, investor orders to buy and sell ETF shares are matched on an exchange with the help of market makers. At the end of the trading day, if market makers have a net short position in shares of an ETF (i.e., they sold more than they bought) or a net long position (i.e., they bought more than they sold), they might decide to offset those positions by seeking to create new shares or redeem the existing shares. ETF creations and redemptions are usually executed once per day at their net asset value, at 4 p.m., Eastern time. The process by which ETFs issue and redeem new shares is actually quite similar to that of mutual funds. Mutual funds accept buy and sell orders throughout the day. At the end of the day, only the difference between the buy orders and sell orders results in net share issuance or redemption. Shares are issued or redeemed once per day at their net asset value, at 4 p.m., Eastern time.

Figure 3. Product-related differences largely stem from how investors transact



Notes: The ETF creation and redemption process is the means by which authorized participants (APs) bring new ETF shares into and out of the market, helping to maintain a balance between supply and demand. APs can also act as market makers, but not all market makers are authorized participants.

Source: Vanguard.

Creation and redemption of ETF shares

ETF shares are created and redeemed by an entity known as an “authorized participant” or “AP,” typically a large broker-dealer. Each business day, the ETF publishes a “creation basket”—a list of names and quantities of securities or other assets. To create ETF shares, an AP delivers the creation basket to the ETF and receives in return a “creation unit,” a large block (typically 50,000) of ETF shares. Under certain circumstances, the AP may provide cash in lieu of some or all of the securities, along with a transaction fee to offset the cost to the ETF of acquiring them. Upon receiving the ETF shares, the AP may sell some or all of them in the secondary market.

A creation unit is liquidated when an AP returns the specified number of shares to the ETF in exchange for the daily “redemption basket” (generally comprising the same securities list as that in the creation basket).

If the AP receives cash in lieu of securities, it will typically pay a transaction fee to offset the cost to the ETF of liquidating the securities.

The creation and redemption mechanisms help ETF shares trade at a price close to the market value of their underlying assets. When the shares begin to trade at a higher price (i.e., at a premium), the AP may find it profitable to create shares by buying the underlying securities, exchanging them for ETF shares, and then selling those shares into the market. Similarly, when ETF shares begin to trade at a lower price (i.e., at a discount), an AP may buy shares in the secondary market and redeem them to the ETF in exchange for the underlying securities. These actions by APs, commonly described as “arbitrage activities,” help keep the market-determined price of an ETF’s shares close to the market value of the underlying assets.

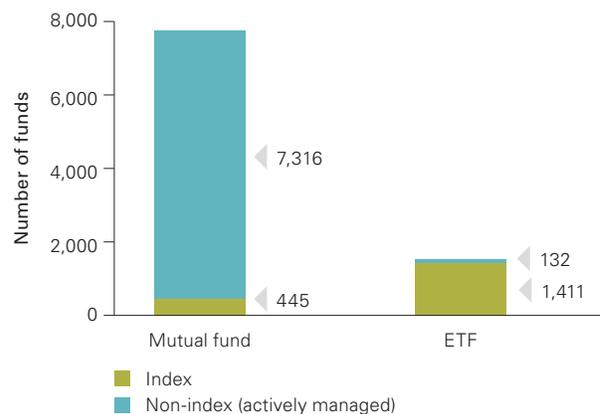
Investors’ choice criteria: Mutual funds versus ETFs

When choosing to implement one’s investment allocation with mutual funds or ETFs, or a mix of both, investors should consider the following four key factors: investment strategy, trading flexibility, accessibility, and costs.

Investment strategy

As part of the portfolio-construction process, investors decide whether to allocate their investments using index-based or actively managed strategies. **Figure 4** demonstrates that, as mentioned earlier, mutual funds are largely actively managed, whereas ETFs are mostly index-based, so investors seeking to use active strategies for specific markets may prefer mutual funds, while investors seeking to use index-based strategies may prefer ETFs. Figure 4 also suggests that there is a wider array of index providers and index-construction methodologies used by ETFs as opposed to mutual funds. ETFs offer exposure to a greater number of unique benchmarks, many of which are lesser-known or more specialized than traditional benchmarks.⁵

Figure 4. Mutual funds are largely active; ETFs are largely indexed



Note: Data as of June 30, 2015.

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

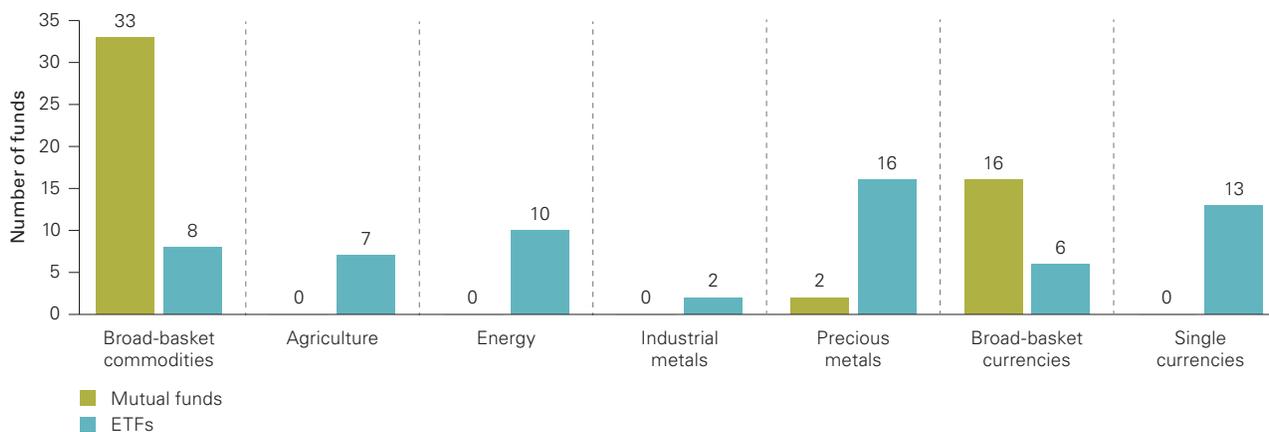
⁵ See Philips and Kinniry (2012), for a discussion of more well-known index-provider construction methodologies.

In this connection, investors should note that the indexing concept has expanded greatly to include a large number of nontraditional, non-market-cap-weighted indexes. Such indexes represent rules-based *active* strategies that attempt to outperform traditional market-cap-weighted benchmarks in some way, including by higher returns or lower volatility.⁶ ETFs that track these indexes are classified as index products because they seek to track an index, even though the index itself may reflect an underlying active strategy.⁷ This has effectively blurred the lines between traditional index strategies and active management.

Another element of investment choice is that of exposure to alternative investments like physical commodities and currencies. Both mutual funds and non-1940 Act ETFs offer these types of alternative exposures but may do so in different ways. In some cases, non-1940 Act ETFs provide investors with more direct and efficient exposure

to alternative investments than do mutual funds. This is particularly true for funds seeking commodity market exposure. For instance, a number of non-1940 Act ETFs provide exposure to commodity markets by investing substantially all of their assets in physical commodities (e.g., gold) or commodity futures. In contrast, mutual funds generally cannot invest directly in physical commodities or commodity futures, and instead must obtain this exposure through a combination of investments (e.g., commodity-related notes, stocks of commodity-related operating companies, and foreign subsidiaries investing in commodity-related derivatives or physical commodities). Investors may appreciate the ability to gain exposure to these alternative asset classes in different ways through a mutual fund or non-1940 Act ETF (see **Figure 5**) as part of either a strategic or tactical asset allocation. The non-1940 Act ETFs, however, are subject to different regulations than mutual funds and can give rise to special tax considerations for investors.

Figure 5. Non-1940 Act structures have enabled ETFs to offer greater access to alternative asset classes



Notes: Data as of June 30, 2015.

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

⁶ See Arnott, Hsu, and Moore (2005), for a discussion of fundamental indexes.

⁷ See Philips et al. (2011), for a discussion of market-cap-weighted versus non-market-cap-weighted indexes.

Trading flexibility

The ability to transact at the daily NAV of a mutual fund may offer sufficient flexibility for most investors; however, some may prefer the additional flexibility offered by ETFs. The exchange-traded nature of ETFs affords investors not only flexibility in the form of intraday trading but variation in the trade type, and the option to frequently trade fund shares. Mutual funds, however, also offer certain trading conveniences.

More specifically, U.S.-listed ETF shares trade and price continually throughout the trading day on an exchange, enabling investors to execute ETF trades on an intraday

basis. Investors can submit an order to buy or sell a mutual fund (i.e., conduct a transaction) at any point in time, but the transaction is executed at the next available NAV, typically 4 p.m., Eastern time. Therefore, if desired, investors can use ETFs to express an investment view with more precise timing than they are able to with mutual funds.

ETFs, by virtue of trading on an exchange, offer investors the same trading flexibility offered by stocks, including limit orders, market orders, stop-loss orders, and the abilities to purchase on margin and to sell short.⁸ Investors can use a limit or market order to emphasize either price or execution certainty, respectively. By

The language of trading: Some key terms

Bid-ask spread. The difference between the price a buyer is willing to pay (bid) for a security and the seller's offering (ask) price. The bid-ask spread represents the best bid and the best "offer" (the latter term is typically used in place of "ask" in exchange trading). Because secondary-market (see definition below) transactions occur at market prices, you may pay more than the value of the underlying securities when you buy ETF shares, and receive less than the underlying securities' value when you sell those shares.

ETF premium/discount. The difference between the ETF's last traded price and its NAV.

Limit order. An order to buy a security at no more (or to sell it at no less) than a specific price. This gives the investor some control over the price at which the trade is executed, but may prevent the order from being completed in full. In such a case, an additional order with a modified price may be necessary to trade the total desired number of shares. However, the higher the limit price for a buy (and the lower the limit price for a sell), the greater the probability that the entire order will be filled. With limit orders, investors must weigh the likelihood that their trade will be fully completed versus transaction costs.

Market order. An order to buy or sell a security immediately at the best available current price. Priority is execution, not price.

Marketable limit order. A limit order whose limit price is set either at or above the best "offer/ask" when buying at or below the best bid when selling. This essentially accomplishes the same goal as a market order, but with some price protection.

Purchasing on margin. Borrowing money from a bank or broker to pay for a portion of a security purchase. Purchasing on margin allows you to buy more securities than you otherwise would be able to.

Secondary market. A market where investors purchase securities or assets from other investors, rather than from the issuing companies themselves.

Short selling. A practice of attempting to profit from a decline in the price of a security. In a short sale, an investor borrows securities from a broker and sells those securities into the market. The investor then buys the securities back at a future date. If the investor buys back the securities at a price lower than the one at which he or she sold the securities, the investor claims a profit. If the price at which the investor buys back the shares is higher than the sale price, the investor books a loss. An investor's potential loss on a short-selling strategy is unlimited, because a stock's upside price is theoretically unlimited.

Stop-loss order. An order to buy (or sell) a security once the price of the security has climbed above (or dropped below) a specified price, called the *stop price*.

⁸ See Dickson and Rowley (2014), for a further discussion of ETF trading best practices.

buying ETFs on margin, investors can leverage returns or obtain capital for liquidity needs. The ability to sell ETFs short enables investors to hedge their portfolio, or express a negative view on a sector or an entire market, albeit at a cost. (See accompanying box, “The language of trading: Some key terms.”) Mutual funds offer limited trade-order types, namely buy or sell. As such, ETFs offer a greater variation regarding the type of trade order.

Mutual funds often implement restrictions on frequent trading of fund shares in an effort to limit excessive portfolio turnover. This is because cash flows into or out of a mutual fund trigger transactions costs as a result of portfolio managers buying and selling securities. These transactions costs are often shared by all shareholders of the fund. ETFs cannot restrict frequent trading, because ETF investors trade with each other and not with the ETF itself. (However, ETF investors also typically pay the full amount of transactions costs resulting from their trades, and any cash flows into or out of an ETF are usually conducted via in-kind transactions—at least in the United States—so existing shareholders in an ETF do not incur costs related to in-kind transactions.) As a result, investors may find that they have greater freedom to implement short-term trades using ETFs than using mutual funds.

The direct trading nature of mutual funds affords investors certain trading conveniences that ETFs typically do not offer. To trade mutual fund shares, investors generally submit a dollar amount to purchase or sell, while ETFs typically require investors to determine a specific number of shares they would like to purchase or sell. Further, mutual funds typically provide automatic investment and withdrawal services that link directly to investors’ bank accounts. ETFs are usually unable to provide such individualized services.

Accessibility

When deciding between using mutual funds or ETFs for a specific portfolio allocation, investors need to determine whether they have access to a specific mutual fund or ETF. On a given broker-dealer platform, investors and advisors may not have access to all existing mutual funds in the industry; that is because a mutual fund must enter

into a selling agreement with the broker-dealer so that it will distribute the mutual fund via the broker-dealer’s platform. Some fund companies may not wish to enter into such agreements.

In contrast, because ETFs trade on an exchange, an ETF investor can access virtually any ETF that exists, so long as the investor owns a brokerage account. It’s possible that a mutual fund or ETF might not be accessible to an investor because it fails to be included on an “approved list.” Generally, such funds or ETFs have not yet undergone a due-diligence review of their investment objectives and costs by the broker-dealer platform.

Costs

Investors should consider two types of costs when evaluating use of mutual funds versus ETFs: ongoing costs and transaction costs. Ongoing costs include expense ratios and taxes and are incurred gradually over time, becoming a larger component of total costs the longer the investment is held. Transaction costs include bid-ask spreads, upfront fees, and premiums and discounts, and are incurred each time an investor makes a trade—thus, increased numbers of transactions lead to increased costs.

More specifics on ongoing costs. The expense ratio, which detracts from investors’ returns because it is gradually deducted from the NAV of a mutual fund or ETF, captures the ongoing expenses incurred by the vehicle. The expense ratio includes: management fees (typically the most significant cost overall), registration fees, legal and auditing fees, custodian and transfer-agent fees, interest fees, shareholder service fees, and other costs such as rent, salaries, and equipment.⁹

Taxes, another ongoing cost, can be a substantial drag on investors’ returns for investments in a taxable account.¹⁰ All 1940 Act funds are furthermore subject to regulation under the U.S. Internal Revenue Code. From a shareholder’s perspective, taxation of 1940 Act ETFs and mutual funds is the same. For example, capital gains or losses on the sale of ETF and mutual fund shares by investors are subject to the same capital gains taxation rules. Equivalent taxation also applies with respect to

⁹ The expense ratio calculation does not include transaction costs that occur inside the portfolio as a result of portfolio transactions. These costs include brokerage commissions and bid-ask spreads paid when buying and selling securities in the portfolio. However, these costs are reflected in the fund’s NAV.

¹⁰ The analysis reflects the impact on taxable investors. The impact of taxes is mitigated for tax-exempt institutions or taxable investors who hold funds in tax-advantaged accounts.

buying and selling of securities by the portfolio manager of an ETF or mutual fund: When an ETF or mutual fund distributes any gains generated on the sale of portfolio securities to its shareholders, short-term capital gains are taxed to shareholders at ordinary income tax rates, and long-term capital gains are taxed to shareholders at the lower long-term capital gains rates. In addition, any net investment income (for example, interest or dividends received by a fund on its portfolio securities) paid out by both are treated as current income and generally taxed to shareholders at ordinary income-tax rates, although for ETFs or mutual funds that invest in dividend-paying stocks, some or all of these distributions may be taxable to shareholders at the currently lower qualified dividend rates.

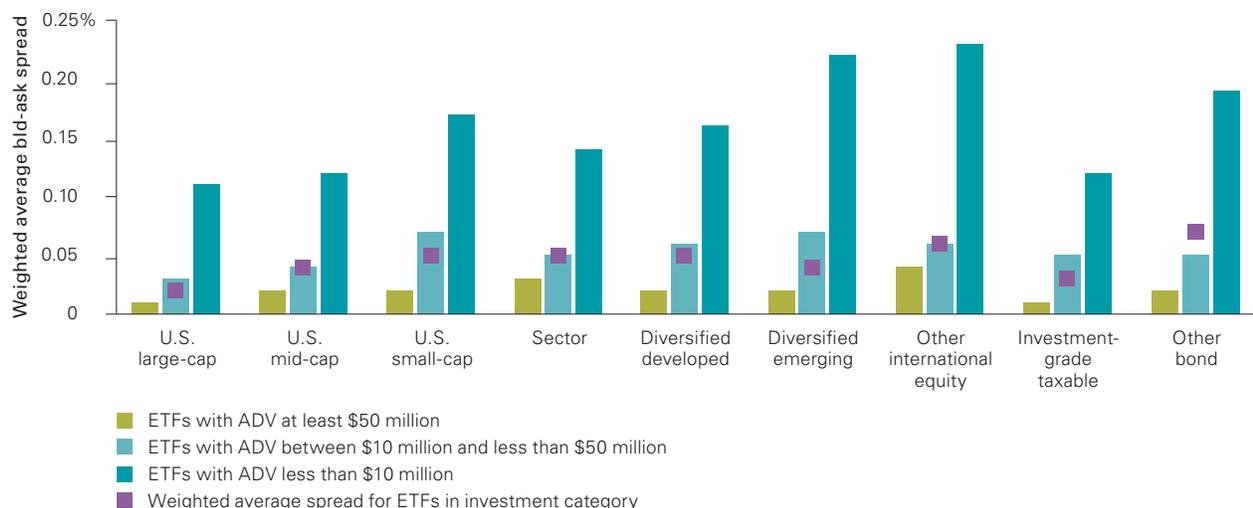
Much has been made of ETFs' in-kind creation and redemption mechanism and how it contributes to ETF tax efficiency. ETFs can satisfy redemptions by selecting those securities with the highest embedded unrealized capital gains (lowest cost-basis shares), thereby leaving those securities with the lowest unrealized capital gains and reducing potential taxes in the future. However, mutual funds may be more likely to realize losses through traditional cash redemptions by liquidating positions with the lowest unrealized gains and/or greatest unrealized

loss (highest cost-basis shares). In addition, mutual funds are also able to use in-kind redemptions, though this is less common than ETFs' use of in-kind redemptions. Ultimately, many factors contribute to tax efficiency. The underlying investment strategy (whether index or active) tends to be the main driver, while Bryan and Rawson (2014) noted that the "tax efficiency of index mutual funds and ETFs may have more to do with diligent portfolio management and investor behavior than simply a choice of vehicle."

More specifics on transaction costs. When transacting products that trade on an exchange, investors incur bid-ask spreads—that is, the difference between the highest price a buyer is willing to pay (bid) for a security and the lowest price a seller is willing to accept (ask or "offer") for that security. If an ETF had an offer price of \$100.02 and a bid price of \$99.98, the bid-ask spread would be \$0.04. ETFs are subject to bid-ask spreads—mutual funds are not.

The bid-ask spread is charged by market makers as compensation for the risks and costs they incur in providing a liquid market for an ETF. As **Figure 6** shows, bid-ask spreads are generally lower for ETFs that trade

Figure 6. Bid-ask spreads of ETFs can depend on both the ETF's ADV and the liquidity of underlying markets



Notes: Chart shows weighted-average bid-ask spreads (based on assets) of ETFs with at least one year of trading history as of June 30, 2015, in various investment categories and, within those, different trading-volume buckets. ADV = average daily volume (in U.S. dollars) of ETF shares on stock exchanges over the 12 months ended June 30, 2015. "Other international equity" includes single-country ETFs and concentrated regional ETFs. "Other bond" includes municipal-bond ETFs and high-yield bond ETFs.

Sources: Vanguard calculations, based on data from ArcaVision and Morningstar, Inc.

in large volumes (since market-makers incur lower risk to offer the ETF on the market) and for ETFs whose underlying securities are more liquid (since market-makers incur lower cost to create ETF shares).

Up-front fees may or may not apply in various situations, but they have the same effect. They remove a portion of the invested amount at the outset of the transaction. Mutual funds can be subject to loads and ticket charges. Loads are a percentage of the amount invested that is charged by the mutual fund. Ticket charges are fixed dollar costs that are sometimes charged by investment account providers to process buys or sells of mutual funds. Even “no load” funds can carry ticket charges when bought or sold on platforms not associated with the fund sponsor. ETFs can be subject to brokerage commissions. They are fees charged by a broker-dealer or brokerage account to make a trade in an ETF. Whether or not an ETF is subject to a brokerage commission depends on the ETF itself and the brokerage account where it is traded.

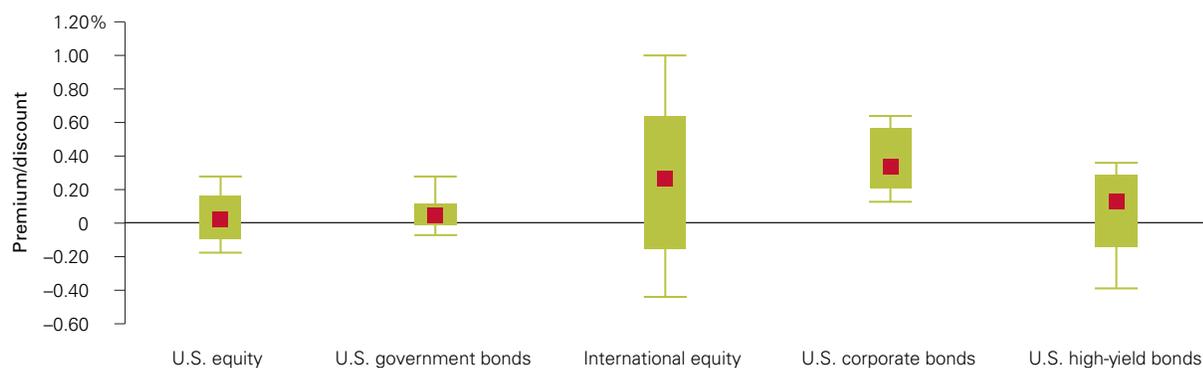
A premium or discount is the difference between an ETF’s market price and the value of the underlying securities in its portfolio. Because an ETF is traded throughout the day on an exchange, its market price can deviate from the value of its underlying securities, although the creation and

redemption of ETFs generally keeps the market price close to the currently observed or implied value of its underlying securities. Any small differences between the two—known as “premiums” (when the market price is greater than the value of the underlying securities) and “discounts” (market price is lower than the value of the underlying securities)—are largely influenced by transaction costs in the underlying securities’ markets, time-zone differences across global markets, and intraday investor supply and demand for the ETF shares.

During times of equilibrium, markets essentially have balanced supply and demand. In such an environment, an ETF’s market price would likely be at a small premium. The premium would reflect various costs faced by the market maker, including those to transact in the underlying market as well as fees related to the creation or redemption of ETF shares. **Figure 7** provides insight into how the average premiums/discounts in ETFs tend to be a function of underlying market transaction costs. In the five categories shown, the median premium/discount, indicated by the red box, rises in accordance with the general level of transaction costs in the respective underlying markets. U.S. equities are extremely liquid

Figure 7. Premiums and discounts reflect underlying market transaction costs and time-zone differences

Historical premium/discount distribution



Notes: Data reflect daily closing premium/discount from July 1, 2014, through June 30, 2015. Red boxes reflect the median. Green boxes cover 5th percentile to 95th percentile of observations. Whiskers extend from 99.5% to 0.5% of observations.

Sources: Vanguard calculations, based on data from Bloomberg, Inc.

and have minimal transaction costs, as do U.S. government bonds. International equities have slightly higher transaction costs than either of the former.

Figure 7 also illustrates how the variability of the premium/discount is largely a reflection of time-zone differences between an ETF's trading hours and the trading hours of the underlying securities, as well as the propensity of the underlying market's transaction costs to fluctuate. In the case of time-zone differences, the effects can be seen notably with international stock ETFs; with fluctuating levels of transaction costs, the effects can be seen notably with U.S. corporate-bond ETFs and U.S. high-yield bond ETFs.

Unlike the bid-ask spread, however, the impact of premiums and discounts is uncertain. Premiums and discounts can either boost investor returns (e.g., if buying at a discount and selling at a premium), hurt the returns (e.g., if buying at a premium and selling at a discount), or have no effect on returns (e.g., if premium or discount remains unchanged). Given the uncertain nature and relatively minimal impact of premiums and discounts, investors may find it more practical to focus their cost analysis on the bid-ask spread.

Comparing costs: Holding period matters

Given that, as just discussed, the ongoing costs accrue gradually over time, while transaction costs occur entirely at the time of transaction, there is a time element to

Figure 8. Holding period matters when no clear-cut cost advantage exists

Hypothetical transaction costs/expense ratio analysis

		Expense ratio	
		Mutual fund > ETF	Mutual fund < ETF
Transaction costs	Mutual fund > ETF	Scenario 1: ETF costs less	Scenario 2: Breakeven-period analysis required (shorter favors ETF)
	Mutual fund < ETF	Scenario 4: Breakeven-period analysis required (shorter favors mutual fund)	Scenario 3: Mutual fund costs less

Note: See text in this section, and appendix Figure A-1, for analysis assumptions and further discussion of breakeven-period analysis.

Source: Vanguard.

the analysis. Determining which of the two competing vehicles incurs lower costs may depend largely on the expected holding period of the investment.

Figure 8 summarizes a hypothetical transaction cost/ongoing cost analysis for a mutual fund versus an ETF.¹¹ The analysis assumes that both the mutual fund and ETF under consideration track the same market, that the

¹¹ This analysis may also apply when comparing one ETF to another ETF, or one mutual fund to another. To analyze costs between specific ETFs and mutual funds, see Vanguard's cost simulation tool at <https://advisors.vanguard.com/VGApp/iip/site/advisor/analysistools/costsim>.

transaction is a one-time purchase in which neither premiums/discounts nor differences in return lost to taxes are incurred (meaning expense ratio is the only ongoing cost), and that gross return expectations are similar for both products. Given these assumptions, investors would face four potential scenarios depending on each product's expense ratio and transaction costs. In scenarios 1 and 3, the product with the lower expense ratio and the lower transaction costs (the ETF, in scenario 1 and the mutual fund, in scenario 3) has a clear advantage over the other. In scenarios 2 and 4, the advantage is unclear, meaning a time-horizon-based breakeven analysis is required, as described next.

The breakeven holding period equals the difference between transaction costs divided by the difference in expense ratio (appendix **Figure A-1** explains the formula in greater detail):

$$\frac{TC_1 - TC_2}{ER_2 - ER_1},$$

Where:

TC_1 and ER_1 = transaction costs and the expense ratio, respectively, for product 1;

TC_2 and ER_2 = transaction costs and the expense ratio, respectively, for product 2.

Figure 9 provides a sensitivity analysis of how breakeven holding periods change as the transaction cost differential and the ongoing cost differential change. For example, if the transaction cost for an ETF is 20 basis points (bps) and 10 bps for a mutual fund, the mutual fund would have a transaction cost advantage of 10 bps. If the expense ratio of an ETF is 10 bps and 110 bps for the mutual fund, the ETF would have an expense ratio advantage of 100 bps. In this case, the breakeven holding period is 0.10 year, or

Figure 9. Breakeven holding period depends on transaction cost and expense ratio differentials

Breakeven holding periods (years) by transaction cost differential and expense ratio differential

		Transaction cost differential (bps)				
		1	5	10	20	50
Expense ratio differential (bps)	5	0.20	1.00	2.00	4.00	10.00
	10	0.10	0.50	1.00	2.00	5.00
	25	0.04	0.20	0.40	0.80	2.00
	50	0.02	0.10	0.20	0.40	1.00
	100	0.01	0.05	0.10	0.20	0.50
	150	0.01	0.03	0.07	0.13	0.33

Note: Breakeven holding periods indicated in shaded area. Bps = basis points.

Source: Vanguard.

roughly five weeks. An investor whose expected holding period is greater than five weeks should choose the ETF, because it will be more cost-effective after that period of time.

Figure 9 shows that the breakeven holding period lengthens as the transaction cost differential increases, because it takes the product with higher transaction costs longer to recoup these costs. Conversely, the breakeven period shortens as the expense ratio differential grows, since the product with the expense ratio advantage needs less time to catch up.

The breakeven analysis suggests that the vehicle with higher transaction costs may be unfavorable for short-term trading strategies. This includes not just frequent trading of the same initial "lump sum" investment but

also frequent trading in the form of multiple, subsequent new cash-flow investments such as dollar-cost averaging. For example, consider a situation in which an investor is deciding between an ETF with a bid-ask spread as its transaction cost, and a mutual fund with no transaction costs. Even though in this situation the ETF has an expense ratio advantage, the accumulation of transaction costs with every ETF trade may make the mutual fund the more cost-effective option. The same considerations should apply for investors deciding between two ETFs.

Conclusion

Deciding to use ETFs or mutual funds (or both) in a portfolio is part of the implementation step of the portfolio construction process. Mutual funds have traditionally been the choice of many investors, but exchange-traded funds have recently emerged as yet another way to obtain diversified exposure to various asset classes.

Although ETFs are often promoted as a significantly better vehicle than mutual funds, the two products possess many similarities, including the benefits of pooled investing, primary regulation under the same laws, and the ability to issue new shares and redeem existing shares, allowing investors to transact at a price that closely reflects the underlying value of their securities.

Ultimately, four key factors should be considered when deciding between mutual funds and ETFs: investment strategy, trading flexibility, accessibility, and costs. Mutual funds may be preferred by investors who want to use active strategies in their portfolio, who prefer the trading convenience of mutual fund investing, and who are satisfied with the availability of mutual funds on their investment platform. On the other hand, ETFs may be preferred by investors who want a greater variety of index-based options, who value the trading flexibility associated with trading on an exchange, and who desire the more open access provided by brokerage-based distribution. Costs must be weighed dynamically, owing to the trade-off between ongoing costs and transaction costs. This trade-off generally results in a selection that is based on the investment's time horizon.

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Appendix. Breakeven-period analysis

Figure A-I. Calculation of breakeven holding period (assuming expense ratio is the only ongoing cost)

(1) Equation for an investment (1)'s value after costs and returns after a certain holding period T:

$$I_1 = (1 - TC_{1B}) * Inv * \frac{(1 + r)^T * (1 - TC_{1S})}{(1 + ER_1)^T}$$

Where:

I_1 = value of investment (1) after all costs and returns (assuming no taxes);

TC_{1B} = transaction costs on buy transaction for investment (1), as a % = Bid-ask spread/2 for buy transaction + commissions (as percentage of original investment value) for buy transaction;

TC_{1S} = transaction costs on sell transaction for investment (1), as a % = Bid-ask spread/2 for sell transaction + commissions (as percentage of ending investment value) for sell transaction;

$$TC_1 = TC_{1B} + TC_{1S}$$

Inv = original investment value (assume same for both investments);

r = annual return of investment (assume same for both investments);

ER_1 = expense ratio of investment (1);

T = holding period of investment (assume same for both investments).

(2) Equation for another investment (2)'s value after costs and returns after a certain holding period T:

$$I_2 = (1 - TC_{2B}) * Inv * \frac{(1 + r)^T * (1 - TC_{2S})}{(1 + ER_2)^T}$$

Definitions for variables same as in step (1), except applicable to investment (2), instead of investment (1).

(3) I_1 and I_2 can be set equal to each other:

$$(1 - TC_{1B}) * Inv * \frac{(1 + r)^T * (1 - TC_{1S})}{(1 + ER_1)^T} =$$

$$(1 - TC_{2B}) * Inv * \frac{(1 + r)^T * (1 - TC_{2S})}{(1 + ER_2)^T}$$

Simplifying the equations yields:

$$(4) \frac{(1 - TC_{1B}) * (1 - TC_{1S})}{(1 + ER_1)^T} = \frac{(1 - TC_{2B}) * (1 - TC_{2S})}{(1 + ER_2)^T}$$

$$(5) \frac{(1 + ER_2)^T}{(1 + ER_1)^T} = \frac{(1 - TC_{2B}) * (1 - TC_{2S})}{(1 - TC_{1B}) * (1 - TC_{1S})}$$

$$(6) T [\ln(1 + ER_2) - \ln(1 + ER_1)] = \ln(1 - TC_{2B}) + \ln(1 - TC_{2S}) - \ln(1 - TC_{1B}) - \ln(1 - TC_{1S})$$

(7) By Taylor approximation, where $\ln(1 + x) \approx x$:

$$T (ER_2 - ER_1) = -TC_{2B} - TC_{2S} + TC_{1B} + TC_{1S}$$

$$(8) T = \frac{TC_{1B} + TC_{1S} - TC_{2B} - TC_{2S}}{(ER_2 - ER_1)}$$

$$(9) T = \frac{TC_1 - TC_2}{(ER_2 - ER_1)}$$

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