CFA INSTITUTE RESEARCH FOUNDATION / **BRIEF**

A COMPREHENSIVE GUIDE TO ETFs (2ND EDITION)

MODULE 1: ETF FEATURES AND EVOLVING LANDSCAPE

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CONTENTS

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A COMPREHENSIVE GUIDE TO ETFs (2ND EDITION)

Module 1: ETF Features and Evolving Landscape

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Exchange-Traded Funds: Features and the Evolving Landscape

Since their creation in the early 1990s, exchange-traded funds (ETFs) have been the fastest-growing segment of the investment management business, ballooning to more than $11 trillion globally as of late 2024.[1] Investors of all types now rely on ETFs for short-term trading and long-term investment. ETFs provide liquid access to virtually every corner of the financial markets. As a result, large and small investors are able to build institutional-caliber portfolios with significantly lower management fees than typically offered by mutual funds. The transparency of fund holdings and investment strategies enables investors to easily evaluate the potential returns and risks of ETFs. This guide will help readers understand the distinct features of ETFs as trading and investment products and gain insight into the present situation for current and future participants in the ETF industry.

ETFs are hybrid investment products, marrying the trading features of common stocks with the investment and structural features of mutual funds. Mutual funds and ETFs offer proportional interests in pooled assets, and both are managed by investment advisers for a fee. The Investment Company Act of 1940 regulates most ETFs and all mutual funds. Unlike mutual funds, however, ETF shares trade on the secondary market (stock exchanges) and thus also live under the infrastructure and regulatory environment of stocks and bonds. They are accessed through brokerage accounts, are available on global stock exchanges, and have continuous pricing and liquidity throughout the trading day. As exchange-traded securities, they can be margined, lent, shorted, or subjected to any other strategy used by sophisticated equity investors. They are frequently used as the underlying securities for derivatives, such as options and swaps.

[1]The first two modules of this series on ETFs will primarily have a United States focus, and thus US dollars ($) will be used as a metric of asset size.

ETFs achieved their early success and growth in part because asset management and trading infrastructure were ripe for disruption during the two deep bear markets in the decade of 2000–2009. ETFs got their start by packaging asset classes, market segments, and simple factors into rule-based investment strategies, offering transparency, low cost, and flexibility. Investors frustrated with active, buy-and-hold investments that failed to cushion them from sustained and deep equity market declines shifted to index-based products to express tactical views and to pursue more strategic portfolio applications. Electronic trading replaced in-person trading and "upstairs" market makers. The exchange-traded index fund was the right vehicle for the moment.

As ETFs expanded into new asset classes, they became attractive to advisers, institutions, and even individuals. ETFs' daily liquidity and transparent portfolios transformed the way investors access those markets, which had profound ripple effects on the underlying markets.

The CFA Institute Research Foundation published *A Comprehensive Guide to ETFs* in 2015. The first edition explained how ETFs work and how they trade, as well as how they fit into portfolio management. This guide also addressed how best to evaluate ETFs for any particular investment or trading objective. Ten years later, it is even more important for investors and market professionals to understand ETF mechanics and due diligence. The modern ETF has evolved to offer access to virtually all asset classes, market segments, and investment strategies and to serve a wide range of investors from the longest long-term holder to the most active intraday speculator. This second edition covers the evolution, features, and effective use of ETFs for the full spectrum of investment strategies. We segment the ETF story into three briefs:

- Module 1. Exchange-Traded Funds: Features and the Evolving Landscape:

  The first module focuses on the core body of knowledge necessary to understand the ETF industry, incorporate ETFs in portfolios, and pursue tactical trading. It includes a comprehensive overview of the existing ETF ecosystem and landscape, a tutorial in ETF structure and properties, an analysis of trends in ETF fees, and an overview of ETF operations.

- Module 2. Evaluating Exchange-Traded Funds: Fitting Choices to Investment Objectives

  The second module will cover the issues critical to investors for evaluating ETFs for specific portfolio needs, comparing ETFs within an investment category for investors of different types, ranging from institutional to individuals, and different investment horizons. It also will address the practicalities of managing an ETF portfolio, from trading and liquidity concerns to understanding the true total cost of ownership.

- Module 3. Exchange-Traded Funds: Regulatory Framework and New Directions for the Industry

  The third module will assess the future of ETF investing, starting with coverage of the regulatory environment in Europe and the United Kingdom, North America, and Asia, including the key global ETF markets by size and trading activity. It will examine topics that ETF issuers and investors should be aware of in the coming years, from tax-driven internal trading to ETF product growth. The module will compare ETFs to existing and potential competitors, such as collective investment trusts (CITs) and direct indexing, and will cover the potential convergence of ETFs and mutual funds through the ETF as a share class. This module will also consider the prospects for further innovation in ETFs and future industry challenges.

ETF Product Features and Focus on Fees

ETF Benefits and Drivers of Growth

To begin any analysis of the ETF market, we must start by asking, why? Why have ETFs been so successful? What features and forces are distinct to ETFs? The answers to these questions are varied and important, including their roots in index and structured strategies; their ability to offer exposure to a wide range of asset classes and investment themes; and their structural benefits versus alternative vehicles in accessibility, cost, transparency, liquidity, flexibility, and tax efficiency.

Index and Structured Strategies Lay the Groundwork for Growth

Most ETFs follow transparent, index-based strategies instead of entrusting security selection, weighting, and market timing to a discretionary portfolio management team. Investors, large and small, have flooded into index-based strategies over the past two decades, whether managed in separate accounts for institutional investors, CITs for retirement and college savers, mutual funds, direct-indexing platforms, or ETFs. Investors moved their money into index investing to take advantage of lower fees and to shed active risk, as many came to understand the difficulty in generating actual alpha and therefore tired of paying for underperformance. (Unless otherwise specified, we define "index investments" as strategies that are managed according to the methodology and holdings of a specific index, calculated and distributed by an index provider.)

Exhibit 1 shows the growth of index investing as a portion of US registered fund assets, rising to 48% as of the end of 2024 from 19% in 2010. The portion of indexed fund assets represented by ETFs has tripled since 2010, from 9% to 27%, while that of mutual funds has approximately doubled, to 21%.

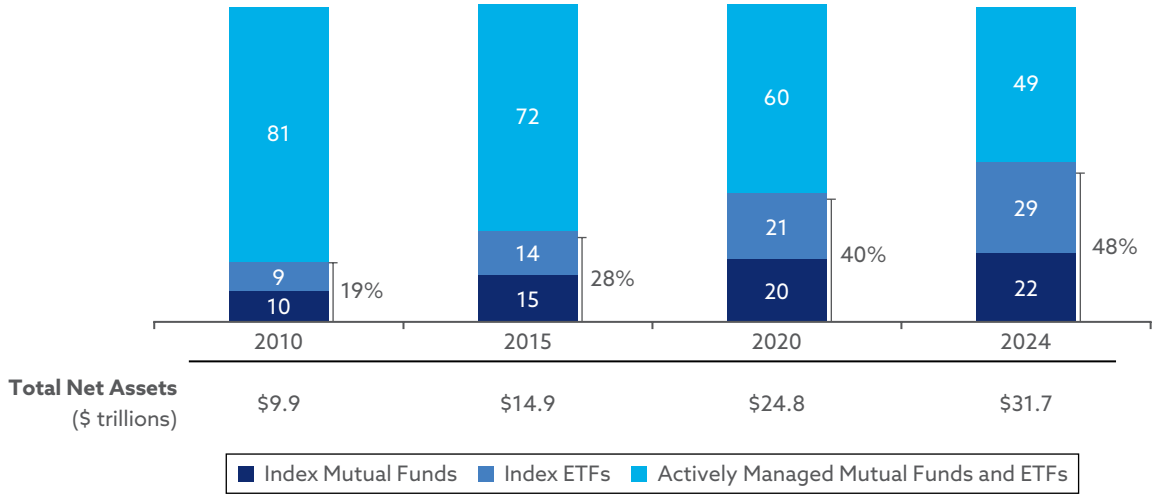
Another perspective on this shift to index-based fund strategies is shown in **Exhibit 2** and **Exhibit 3**, which cover US registered investment companies.

Exhibit 2 shows the flows into domestic equity funds over the past 10 years. In aggregate, mutual fund assets remain significantly larger than those of ETFs, but the changes in flows over the years for US equity fund assets reflect the preference for index investing. The outflows of close to $3 billion from actively managed equity strategies have been mirrored by index inflows of a similar magnitude, the bulk of which have gone into ETFs.

Exhibit 3 shows the count and assets of various fund types as of the end of 2024 in the United States, including mutual funds, ETFs, closed-end funds (CEFs), and unit investment trusts (UITs).

Despite the flow advantage of ETFs in the past decade, mutual fund assets, at $25.5 trillion, were still three times the size of ETF assets in the United States at the end of 2024. Mutual funds still dominate retirement fund investing, where ETFs have yet to gain a meaningful foothold, in large part because of the operational complexities of access through exchange transactions.

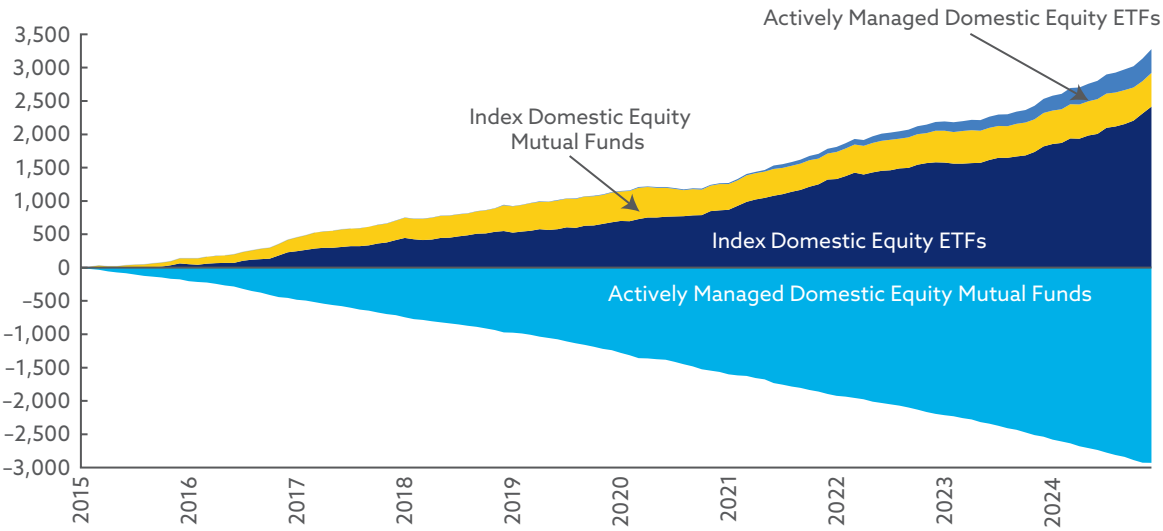
Exhibit 1. Index Funds as a Share of the Fund Market (% of long-term fund total net assets), 2010–2024



Notes: Data exclude money market funds. Data for ETFs exclude non-1940 Act ETFs.

Source: Investment Company Institute.

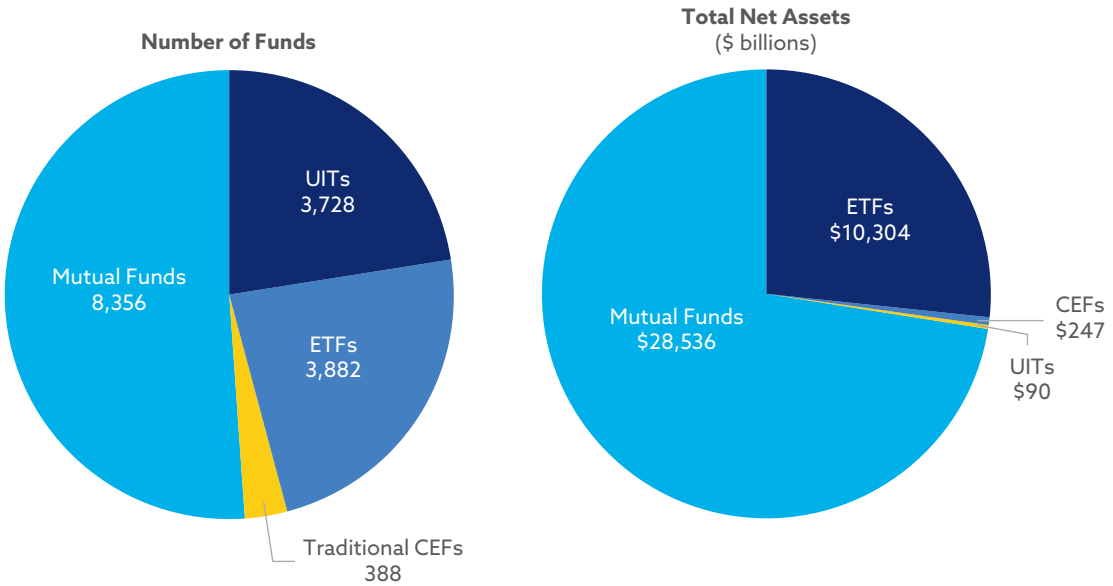
Exhibit 2. Cumulative Domestic Equity Mutual Fund and ETF Flows ($ billions), 2015–2024



Notes: Fund data include net new cash flow and reinvested dividends. ETF data for net share issuance include reinvested dividends.

Source: Investment Company Institute.

Exhibit 3. US Investment Company Total Net Assets and Number of Funds, as of Year-End 2024



Notes: Data for mutual funds and ETFs are as of 31 December 2024. Data for traditional CEFs and UITs are as of 30 September 2024. Mutual fund and ETF data for number of funds include funds that invest primarily in other funds. CEF data include only traditional CEFs. CEF data for total net assets include preferred share classes.

Source: Investment Company Institute.

Low Costs Attract Assets

Index-based strategies can be run efficiently, and therefore, they can be offered to clients at a low price point. Index portfolio managers need not invest in research and security analysis. Broad-based, cap-weighted indexes feature low turnover compared with active strategies, and therefore, they require less rebalancing and incur fewer trading costs than their high-turnover active counterparts. ETFs have an additional cost advantage: Most trading costs are externalized because buyers and sellers bear the expense of their asset addition or redemption.

The cost advantage of ETFs is implied by their name: These funds are *exchange traded*. Investors buy or sell an ETF through a broker on an exchange. The broker bears the costs of recording who you are, sending prospectus documents, handling inquiries, and other factors. This means ETF issuers have only a handful of "customers" from an operational perspective—that is, the trading firms (generally large market makers) who serve as the authorized participants (APs)—authorized to create or redeem the ETFs shares. In contrast, in the mutual fund world, the fund management company interacts directly with the individual investor. As a result, distribution and recordkeeping costs accrue to the fund, which raises the overall cost of ownership. These are generalities, but the overarching theme is reflected in the data: ETFs are generally less expensive to run than traditional mutual funds, active institutional strategies, and, certainly, hedge funds, and those savings accrue to the investors.

The lower costs of investing in ETFs are also the result of competitive forces. Investors use fees as a key criterion to select an ETF as expense ratios are visible and drive performance. Competition has driven the fees of the S&P 500 Index ETFs down to the low single digits or even zero. For new categories of ETFs, such as the spot bitcoin ETF offerings that launched in 2024, new launches are often accompanied by short-term waivers of fees for periods of time to gain market share. The importance of fees as a catalyst for ETF growth is evidenced by the fee compression in categories of ETFs that has occurred over time, which we cover later.

It is common to have several fund sponsors offer ETFs that track the best-known indexes, leading to extreme price competition. The four ETFs with different fees that track the S&P 500 offer the best examples: the SPDR S&P 500 ETF Trust (SPY; 0.09%) and the SPDR Portfolio S&P 500 ETF (SPLG; 0.02%) from State Street Global Advisors (SSGA), the iShares Core S&P 500 (IVV; 0.03%) from BlackRock, and the Vanguard S&P 500 Index Fund (VOO; 0.03%). For frequent traders, the liquidity and cost of transacting may outweigh management fee differentials. The best example of this focus on factors other than fees is that the liquidity winner in the S&P 500 ETF complex, SPY, continues to charge a fee of 0.09%. Although this fee is low, it is still the highest in this category.

Access across Asset Classes and Investment Themes

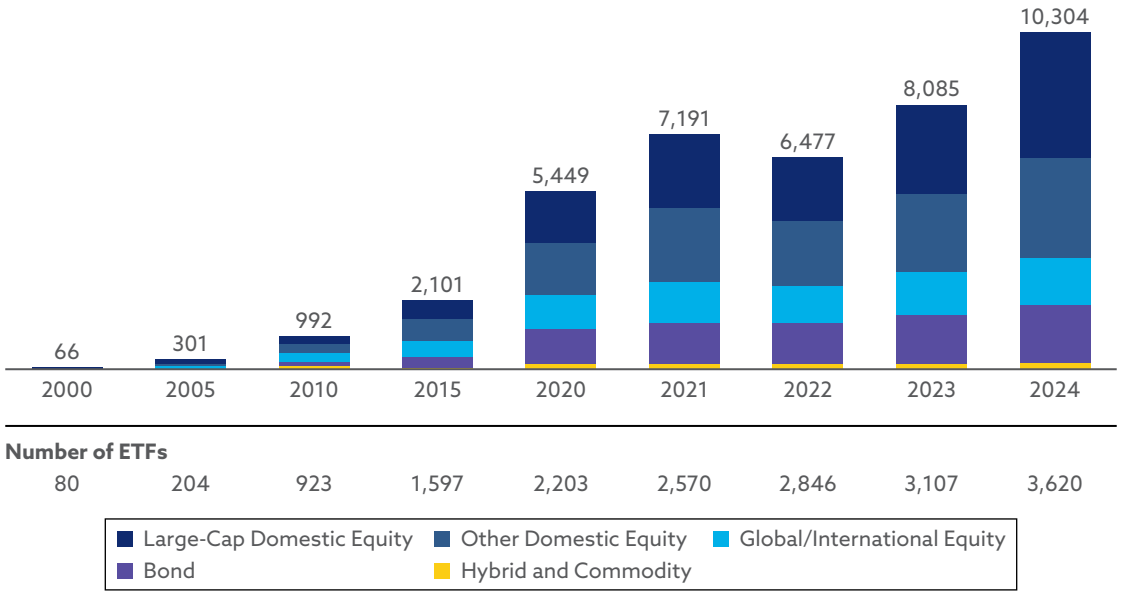
ETFs offer access to a wide variety of investment strategies. Many investors and advisers now use ETFs for their entire portfolio, across every asset class and investment need, from aggressive, high-risk strategies to cash-like vehicles. Thus, ETFs have created a wealth of new portfolio construction opportunities for large and small investors by making a broad range of asset classes and strategies available. As late as the 1990s, it was difficult and costly to own alternative assets, such as gold bullion, commodity futures, emerging market bonds, currencies, or collateralized loan obligations (CLOs), limiting access to large institutional investors. Complex fixed-income strategies were offered primarily in mutual fund packaging or through institutional accounts, as the dealer market made corporate bond purchases (or sales) too costly for most small-scale investors.

ETFs now cover the full spectrum of the bond market, offering different issuer profiles, maturities, credit risks, and types of products, such as mortgages, municipal bonds, bank loans, emerging market bonds, and more exotic instruments. In addition, gold, oil, and agricultural and industrial commodities are represented in the ETF product mix along with all major currencies. The latest security type to enter the ETF space is cryptocurrency, with a suite of ETF offerings from leading providers with underlying exposures to spot bitcoin and bitcoin and ether futures.

Exhibit 4 shows the asset class breakdown of US ETF assets since 2000, according to the Investment Company Institute (ICI). In 2015, assets reached $2 billion, after hitting $1 billion just five years earlier. By the end of 2024 total assets in US ETFs had grown to more than $10 billion, with the largest component, US equity, about evenly divided between large-cap equity and other categories. Global and international equity and bond ETFs have also been a sizable and growing part of the ETF market, such that all the major asset classes are represented and thriving. We discuss more about the trends in flows as we cover the ETF landscape in more detail later.

Many investment advisers have taken the approach to use ETFs exclusively to assemble suites of model portfolios that can be tailored to the investment objectives and target risk

Exhibit 4. Total ETF Net Assets ($ billions at year-end) and Number of ETFs, 2000–2024



Notes: The first bond, hybrid, and commodity ETFs were opened in 2002, 2007, and 2004, respectively. Commodity ETFs include funds—registered and not registered—that invest primarily in commodities, currencies, and futures.

Source: Investment Company Institute.

profile of an individual investor. Similarly, single-ticker portfolio ETFs can be used to simplify portfolio management by offering exposure to a spectrum of asset classes with baked-in rebalancing rules.

In addition to providing core exposure to the major asset classes, hundreds of specialty ETFs offer tailored exposures for investors looking for more specialized strategies to complement their long-only portfolio positions. As an investment objective, some ETFs offer leveraged or inverse daily exposure, which provides access to those seeking to profit from price declines as well as upside momentum. Leveraged and inverse ETFs were originally offered on broad-based indexes, sectors, and commodities, but now they are also available on single stocks, essentially competing with traditional short selling. ETFs can even pair cash positions with over-the-counter swaps, allowing investors to access patterns of returns from derivative products in an easily tradable structure. Finally, ETFs that combine option positions with an underlying index or stock portfolio have also seen significant asset growth since their launch in 2018. They allow investors to mold their pattern of return with downside protection, upside caps, and ongoing income, creating a wide range of paths to accessing returns from a single underlying index, such as the S&P 500. These option-based strategies, which traditionally were available only to institutions or as structured products for the wealthiest investors, are far less complex to manage and use in the ETF package.

Transparency

ETFs are inarguably the most transparent pooled investment structure ever created and stand apart from most traditional asset management approaches that have limited disclosure of holdings as a way to protect the value of their investment process. Most ETFs disclose their full portfolio holdings daily on their websites. This transparency is valuable for investors to monitor exposure, follow how the ETF achieves its investment objectives, ensure that the ETF tracks its benchmark indexes, and verify that intraday prices are in line with the holdings.

In contrast, mutual funds must currently disclose their portfolio holdings every quarter, with a lag of up to 60 days. Hedge funds and institutional fund managers typically report on performance and positions just four times a year, with a lag of a few weeks after quarter-end, and report only to their current and prospective clients. Between these reporting periods, investors do not know whether a fund has been invested according to its stated investment objective or whether the manager has taken unexpected risks, such as a significant bet on a single company. Funds can and occasionally do stray from their stated investment objectives, which can have a negative impact on an investor's asset allocation plan. This lack of transparency can create the opportunity for hidden exposure problems. For example, if an active mutual fund decides to take a significant position in a particular security between reporting periods, an investor who is holding that security elsewhere will be "doubled up" with unintended exposure.

Financial data providers, such as Bloomberg, FactSet, and Refinitiv/LSEG, supply ETF holdings data collected from custodians as part of the services they offer. They also offer details on the holdings and fundamentals of the portfolios, such as dividend yield, financial ratios, and credit metrics. Index websites provide similar coverage for their products and also make available daily returns for the index since inception, which, in most cases, precedes the launch of the ETF. As a result, investors can evaluate the return and risk features of the underlying index across a wide range of historical market conditions and horizons.

Liquidity and Price Discovery

Another major benefit of ETFs is their liquidity. ETFs can be bought or sold throughout the trading day (and even in after-hours sessions) on secondary markets. ETFs have become popular trading vehicles, serving as equitizing vehicles and tactical tools and providing access to volatile asset classes.

The distinguishing feature of ETFs is that, unlike CEFs, they have a creation and redemption mechanism to ensure that they trade close to their true net asset value (NAV) throughout the day. This process, which is covered later in this module, allows for arbitrage between the ETF and its underlying securities. Market makers and arbitrageurs continually check for price alignment between the ETF market price and the price of the underlying securities or futures during the trading day. When the price discrepancy becomes larger than the cost of transacting in the ETF and underlying basket, traders tend to move fast to take advantage of the profit opportunity, pushing the price toward NAV in the process.

ETF trading desks at investment banks, brokers, and hedge funds compete for customer order flow and seek arbitrage opportunities between ETFs and other products, including portfolio

trades, swaps, options, and futures on similar indexes. These desks are structured to commit capital, provide information on the ETFs, and answer execution questions for institutional investors, registered investment advisers, and financial adviser networks. This market structure lends itself to efficient price discovery and greater liquidity and is obviously good for investors: It not only ensures that they get a fair price for their trades but also facilitates the ongoing price discovery process for otherwise illiquid portfolios. At times when volume moves to ETFs (common during high-volatility periods), the ETF's intraday price becomes a critical input in assessing the fair value of the securities it holds.

Because ETFs trade as a single security and are more efficient to trade than an entire portfolio, their prices are often the first to move when new information arrives affecting an ETF's holdings. In the case of many illiquid or poorly priced markets, ETFs regularly are a source of price discovery for the securities in the fund. ETFs containing international stocks and bonds continue to trade when the underlying securities markets are closed. In the fall of 2010, for example, the municipal bond markets became extraordinarily illiquid, and the ETFs tracking municipal bonds became the only source of liquidity in that market. ETFs enabled investors to buy or sell those bonds at a time when the primary markets were effectively frozen. Indeed, many investors now believe ETFs provide the most accurate pricing of fixed-income portfolios and indexes in the market.

Flexibility and Anonymity

The ability to modify positions with anonymous ETF trades provides a critical function for pension funds, sovereign wealth funds, endowments, foundations, and hedge funds: It allows these large institutional investors to accumulate or reduce large positions without revealing the size of their trading needs. ETFs enable investors to efficiently deploy or raise capital with minimal disruption to financial markets as they create a central marketplace for trading segments of asset classes, factors, and themes.

Even funds that shift among various active investment strategies may temporarily hold ETFs to "equitize cash" during a period of transition between active holdings. For example, if a large pension fund wants to replace one active manager with another, such as a mid-cap value manager, they may ask the manager being fired to shift the assets into an ETF tracking their benchmark. This ETF position can then be transferred to the new manager, who will have the opportunity over time to shift into specific stocks that represent their active investment strategy.

Tax Efficiency and Tax Fairness

Another key investor benefit of ETFs is tax efficiency. In regard to after-tax returns, in most cases, ETFs offer a marked advantage over mutual funds. ETFs offer greater tax efficiency for two reasons: (1) lower portfolio turnover for the large portion of ETFs that are index based and (2) the ability to handle redemptions in a tax-efficient manner. Because most index strategies tend to have lower turnover than actively managed strategies, they do not generate capital gains to the same extent as the active, discretionary strategies common to mutual funds. (Of course, this depends on the index because some smart beta and derivative-based ETF strategies can have high turnover and some active mutual fund managers can run tax-aware trading strategies that seek to minimize capital gains.)

Tax fairness is another matter. In a traditional mutual fund, when investors want to redeem (or if the manager changes opinions on securities), the manager sells securities, potentially incurring capital gains that must be distributed to all individual investors in the mutual fund, who may pay capital gains taxes on those distributions. In contrast, ETFs rarely make capital gains distributions; instead, redemptions are handled in kind by delivering a basket of securities rather than cash to the redeeming AP. By delivering securities instead of cash, ETF portfolio managers can usually avoid incurring capital gains. This defers tax events until the ETF investor liquidates the holding by selling the ETF shares, which most investors prefer. (Not all ETFs can take advantage of this situation; typically, bond and derivative-based ETFs will forfeit this tax advantage to some extent.)

ETFs provide an excellent opportunity for tax-loss harvesting. Normally, if investors want to sell a security to book a loss to offset gains in other investment holdings, the "wash sale rule" (Internal Revenue Code Section 1091) prohibits them from claiming the loss for tax purposes if they purchase a "substantially identical" security within 30 days. This rule poses problems for a long-term asset allocation strategy. With an ETF, however, investors can often sell one fund and replace it with another, tracking a different but similar index, and thus they can maintain the focus of their investment exposure while also capturing the tax loss.

ETFs Bring Risks and Challenges

ETFs have numerous advantages, as we outlined in the previous section. Before incorporating ETFs in an investment strategy, however, investors should be aware of several potential drawbacks.

Access without Understanding Can Be Risky

Investors new to ETFs—and their sometimes-novel asset classes and strategies—may not be familiar with the underlying assets, drivers of return, and associated risks. Put another way, just because an ETF exists to make something easy to own does not necessarily mean that it is suitable for every investor or for any given purpose.

As ETFs have become mainstream, investors may believe they know what they are buying simply from the ETF fund name or the ticker. They could be in for quite a surprise if they do not take the time to research the fund's strategy. This information is easily available, given that regulators mandate significant public disclosures of ETF objectives, strategies, and risks. Perhaps more than any other form of investment, with ETFs, the burden is on the investor to understand the portfolio construction methodology and potential exposures.

Furthermore, many ETFs provide exposure through futures, structured notes, or swaps; these investment vehicles involve more complex portfolio structures, counterparty risks, leverage, and unfamiliar tax treatment. ETFs that offer exposure to commodities, leveraged and inverse returns, currency, volatility, or derivatives are particularly subject to this risk. Investors considering these less conventional investment strategies may need to explore the features of these strategies more thoroughly than they would if they were investing in more conventional investments. Many investors turn to financial professionals, such as registered investment advisers, to conduct research, due diligence, risk analysis, and ETF portfolio construction for a fee, or they rely on name-brand model portfolios of ETFs to circumvent the due diligence process.

Transaction Costs and Market Disruptions in Underlying Holdings

Although ETFs have lower expense ratios and often less turnover (and related trading costs) than mutual funds, their holders do incur transaction costs upon purchase and sale. With exchange-tradability comes the burden of paying commissions, bid–ask spreads, and, potentially, premiums and discounts to the fund's NAV. Although many brokers offer commission-free trading programs for ETFs with reduced trading costs for certain investors, even within these commission-free programs, ETF investors must still stomach the spread—that is, the difference between the price at which an ETF is offered for purchase versus the price for sale.

Most ETF issuers have capital market teams that assist large investors in developing trading strategies. They typically encourage smaller ETF investors to use limit orders and avoid trading at the open and close, when the price alignment of the ETF with the underlying securities can be less efficient. Conversely, mutual funds are often free to trade, but internally they incur the costs of buying and selling the underlying securities with each day's cash flow or changes in portfolio holdings. Although the trading costs of commissions and market impact show up in fund performance, they are otherwise largely hidden from the mutual fund investor.

Disruptions in the markets for the securities underlying an ETF generally affect the spreads and ability to trade an ETF. This was made clear to investors during the so-called flash crashes of May 2010 and August 2015, when many ETFs saw trading halted or disrupted because a large chunk of the stocks they held were halted. Because a single stock can be held in many ETFs, simultaneous halts across several stocks will, in turn, likely affect the ETFs in which they are held. New rules were put in place in 2010 to reduce this potential impact by standardizing how ETFs reopen after a disruption. Investors, however, must still expect that ETF trading is subject to the same risks of trading disruptions as those that apply in the underlying securities, commodities, or futures.

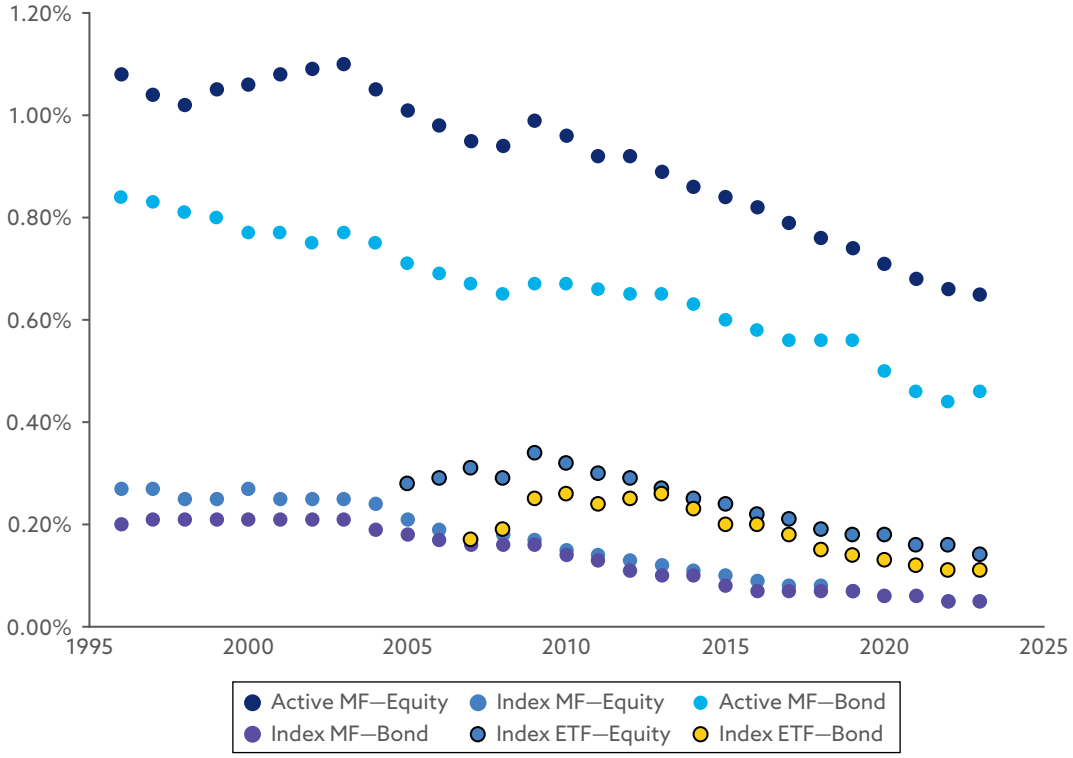
Trends in ETF Management Fees: The Great Compression

ETFs, especially broad-based, cap-weighted products that dominate the US ETF industry, have gained traction over other fund products because they are famously cheap, and because they get cheaper every year. The twin technologies of index-based investing and the ETF structure have allowed asset managers to run highly efficient portfolios. ETF investors have captured the benefits of this cost savings.

First, a bit of context is in order. As the fund industry grew and technological enhancements increased operational efficiency, asset managers were able to reduce management fees on all types of products, especially mutual funds and ETFs. According to ICI, the asset-weighted average expense ratio of an actively managed equity mutual fund declined from 1.10% in 2003 to 0.65% in 2023—a 41% reduction. That downward trajectory is typical, as chronicled by ICI's data, shown in **Exhibit 5**.

One finding is clear: Index-based strategies are much cheaper than their actively managed counterparts and have been so for decades. In 1996, the starting point for ICI's dataset, assets in passive mutual funds were less than $100 billion, amounting to one-twentieth the size of active funds. Back then, passive fund management fees were 75% cheaper than those charged by active managers.

Exhibit 5. Expense Ratios by Year and Fund Type, 1996–2023



Note: Expense ratios are measured as asset-weighted averages.

Source: Investment Company Institute, "2024 Investment Company Fact Book: Data Tables" (2024). www.icifactbook.org/24-fb-data-tables.html.

Structural Advantages of Index Investing

This cost advantage of index-based strategies stems from several factors, including lower research costs (no army of analysts or star managers to support) and minimal trading commissions for funds tracking low-turnover indexes. Fund operations can also be streamlined, as passives require less risk management, compliance, and marketing support. Index-based investment approaches also scale well, enabling a single team to manage hundreds of billions of dollars. For example, a team of four people manages the Vanguard S&P 500 funds, including both ETFs and mutual fund share classes, which had $1.4 trillion in assets as of 28 February 2025.

Structural Advantages of ETFs

ETF cost efficiency is a critical factor in the vehicle's growing success. Because ETFs have a streamlined structure and distribution model, they offer a significant operational advantage over traditional mutual funds. A key factor is the reduced overhead for ETF providers because they do not need to maintain detailed shareholder records or manage cash reserves for redemptions, unlike mutual fund companies.

ETF operational costs are generally lower than those for mutual funds. ETFs do not charge sales loads or short-term trading penalties, and they can avoid the 12b-1 marketing fees that are common with mutual funds. Although ETF investors may incur trading commissions and face bid–ask spreads when buying and selling shares on an exchange, they avoid the recurring account (so-called "wrap") fees that can accrue via wealth advisers.

The distribution model for ETFs also promotes cost efficiency. Instead of paying advisers directly, ETF issuers pay platform fees (known as "pay to play") to brokerage firms, allocating them a percentage of the ETF's expense ratio in exchange for offering the ETF on favorable trading terms.

Index Investing + ETF Structural Advantages = A Big Win

Index management is cheap compared with active discretionary investment management. The ETF structure also strips costs down to the bone. It is not surprising that the biggest, broadest index-tracking ETFs are practically free. Fee compression has been a prevalent trend in the ETF industry, driven by two primary factors: (1) investor preference for the cheapest products and (2) asset managers cutting fees to remain competitive. As investors have become more cost-conscious, they have gravitated toward the lowest-fee investment options available, putting pressure on ETF issuers to decrease expense ratios across all asset classes and investment strategies.

For investors, fee compression has been an overwhelming positive, finally allowing the "little guy" to capture market returns through ultra-low-cost products. Today, anyone with a brokerage account can access the global stock market and most US dollar–denominated investment-grade bonds for less than 0.04% in annual fees. **Exhibit 6** provides an example of a three-fund portfolio consisting of 60% equity and 40% fixed-income exposure selected by FactSet analysts to cover global stock and US bond markets.

It is possible to build an even cheaper portfolio, although it might be less comprehensive.

In contrast, ETF issuers have had to compete aggressively through fee levels and have become extremely efficient to offer value to clients. As of 30 June 2024, the average US ETF fee level, on an asset-weighted basis, was just 17 bps. Today, nearly 60% of all ETF assets are held in funds with expense ratios of 10 bps or less; those costing between 10 bps and 20 bps held another 18% of the AUM.

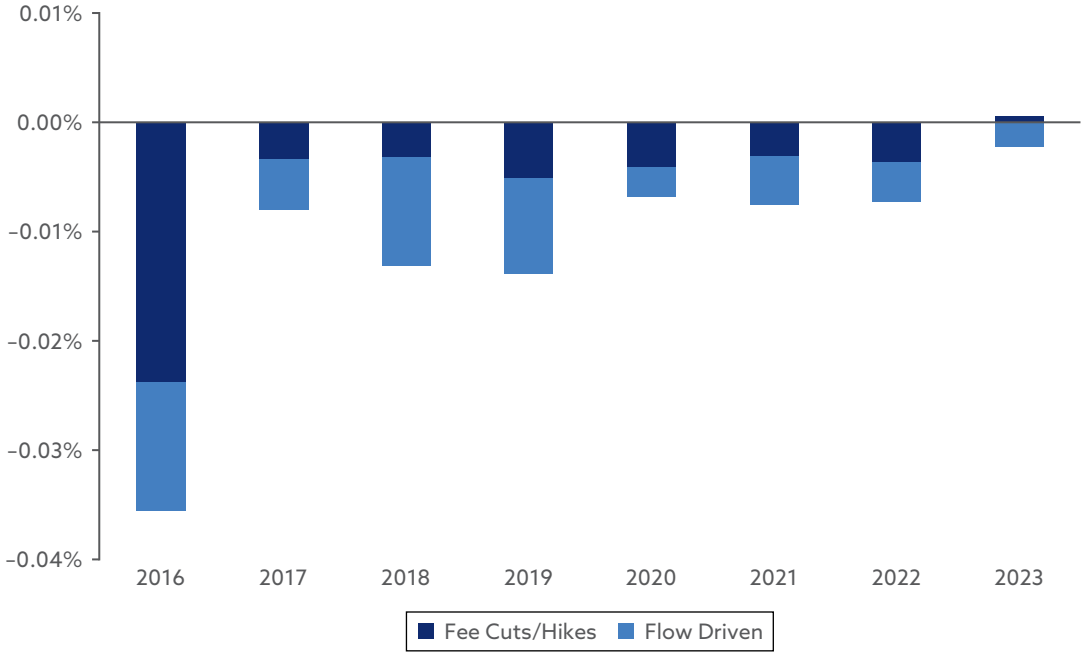
Investors have been pushing down ETF fees for years, by funneling most of their new investments into the cheapest products. This has provoked a perpetual fee war among asset

Exhibit 6. A Three-Fund Portfolio Example

Ticker	Name	Expense Ratio	Weight
VTI	Vanguard Total Stock Market ETF	0.03%	36%
IXUS	iShares Core MSCI Total International Stock ETF	0.07%	24%
AGG	iShares Core US Aggregate Bond ETF	0.03%	40%

Source: FactSet (31 March 2025).

Exhibit 7. ETF Expense Ratio Changes



Source: E. Kashner, "ETF Investors Say 'No Thanks' to Fee Hikes," FactSet (1 February 2024). https://insight.factset.com/etf-investors-say-no-thanks-to-fee-hikes.

managers, who vie for the lowest price tag, dropping their fees and accelerating a virtuous cycle. **Exhibit 7** shows the asset-weighted expense ratio changes since 2016, broken down by the proportion attributable to asset managers (fee cuts/hikes) and flows into lower-cost ETFs (flow driven).

Over the first half of 2024, ETFs that gained market share cost just 15 bps, whereas those that forfeited ground to their competitors cost 19 bps. The numbers are similar for equity ETFs—14 bps for those that gained market share and 18 bps for those that lost ground. Competition was even tighter among the plain-vanilla ETFs—those that track indexes that replicate the market, in whole or in part—such that the ETFs that gained market share cost just 8 bps (asset-weighted average). Investors have made their preferences clear and have thrown down the gauntlet toward competitive fees for asset managers who wish to gain a foothold in the rapidly growing ETF industry.

How ETFs Work

ETFs work differently from mutual funds. The differences create not only the distinct benefits ETFs offer but also some of their risks. In this section, we explain how ETFs work, from inception to day-to-day trading and fund flow processing. These concepts include (1) the creation and redemption process and the role of arbitrage, (2) settlement and clearing, (3) the US ETF legal structures, and (4) industry contributors in the ETF ecosystem.

Creation and Redemption

Like stocks, ETFs are traded on stock exchanges. Unlike stocks, however, they do not get onto an exchange through a traditional subscription-based initial public offering (IPO). Unlike mutual funds, ETF shares are not available to the investor by direct subscription. Instead, ETFs feature a creation and redemption mechanism that allows for the continuous creation and destruction of ETF shares (although the initial shares are generally created with seed money from trading partners for the first few days of life). As we discussed earlier, understanding how this mechanism works between ETF managers and APs is essential to understanding the benefits and some of the potential risks of ETFs.

The Creation and Redemption Process

Perhaps the most important and distinct component of the ETF structure is the process for creating and redeeming shares. The best way to explain the creation and redemption process is to describe it in action. Consider that you want to put money to work in an ETF. You place a buy order in your brokerage account, and your broker arranges to buy those shares from an investor who wants to sell. After the order is executed, you receive shares of the ETF in your brokerage account just as if you had transacted in a stock in the secondary market. From your perspective, the trade is done. Behind the scenes, however, the process has just begun.

The ETF issuer does not yet know that you bought these shares, and it does not receive any influx of money to invest. Shares simply transfer in the secondary market from the seller (an investor) to the buyer (another investor) and move through a securities settlement process. The process works well, but it seems to create a chicken-and-egg problem: If you can buy ETF shares only from another investor, where do the first shares come from?

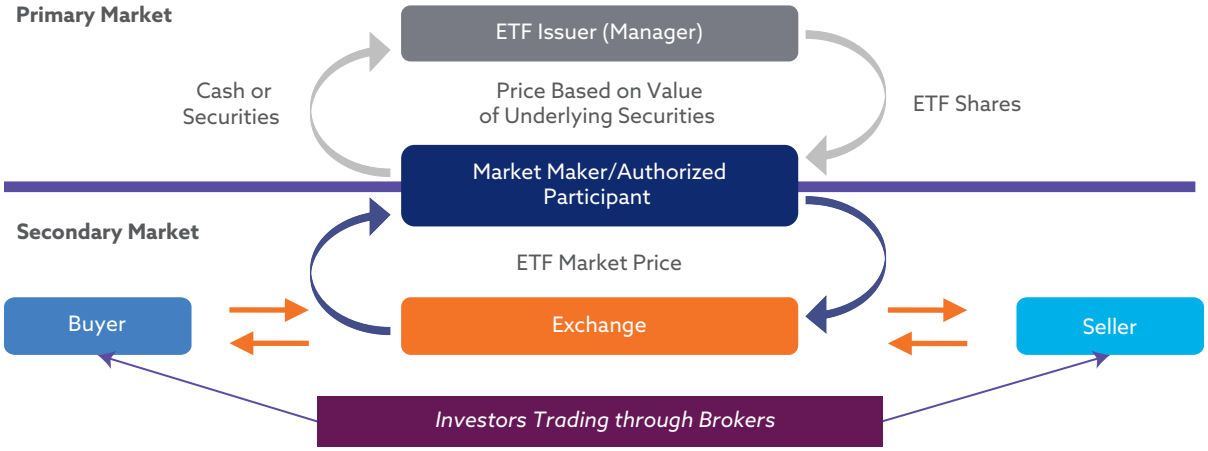
ETF shares can be created or redeemed only by a special group of institutional investors—APs—who are designated when the ETF is issued. APs are large broker/dealers, often market makers, who are authorized to transact with the issuer through the creation and redemption process. In this sense, APs interact with ETF issuers much like individual investors interact with a traditional mutual fund firm.

Exhibit 8 illustrates the ETF creation and trading process, dividing access to the funds into the primary and secondary markets. APs interact in the primary market with the ETF issuer by exchanging either the underlying securities according to the composition of the fund that day or cash based on the closing prices of the securities in the basket for shares of the ETF. Investors buy and sell through brokers on an exchange in the secondary market. On many days, no primary market creation or redemptions occurs when buy-and-sell orders are roughly in balance.

In this process, the AP is, in effect, the investor in the ETF from the standpoint of the fund issuer or manager. The AP has responsibilities and opportunities that extend beyond those of a typical mutual fund investor. When a mutual fund investor wants to buy new shares from a mutual fund firm, the investor sends that firm cash. Certain ETFs (notably, certain bond ETFs) transact in cash, but most operate using in-kind creations and redemptions.

Creation and redemption begins each day when an ETF issuer publishes a list of securities that it wants to introduce to or remove from the fund. For example, an S&P 500 ETF manager typically wants to own all the securities in the S&P 500 Index in the exact weights they appear in

Exhibit 8. ETF Creation, Redemption, and Trading Process



that index. This list of securities specific to each ETF (called the "creation basket") is disclosed publicly each day. Some funds may publish separate creation and completion baskets that, when combined, provide a full portfolio picture. The fund may also publish a redemption basket, if it wants to divest a different basket of shares than it would like to acquire. For example, a fund might use a redemption basket containing a stock it is trying to get rid of and exclude that stock from the creation basket.

When creating new ETF shares, the AP goes to the market and buys all the stocks in the creation basket for that day, according to the specified share counts. After the AP exchanges this basket of securities for ETF shares from the issuer, which are equal in value, the AP can go to the market and sell the ETF shares to individual investors.

These transactions between the AP and the ETF issuer occur in large blocks (called "creation units"), which are traditionally equal to 50,000 shares of the ETF. The exchange is one for one: One carefully articulated basket of underlying securities is exchanged for one block of ETF shares.

This same process also works in reverse: If the AP has a block of ETF shares to redeem, it presents them for redemption to the ETF issuer and receives the basket of underlying securities. The AP then can sell these shares on the open market or can hold them as part of its trading book inventory.

The holdings for that day's creation basket are published each morning and made available to all market participants. As a result, an AP can trade shares or ETFs in the secondary market during the trading day (as can other market makers that have resources devoted to ETF arbitrage). APs can sell 50,000 ETF shares without needing to have them in inventory while simultaneously buying the basket of underlying securities because it will be able to swap the basket for the 50,000 ETF shares by the end of the day. Although the actual process of exchanging baskets happens after the close through the overnight settlement process, the AP can rely on the basket composition to quote bid–offer spreads and execute trades throughout the day.

The cost and risks of ETF arbitrage are affected by the width of the bid–ask spread and trading range around the intraday portfolio value.

ETF Arbitrage

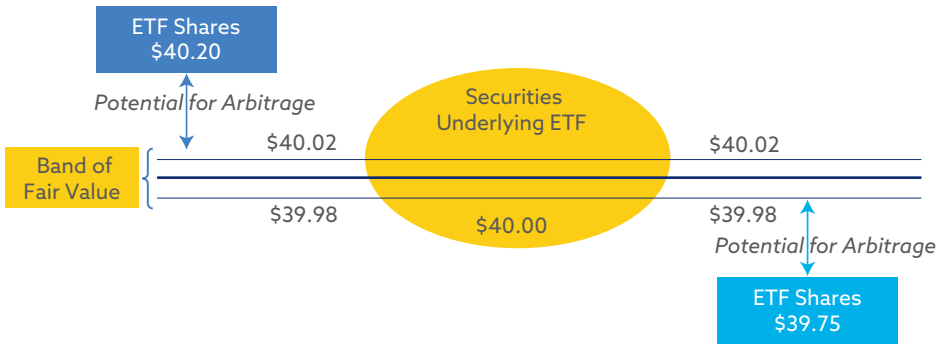
The back-and-forth creation and redemption mechanism is vital to ensuring that the ETF's price stays within a tight range around the NAV of the portfolio of securities it holds. Most investors, large and small, buy ETFs through their brokerage accounts, just as they do stocks. The price those investors pay is based entirely on supply and demand for that ETF, as with a stock. When buyers outnumber sellers, the price of the ETF goes up. If, however, the ETF price goes up more than the true value of the underlying securities would suggest is "fair," APs and other market makers become active in the market. Specifically, when they can buy the underlying securities and create new shares of the ETF at fair value at the end of the day, they will start selling ETF shares at their temporarily inflated value while simultaneously buying the basket to capture the value differential. This arbitrage opportunity not only creates an incentive for APs to provide liquidity but also keeps the ETF trading at or near fair value.

The scenario in **Exhibit 9** shows how the process works: The ETF stock exchange bid price is $40.20. The fair value of the ETF based on its underlying stocks, however, is only $40.00, and the cost of trading for the AP is about 2 cents on either side of the fair value. In this case, an AP will buy the basket of securities that the ETF tracks and exchange it with the ETF provider for a creation unit. The AP will then sell ETF shares at $40.20 and pocket the 18 cent difference per share (after considering the 2 cent cost of conducting the arbitrage).

This trading activity places downward pressure on the ETF price because the AP is pushing shares out into the market. It also places upward pressure on the prices of the underlying securities because the AP went into the market and bought the underlying shares. If the ETF share price trades at a premium, the AP will repeat this process until no further arbitrage opportunity exists.

If, however, the ETF is offered for sale at $39.75, the AP (market maker) will buy up those cheap shares at $39.75 with the plan to redeem them with the ETF provider in exchange for the basket of the underlying stocks. The AP can then sell the stocks on the exchange and pocket

Exhibit 9. The ETF Arbitrage Band and Process



Source: This graphic is a hypothetical example constructed by the authors for illustration purposes.

the 23 cent price difference per share after transaction costs. Once again, if the share price continues to be offered at a discount, the AP will pursue this process until no further arbitrage opportunity exists.

The valuation differential at which it makes sense for ETF market makers to step in is called the "arbitrage gap," and it varies with the liquidity of the underlying securities and a variety of related costs. For some ETFs, this gap or band around fair value can be as small as 1 cent, whereas for other ETFs, it can be substantial. For any ETF, however, the gap creates a band around fair value inside which the ETF will fluctuate without inviting arbitrage.

These are abstract scenarios, of course, and do not include all potential costs that the APs incur. The AP generally pays all trading costs associated with buying up the baskets and ETF shares and also pays a fee to the ETF provider to cover costs associated with creation and redemption activities. If the AP is transacting at a size smaller than the minimum creation unit (i.e., if demand exists for only 30,000 shares), since the AP can create only in blocks of 50,000 shares, they must pay additional costs to hedge the remaining 20,000 shares until they can be rolled off the AP's books.

These and similar costs influence how large or small the premium or discount needs to be before the AP will step in with the creation and redemption process. ETF desks at APs, as large and active financial market participants, are staffed with traders who are regularly making markets in ETFs while also creating and redeeming. As a result, their commissions and trading costs are typically among the lowest of the participants in the security market. They often consolidate ETF market making with other portfolio or index product trading activities that occur at their firm, which keeps their costs and net risks as low as possible. For example, rather than buying all the securities in a creation basket, the AP can elect to use shares it holds, as a market maker, in its inventory. Also, after a day of engaging in ETF purchases and sales, an AP cares only about a net long or short exposure in its transactions with the ETF issuer. In many cases, each fund has only a few APs, which reduces the operational complexity of handling daily fund flows.

The APs absorb all the costs of acquiring new securities for the fund, which is a significant advantage of handling flows into and out of the ETF. Because investors pay only when entering and exiting the fund, these costs are reflected in the ETF trading spread. Thus, existing and ongoing ETF shareholders are shielded from the negative impact of transaction costs from money entering and exiting a fund from new or redeeming shareholders.

In contrast, when a new investor enters a traditional mutual fund, any trading fees associated with putting that investor's investment dollars to work are borne by other shareholders in the fund. The same thing happens when an investor sells: The costs are distributed among the investors who remain in the fund. Because the ETF structure embeds the trading costs in the ETF spread, it assigns the fee to the appropriate investors—that is, the ones doing the actual buying and selling.

It Pays to Design ETFs with Authorized Participants in Mind

ETF issuers have a tremendous ability to influence how well the creation and redemption process works for a fund when they design an ETF. If the issuer demands that the size of a creation

basket is 200,000 shares and not 50,000 shares, an AP will have more difficulty stepping in to arbitrage when net new demand is lower than 200,000 shares. Basket sizes may range from 10,000 shares for UBS commodity exchange-traded notes (ETNs) to 600,000 shares for a handful of iShares ETFs tracking broad international markets. Issuers also control the level of the fees they charge for creation and redemption. This affects the AP's bottom line and thus the likelihood that the AP will step in to keep prices in line with fair value.

If the ETF holds highly illiquid securities, the issuer can customize the basket that APs must deliver, deviating from full replication and thereby lowering the costs of creation. In extreme cases, the fund may allow for the creation of ETF shares for cash. This flexibility carries its own cost. In general, the more work the issuer will need to do to true-up the portfolio because of cash in lieu of securities, the larger the creation and redemption fee will be, with many fund documents allowing for up to a 2% charge to the creating AP's firm. For extremely liquid underlying securities, such as mega-cap stocks or US Treasuries, creation fees may be as little as $50. An issuer can also include or exclude clawback clauses for cash-based creations. These clauses stipulate that the costs of putting that money to work can be charged back to the AP.

As the price of the ETF moves during the day, investors benefit from knowing whether the market price is a fair reflection of the price of all the fund holdings. This useful data series is generally referred to as the intraday indicative value (IIV or IV), intraday NAV (iNAV), or indication of portfolio value (IOPV); all three terms mean the same thing. When iNAV is available, which is the case for financial advisers and other market professionals who have access to quote services, investors can monitor the quoted price of an ETF to determine whether they are going to get a fair deal when buying or selling shares. Otherwise, investors need to base their fair value assessments on similar assets (e.g., matching intraday performance of an ETF versus its reported index performance) or accept that the arbitrage process will keep their chosen ETF trading near fair value. Alternatively, sophisticated investors can use daily holdings files to create real-time assessments of fair value.

Caveat: Timing Differences

It is essential for investors to be aware of the difficulty an AP can face in managing creations and redemptions when the basket contains securities that trade outside of US market hours. For example, consider an ETF that only holds stocks trading in Tokyo. Throughout the US trading day, none of those stocks can be traded on Japanese exchanges because their trading day is over. US investors will surely be trading the ETF shares on the basis of their perceptions of how the ETF's stock holdings *would be* performing, however, if the stocks were trading and their assumptions regarding where the stocks will trade the next morning when the Tokyo exchange opens.

Tools are available for APs to manage these timing discrepancies; after-hours trades (with NYSE/ARCA now suggesting a 22-hour daily session), futures and options on Japanese equity indexes, American Depositary Receipts, and proxy portfolios also trade in US hours. These tools help APs estimate fair values when the underlying markets are closed. These hedges are not quite perfect, and the results are also imperfect. Therefore, because the assessment of fair pricing is far more of a judgment call than a science, spreads tend to be wider on ETFs trading outside local market hours.

Settlement, Clearing, and Short Sales

ETFs often top the list of the most-shorted securities, occasionally arousing suspicion that ETFs are on the verge of breaking the capital markets. Even the popular press has claimed that ETFs are a special class of securities subject to different rules when it comes to the back-office processes. From the perspective of an investor buying ETFs on the open market, they go through the same settlement and clearing process as any other stock listed on the US stock markets. So, although ETFs are not unique, they are often uniquely in the crosshairs of misunderstandings about how settlement works.

In reality, a different set of rules exists not for ETFs as a security *but for market makers*. Because market makers are essential to keeping ETFs trading fairly, we must understand the way they clear and settle ETFs, starting with the investor.

National Security Clearing Corporation and Depository Trust Company

The National Security Clearing Corporation (NSCC) is a subsidiary of the Depository Trust Company (DTC). The DTC holds the book of accounts—that is, the actual list of who owns what, for all US listed equities, mutual funds, and ETFs. This information is aggregated at the member-firm level, rather than at the individual investor level. For example, the DTC tracks how many shares of Microsoft are currently held by the broker Charles Schwab, but Charles Schwab is responsible for tracking which of its customers own which ETFs—and how many shares.

All trades that have been made are submitted at the end of each day to the NSCC, which matches and clears most trades through a nightly batch process. As long as both parties of a transaction agree that Party A sold Party B *X* shares of *Y* stock, the NSCC becomes the guarantor of that transaction on the evening of the trade and the trade is considered cleared. The buyer is then guaranteed beneficial ownership in the stock (or ETF) as of the time the trade was marked as executed, even if something (e.g., bankruptcy) happens to the seller before the trade is settled.

After each trade is cleared, the DTC tallies up the total of all trades in a process of continuous net settlement. For example, suppose the following at the end of a trading day:

- E*TRADE owes Schwab 500 shares of SPY.
- Schwab owes Bank of America Merrill Lynch 500 shares of stock SPY.

From the DTC's perspective, Schwab is considered to be "whole"—that is, it both is owed and owes 500 shares of SPY. To settle the day's transactions, E*TRADE's account will be debited the 500 shares of stock SPY and Bank of America Merrill Lynch will be credited 500 shares. The NSCC has to complete this process in one day and must have each firm review its records and correct any discrepancies. This $T + 1$ settlement process was implemented in May 2024, updating the $T + 2$ process from 2017. To date, $T + 1$ has worked flawlessly for the vast majority of ETF transactions.

Market Makers Get Special Rules

Settlement works differently for market makers (all APs are market makers, but not all market makers are APs). The job of a market maker is to constantly buy and sell a given security, and

therefore, they are likely to be genuinely short at the end of a given day. Put another way, market makers are uniquely able to sell securities they do not currently own, which for any other market participant would be considered "naked shorting" and against the rules. The settlement system, however, does not grant market makers this right forever. To facilitate normal operations, market makers have up to six days to settle their accounts by buying or borrowing the missing securities in question.

A market maker often benefits from delaying ETF settlement for as long as possible. For example, if a market maker or AP is trading SPY, it might intentionally sell more SPY than it owns until it has sold enough to warrant creating a basket with the ETF issuer, thus making good on its sales. The longer the market maker delays basket creation, the longer it can avoid paying the creation fees and related execution costs. This delay also gives the AP more time before it must take responsibility for the full creation basket of ETF shares.

ETFs with large expense ratios or embedded costs, such as the cost of maintaining swaps for leveraged or inverse ETFs, create a second incentive to delay settlement for as long as possible. Because the market maker is short the ETF shares, the market maker is, essentially, collecting both the fees and expenses of the position.

This timing issue is largely academic for investors because as soon as the trade is made, it is guaranteed by the NSCC. Eventually, whether through market transactions or creation activity, all ETF trades do settle, just as stock transactions do.

ETF Shorting

An unusual result of the trading and settlement process is the dominance of ETFs on the SEC's shorted securities reports, as market makers support ETF growth by selling ETF shares before completing the arbitrage with a creation. This is not a "failure," as the media often describes it, because market makers are given an extended time window to close out short positions.

At times, ETFs have more shares sold short than seemingly exist. For example, at the end of Q1 2014, SPDR Retail (XRT) had $720.51 million in AUM, but the SEC reported $2.06 billion in XRT sold short.

Investor Opinion Shifts Quickly

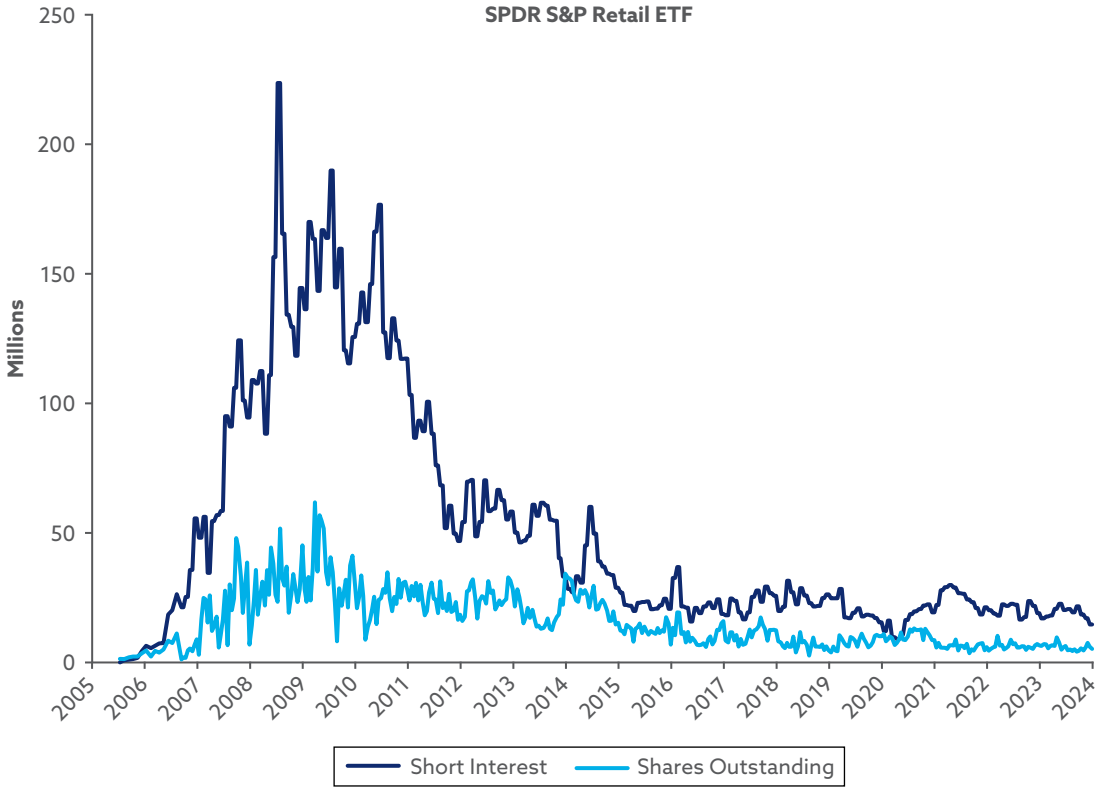
As shown in **Exhibit 10**, over the three-year period ending in Q1 2014, the actual number of shares outstanding of XRT varied from less than 3 million to more than 22 million.

It is easy to look at these numbers and assume that something went incredibly wrong. How do we explain the consistent short interest that appears to be higher than shares outstanding in this chart? (The top line shows reported shares sold short.) There are two main explanations.

Reporting Delays

A large number of ETF shares may be reported as being short, but this does not necessarily mean the market contains "phantom" shares. The process for reporting shorts is notoriously buggy, and data frequently lag by days or even weeks. Such lags can exaggerate inconsistencies.

Exhibit 10. XRT Shares Outstanding, 2006–2024



Source: FactSet.

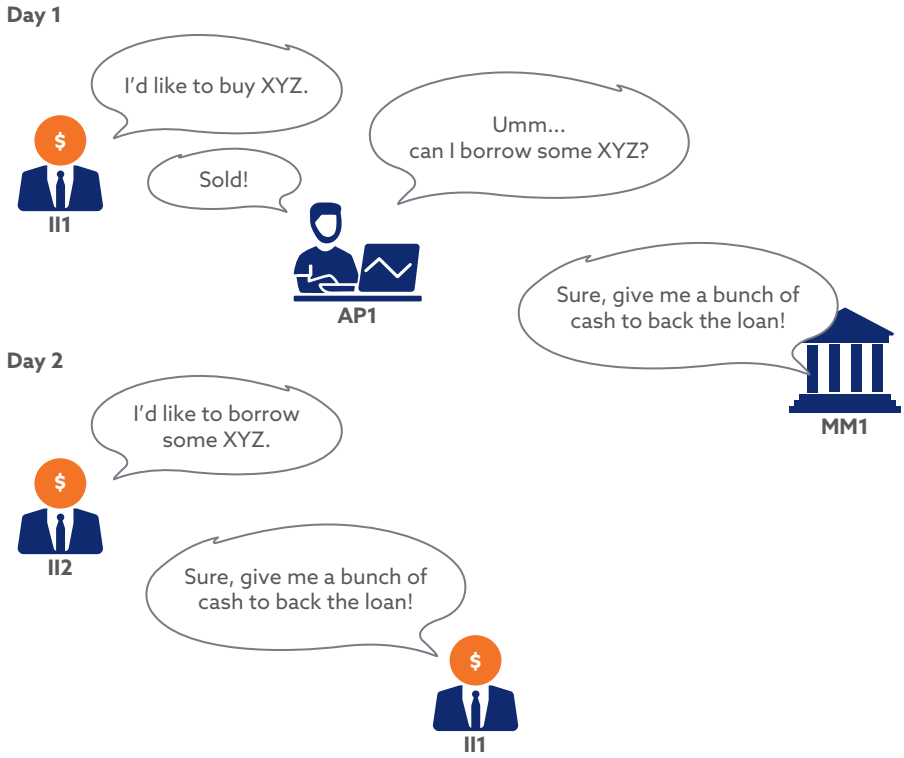
Daisy Chains

Consider another scenario—one of "cascading shorts." On Day 1, an institutional investor (II1) buys some ETF shares from an authorized participant (AP1). Because AP1 does not own the shares, it has to borrow them from a market maker (MM1) and hand over some cash or short-term bonds as collateral for the loan. Those specific shares are now 100% short. From the perspective of II1 (the original buyer, which kicked off the transactions), it is the sole owner of the shares, and II1 can do whatever it wants with them. AP1 owes shares to MM1, and MM1 has loaned its long shares to AP1.

On Day 2, II1 lends its shares to a second institutional investor (II2), which then sells them short. These specific ETF shares are now notionally 200% short. See **Exhibit 11** for an illustration of this process.

No real risk is embedded, and nothing untoward has happened. Like all shorts (that are not naked), collateral is required to offset the market risk of the short exposure, and this chain can rapidly unwind. If the original owner of the shares (the market maker) wants them back, the AP can simply create them (or recall them directly).

Exhibit 11. Cascading Short Sales



Source: This graphic is a hypothetical example constructed by the authors for illustration purposes.

In this example, only the investor at the end of the chain (the one that ultimately buys from II2's short sale) has an unencumbered claim on the shares. Everyone else in the chain knows they have lent the shares. If they want to redeem them, they need to recall them. This cascading recall most likely leads to the creation of new shares. Although the chain appears to produce frightening numbers (200% of an ETF's shares sold short), the reality is not at all scary.

US ETF Legal Structures

The modern mutual fund industry was created by the passage of the Investment Company Act of 1940 (the 1940 Act). Mutual funds are one of the three types of investment companies created by the 1940 Act—that is, open-end funds (OEFs). The other two are CEFs and UITs. Most but not all ETFs are also structured as OEFs. ETFs first came into being as 1940 Act products that were granted exemptions from portions of the act (in particular, those parts related to trading only at end-of-day NAV and the use of affiliated and in-kind transactions for creation and redemptions), a status called "exemptive relief." Later, ETFs governed by the Securities Exchange Act of 1933 (the 1933 Act), which governed the continuous offering nature of ETFs, were also permitted.

To function, an ETF required exemptive relief from certain requirements of the 1933 Act, the 1940 Act, and the Securities Exchange Act of 1934 (governing market manipulation protections). Until recently, those exemptions were individualized, issuer by issuer, and varied significantly. ETF regulation was messy and inconsistent.

That all changed with the advent of the SEC's ETF Rule 6c11 of the 1940 Act (Rule 6c11), which went into effect in December 2019 after years of back and forth between investors, industry, and regulators.

The Base Case

Following Rule 6c11, the vast majority of ETFs now exist as OEFs that operate under a standard set of guidelines that cover the following:

- Transparency: All funds relying on Rule 6c11 must disclose their full holdings daily on a public website.
- Standardization: Funds filed under Rule 6c11 must meet certain liquidity and structural requirements.
- Custom baskets: Funds under Rule 6c11 are allowed to create custom creation baskets for authorized participants, giving them significant flexibility in how they manage the creation redemption process.

Alternative Structures

Although most ETFs are now covered under Rule 6c11, several types of ETFs still require specific exemptive relief. These noneligible funds include the following:

- 1933 Act products: grantor trusts, commodity pools, and ETNs
- UITs: the SPDR S&P 500 ETF Trust (SPY), SPDR Dow Jones Industrial Average ETF Trust (DIA), and Invesco QQQ Trust Series I (QQQ)
- OEFs that
  - build leverage into the strategy (all levered and inverse funds are specifically excluded from Rule 6c11);
  - are share classes of existing mutual funds, such as most Vanguard ETFs; and
  - are nontransparent by design, including several popular actively managed funds.

From an investor's perspective, these alternative structures may appear similar to the common ETF structure. For this reason, investors must examine a prospectus to assess the benefits, costs, and risks of the specific structure behind the ETF product. The following are some of the key features of the trust and ETN structures.

Trusts

Trusts allowed by the legislation include 1940 Act UITs and 1933 Act grantor trusts, commodity pools, and trusts.

The very first US ETF, SPY, was a UIT, but the structure's limitations meant that only six other funds (out of thousands) followed this path. The last UIT ETFs launched in 2002.

Under the 1940 Act, UITs are allowed and are regulated by it, but they do differ from traditional mutual funds in specific ways. Most importantly, UITs are more passive than ETFs that are structured as mutual funds. In addition, UITs cannot be actively managed and are not subject to human discretion; in fact, they do not have boards, corporate officers, or even an investment adviser.

As a result of this hands-off approach, no reinvestment of dividends received by the fund occurs. Instead, the dividends are held in a non-interest-bearing account until they are paid out. UITs also may not participate in securities lending. This inability to reinvest dividends received can have a detrimental effect (called a "cash drag") on the tracking performance of the UIT.

Structurally, a UIT must fully replicate the index it is tracking, rather than using any optimization or sampling method. When the underlying index rebalances or reconstitutes, a UIT must transact at each constituent's closing price, to avoid deviating from the index's pricing.

Another type of trust that may be used in ETFs is the grantor trust. Instead of being organized under the 1940 Act, grantor trusts are registered under the Securities Act of 1933. They hold a portfolio of assets that is not managed and that cannot be altered. If the portfolio contains securities, investors have voting rights on those underlying securities within the trust. Any dividends are distributed directly and immediately to shareholders of the trust.

Grantor trusts are used primarily to hold single assets, such as gold or bitcoin. The SPDR Gold Shares ETF (GLD), for example, which tracks the price of gold, is a grantor trust. GLD is not a commodity pool (we discuss these next), and it is not regulated by the Commodity Futures Trading Commission (CFTC), because the trust holds physical gold bullion, not futures. Shares are created and redeemed through the same AP creation and redemption process, but instead of securities, physical bullion and cash are exchanged for shares at NAV. For something as simple as GLD, the grantor trust structure works well and efficiently.

Commodity pools and trusts are another type of trust that may be used in ETFs. Any futures-based ETF is, by definition, regulated by the CFTC—not the SEC—as an investment vehicle. Under CFTC rules, such funds are considered commodity pools. For example, the United States Oil Fund (USO) ETF is designed to track the price movements of West Texas intermediate crude oil. Instead of owning thousands of barrels of oil, however, the ETF invests almost exclusively in futures contracts and thus is a registered commodity pool.

ETFs based on futures and commodities use this structure. The ProShares VIX (Chicago Board Options Exchange Volatility Index) Short-Term Futures Fund ETF (VIXY) and the VIX Mid-Term Futures ETF (VIXM), as well as other funds that rack rolled futures indexes, are also commodity pools.

Commodity pools live solely under the umbrella of the 1933 Act and have no independent boards or similar regulatory protections afforded under the 1940 Act. These commodity pools are taxed by the IRS as limited partnerships and thus can distribute different kinds of tax forms (i.e., K-1 partnership income). This structure can expose investors to capital gains even if they have not sold their positions.

ETNs

Although we may use the term *ETF* to also refer to ETNs, ETNs are not truly funds. They are unsecured debt obligations of the issuing institution. They are structured as a promise to pay a

pattern of returns based on the return of the stated index or security, minus management fees. The issuer of the note takes responsibility for setting up whatever counterbalancing hedges it believes are necessary to meet those obligations.

Although ETNs, like ETFs, are traded on exchanges, they are registered under the Securities Act of 1933. ETN holders do not have voting rights on underlying securities, because the notes are simply debt obligations (securities) of the issuer. They are, in a very real way, just corporate bonds with specified payout patterns.

Of all exchange-traded products, ETNs have the largest potential counterparty risk because they are effectively corporate debt. Most ETN issuers are on standby to exchange the note for intrinsic value with a notice period of one day. Theoretically, if an issuing bank declares bankruptcy, any ETNs issued by the bank would be effectively worthless. Baskets of notes may be redeemed back to the issuer at NAV, however, typically on a daily basis (like shares of an ETF). Therefore, an extremely rapid and catastrophic failure would be required to catch investors by surprise.

In 2008, when Lehman Brothers defaulted, it had three ETNs on the market. Any investors holding the ETNs when they stopped trading lost nearly all their money. Most reasonably aware investors, however, should have known that Lehman Brothers was headed for difficulty and had substantial time to liquidate their shares on the open market in the prior weeks.

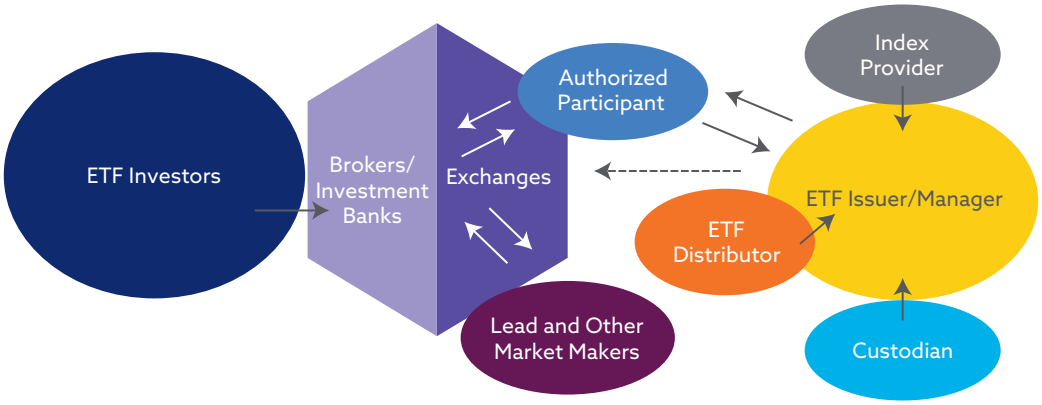
In exchange for this counterparty risk, ETNs offer two distinct advantages. The first advantage is exposure: ETNs can open up distinct areas of the market or can allow strategies in which physically transacting in and settling the underlying securities each day would be difficult, often (although not always) with zero tracking error. The second advantage is taxation. Under current interpretations, the IRS considers ETNs prepaid forward contracts. Thus, investors do not recognize capital gains or losses until the sale or redemption of their shares. Typically, ETNs also do not distribute dividends or interest that would have to be declared as taxable income. In certain asset classes, including commodities, ETNs can have significantly better long-term tax treatment than competing ETFs. (Note that, as of this writing, only 2 of the 59 active ETNs in the United States have more than $1 billion in assets.)

Participants in the ETF Ecosystem

Having covered how ETF issuers interact with APs and market makers and with the knowledge of how ETFs are created and redeemed, how trades are settled, and how market prices relate to NAVs, it is useful to examine the other side of the business: the wider ETF ecosystem, which includes investors, brokers and investment banks, and security exchanges, along with firms that service ETF issuers, such as distributors, index providers, and custodians. **Exhibit 12** illustrates the participants and flows of services and funds through this ecosystem.

Many types of investors, large and small, participate in the ETF marketplace through brokers and investment banks that are members of exchanges. At the end of the trading day, however, only APs can create or redeem ETF shares with the ETF issuer. ETF issuers rely on many types of service providers as they manage the funds and create and redeem shares. Most license a benchmark from an index provider, which, in turn, provides intellectual property and marketing support for that index. (This step is not relevant to actively managed ETFs.) ETF issuers also contract with custodians, transfer agents, accountants, legal firms, and compliance vendors.

Exhibit 12. Schematic of the ETF Ecosystem



Source: This graphic is a hypothetical example constructed by the authors for illustration purposes.

They also can use subadvisers for portfolio management and trading. Distribution services can be handled by the ETF issuer or can be outsourced to a third party. The distributors and index providers support issuers by providing ETF investors with education, research, and documents that describe the key features of the strategy embedded within the ETF.

Most ETF issuers produce factsheets, product reports, holdings files, and all manner of descriptive data, such as AUM, dividend payment schedules, premiums and discounts to NAV, and trading spreads, as well as portfolio metrics, such as price-to-earnings ratio, often with the help of a financial data provider. Many professional ETF investors also subscribe to sophisticated ETF data and analysis services from Bloomberg, FactSet, Morningstar, and similar firms. This seemingly complex network of actors and activities has evolved since the early 1990s into a well-oiled machine that has had few, if any, operational errors across trillions of dollars in trading.

Making Sense of the ETF Landscape

Now that we understand how ETFs have achieved their efficiency with a structure that set them on a path to dominate fund flows, we are well positioned to explore the contours of the ETF industry. In this section, we will cover the population served by ETFs, the products that have evolved to appeal to this population, and the competitive landscape for firms that seek to issue and grow ETF product lines.

ETF Applications and Categories of Investors

ETFs have democratized both index investing and tactical trading. They have succeeded by appealing to a wide range of investors who have a broad set of goals and time horizons.

Before democratization, indexing was mostly for large institutional clients, starting in the 1970s. A few large asset managers, such as SSGA, Wells Fargo Nikko (the predecessor firm of BGI/BlackRock), and Northern Trust, offered index replication services; large pension funds hired in-house staff to run index portfolios. Institutions typically held separately managed or

commingled accounts, which were offered at lower fees relative to mutual funds. Indexing for the masses started in the mid-1970s with the launch of the Vanguard S&P 500 Index Fund. In the next two decades, index mutual fund offerings came from other large asset managers, including Vanguard, Fidelity, State Street, and Alliance Capital.

In 1993, with the launch of the SPDR S&P 500 ETF Trust, the index investing business began to change. ETFs offered plain-vanilla portfolios at the same cost to virtually all categories of investors regardless of the holding period. Suddenly, individuals, financial advisers, hedge funds, family offices, proprietary trading firms, asset managers, and institutional asset owners could invest in a broad range of indexes, at little cost and without needing intermediaries. All investors needed was a few hundred dollars and a brokerage account. Few financial products—other than checking accounts and government securities—are accessible at the same cost and on the same platform to small and large investors alike.

ETFs' on-exchange trading provided a marketplace in which all types of investors, regardless of asset size or length of time horizon, could transact in a transparent manner with the regulatory protections of exchange-traded stocks and, in most cases, registered investment companies. Today, ETF users make up an array of investor types, with investment holding periods ranging from minutes to hours, months, and even multiple years. This was not always the case.

In the first decade they were available (1993–2002), ETFs were used predominately for tactical trading by hedge funds and institutional investors (asset managers and asset owners), much like exchange-traded derivatives. Such products as SPY, Invesco QQQ, IWM (iShares Russell 2000 ETF), and EEM (iShares MSCI Emerging Markets ETF) were seen as substitutes for futures or swaps. This innovation extended index exposure to a broader choice set in a friendlier, more accessible structure.

By the mid-2000s, individual investors, financial advisers, and asset owners started to use ETFs for core asset class exposure as a part of their strategic asset allocation, which remains the primary investment application of ETFs. They also began to turn to ETFs for focused strategies based on specific style factors, such as value, growth, momentum, or dividend features, often jettisoning active managers who offered similar strategies in costly, inefficient mutual funds.

Today, the market values some ETFs for their exceptional liquidity and others as efficient buy-and-hold investment vehicles. For asset owners and asset managers, ETFs can often be used as a temporary repository until a more permanent investment selection or manager selection is made. Liquidity seekers might pay a small premium in management fees as a tradeoff for near-seamless trading. Long-term investors might be willing to trade ETFs at slightly elevated bid–offer spreads in exchange for rock-bottom operating expenses.

This is easy to see by looking at the market turnover of an ETF—the average ETF holding period, calculated by dividing the ETF's assets by its average daily dollar volume. The most actively traded ETFs, based on average US dollar volume for the first half of 2024, are listed in **Exhibit 13**, along with their average holding period. This is calculated by dividing the assets of the ETF at the end of June 2024 by the total dollar value of all shares traded from January through June.

The eight ETFs that led in trading activity in the first half of 2024 turned over their assets every 4–20 trading days, or in a month or less. These ETFs would be valued more as trading vehicles than as investment vehicles. IVV and VOO, which are lower-fee alternatives to SPY for S&P 500 equity exposure, stand out with significantly longer average holding periods, almost a full year.

Exhibit 13. Average Holding Period for the Most Actively Traded US Equity ETFs, January–June 2024

ETF Name	Ticker	Average Holding Period (Trading Days)
SPDR S&P 500 ETF Trust	SPY	20
Invesco QQQ Trust Series I	QQQ	19
iShares Russell 2000 ETF	IWM	10
iShares 20+ Year Treasury Bond ETF	TLT	15
ProShares UltraPro QQQ	TQQQ	7
iShares iBoxx $ Investment Grade Corporate Bond ETF	LQD	11
iShares iBoxx $ High Yield Corporate Bond ETF	HYG	6
Direxion Daily Semiconductor Bull 3x Shares	SOXL	4
iShares Core S&P 500 ETF	IVV	227
Vanguard S&P 500 ETF	VOO	255
Financial Select Sector SPDR Fund	XLF	23

Source: FactSet.

SPY is valued by short-term investors for its liquidity, and its fees are not as much a factor when held for short periods. IVV and VOO are favored by longer-term investors as strategic holdings in buy-and-hold asset allocation strategies.

ETF Strategies: Scope and Growth

Today, all classes of investors use ETFs both as liquid trading vehicles and as a means of gaining exposure to virtually all asset classes globally. Asset managers are racing to meet demand and to attract attention and capital.

ETF strategies have evolved significantly over time in terms of coverage. The first launches offered exposure to major US indexes, such as the Dow Jones Industrial Average, the NASDAQ 100, and the S&P 500 and 400, and to a suite of countries. Since then, ETF offerings have expanded to cover most of the global investable market, including bonds of all types; commodities; currencies; equities parsed by geography, sector or industry, size and style, or dividends; bonds parsed by sector, credit quality, and maturity; and geared exposure, alternatives, and asset allocation vehicles. As the coverage and slicing-and-dicing grid filled in, asset managers came to market with new takes on security selection and weighting, moving away from plain vanilla—that is, broadly inclusive, market-cap-weighted reflections of a market segment—toward a host of new investment strategies.

Identifying Market Segments

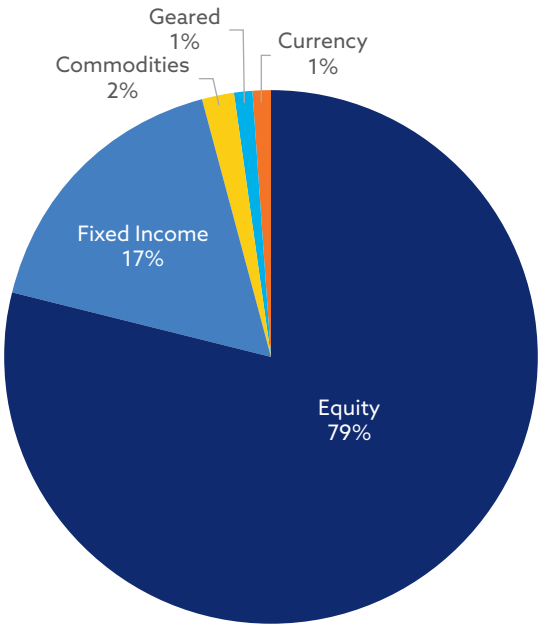
ETF assets are distributed among asset classes and investment strategies, but the distribution is hardly equal. Equity and bond ETFs are by far the most popular, with 79% and 17% of all US ETF dollars allocated to this class as of 31 December 2024, as shown in **Exhibit 14**. All other asset classes, including commodities, currency, asset allocation, alternatives, and geared ETFs, jointly hold just 4% of the assets.

This lopsidedness continues within the major asset classes. Equity ETFs can be segmented into three categories: size and style, sector, and high dividend yield. Size and style parse the market on two axes: relative market cap and the growth/value spectrum. This category also includes total market ETFs. Sector ETFs split companies by business activity into wide groups by sector, narrow groups by industry, or novel groupings by investment theme. High-dividend-yield ETFs select stocks with higher-than-average payouts.

Bond ETFs also fall into three major categories by issuer type: government, corporate, and broad based, which includes both government and corporate issuers. Equity ETFs are dominated by size and style funds; bond ETFs are led by government and broad market funds. The breakdowns are shown in **Exhibit 15**.

Each category can be parsed into finer slices, by geographic exposure, by market cap size or growth/value orientation, by sector or industry, by credit quality, or by maturity. This specialization allows funds to operate in distinct market segments, as each segment offers a distinct combination of economic and geographic exposures. For example, as of 30 June 2024, US ETF

Exhibit 14. US ETF Market Share by Asset Class, December 2024



Source: FactSet.

Exhibit 15. ETF Intra-Asset-Class Market Share, 31 December 2024

Asset Class	ETF Category	Weight
Equity	Size and Style	86%
Equity	Sector	12%
Equity	High Dividend Yield	3%
Fixed Income	Government	40%
Fixed Income	Broad Market	36%
Fixed Income	Corporate	25%

Source: FactSet.

investors looking for unlevered exposure to Chinese equities could choose among the following 21 ETF segments:

- Equity: China Large Cap
- Equity: China Small Cap
- Equity: China Total Market
- Equity: China Total Market Growth
- Equity: China Extended Market
- Equity: China Communication Services
- Equity: China Consumer Discretionary
- Equity: China Consumer Staples
- Equity: China Energy
- Equity: China Financials
- Equity: China Biotechnology
- Equity: China Health Care
- Equity: China Industrials
- Equity: China Information Technology
- Equity: China Materials
- Equity: China Real Estate
- Equity: China Broad Technology
- Equity: China Consumer
- Equity: China Environment
- Equity: China Internet
- Equity: China Utilities

US ETF municipal bond investors could consider the following 20 segments:

- Fixed Income: US Government, Local Authority/Municipal Investment Grade
- Fixed Income: US Government, Local Authority/Municipal Investment-Grade Floating Rate
- Fixed Income: US Government, Local Authority/Municipal Investment-Grade Ultra-Short Term
- Fixed Income: US Government, Local Authority/Municipal Investment-Grade Short Term
- Fixed Income: US Government, Local Authority/Municipal Investment-Grade Intermediate
- Fixed Income: US Government, Local Authority/Municipal Investment-Grade Long Term
- Fixed Income: US Government, Local Authority/Municipal Broad Credit
- Fixed Income: US Government, Local Authority/Municipal Ultra-Short Term
- Fixed Income: US Government, Local Authority/Municipal Short Term
- Fixed Income: US Government, Local Authority/Municipal Intermediate
- Fixed Income: US Government, Local Authority/Municipal Long Term
- Fixed Income: US Government, Local Authority/Municipal High Yield
- Fixed Income: US Government, Local Authority/Municipal High-Yield Intermediate
- Fixed Income: California Government, Local Authority/Municipal Investment Grade
- Fixed Income: California Government, Local Authority/Municipal Investment-Grade Short Term
- Fixed Income: California Government, Local Authority/Municipal Investment-Grade Intermediate
- Fixed Income: California Government, Local Authority/Municipal Investment-Grade Long Term
- Fixed Income: Minnesota Government, Local Authority/Municipal Investment Grade
- Fixed Income: New York Government, Local Authority/Municipal Investment Grade
- Fixed Income: Puerto Rico Government, Local Authority/Municipal

As of 30 June 2024, FactSet analysts identified 630 distinct market segments in which ETFs operate. Most of these segments are competitive, meaning that at least two ETFs are vying for investors' dollars. At the very top—among the 60 segments that account for 90% of all US ETF assets—the median fund count is 16. The largest segment by count and dollars is Equity: US large cap, where 472 ETFs duke it out to attract flows. The runner up, Equity: US total market, has 191 ETFs. In contrast, 43% of these segments (by count) are not competitive, but for good reason: Jointly, they control just 0.9% of US ETF AUM. Dollar-wise, all the action is in the competitive segments.

The Differentiation Challenge

It is hard to stand out in the ETF space. Asset managers who do not dominate the market for plain-vanilla, broad-based ETFs have had to find a way to differentiate and promote themselves. Over the years they have tried many tactics, including reintroducing the allure of potential outperformance by way of investment strategy (i.e., smart beta), trend following, or both; melding social action with investing; managing downside risk through insurance-like strategies; and returning to active management.

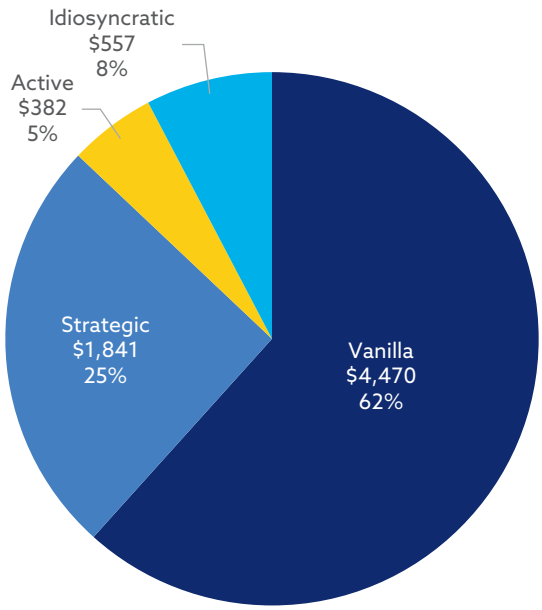
Differentiating by picking and choosing certain securities strategically from within an investment universe and deviating from market-cap weighting first came to the equity ETF universe in the form of growth and value investing, but it has since expanded to include many schemes, including using fundamental factors, particularly dividend yield and dividend growth, and also technical factors, such as volatility and momentum, all of which are piloted by academic researchers looking to attribute performance drivers. Collectively, these strategies are marketed as "smart beta" or "strategic beta," touted as systematic or structured versions of active management. Strategic beta versions of plain-vanilla exposures proliferated and competed with actively managed mutual funds, plain-vanilla ETFs, and each other. Also in the mix are idiosyncratic ETFs, which focus on processes outside of the traditional academic approaches, such as exchange listing, ESG (environmental, social, and governance), or equal weighting.

Plain-vanilla equity strategies continue to dominate, with more than 60% of all equity assets, but the other strategy groups have carved out significant market share. **Exhibit 16** shows how the assets are distributed.

Equity Differentiation, Round 2

Facing market saturation in both plain vanilla and strategic beta, asset managers offer targeted trend-following products, often called "thematic ETFs." These products, frequently marketed to retail investors, allowed for bets on narrow industries. Many keyed off the success of Invesco QQQ, which tracks the NASDAQ 100, an index often associated with technology

Exhibit 16. US Equity ETF Strategy Group Categories: AUM ($ billions) and as a Percentage of Total, 30 June 2024



Source: E. Kashner, "U.S. ETF Flows: Investors Are Getting Polarized," FactSet (25 July 2024). https://insight.factset.com/u.s.-etf-flows-investors-are-getting-polarized.

and high-growth stocks; VanEck Gold Miners (GDX); a popular cybersecurity ETF (Amplify Cybersecurity ETF, or HACK); ROBO Global Robotics ETF (ROBO); and ARK Innovation ETF (ARKK).

ARKK also is an early example of active management making its way to the ETF universe. Since the passage of Rule 6c11, the expansion of custom basket permission, and the approval of mutual fund conversions, active managers have rushed to offer ETFs that complement or mimic their mutual fund products.

At the same time, the idea of doing well by doing good reached the ETF landscape, as some ETFs aimed to favor or exclude companies that ranked as virtuous or sinful on various scales of environmentalism, social activism, and corporate governance (i.e., ESG).

More recently, ETF issuers have turned their attention to option strategies packaged as ETFs. Products offering income from the sale of covered calls or limited downside protection from the purchase of out-of-the-money puts or collars have caught advisers' attention and gained market share.

Making Way in Bond Land

Differentiation in fixed-income ETFs has followed a similar path, although active management gained a foothold earlier, with the 2008 launch of Guggenheim Enhanced Short Duration ETF (GSY), and accelerated with the 2009 launch of PIMCO Enhanced Short Maturity Active ETF (MINT).

Plain-vanilla products continue to dominate, as shown in **Exhibit 17**. Strategic beta within fixed-income products, which focus on duration and credit quality, has had limited uptake. Notably, one vanilla sub-strategy has emerged as a winner: bullet maturity ETFs. These funds hold bonds that mature within a discrete window, often in a calendar year, allowing investors to anticipate NAVs converging to a level determined by par valuations.

As the ETF landscape has become crowded and competitive, issuers have continued searching for opportunities to break through or grow. Many creative ideas flourish—but not all. Some first movers are co-opted by larger competitors who offer copycat products at lower price points. Some ideas just never catch on. After all, the law of averages dictates that it is nearly impossible to outperform core vanilla year after year.

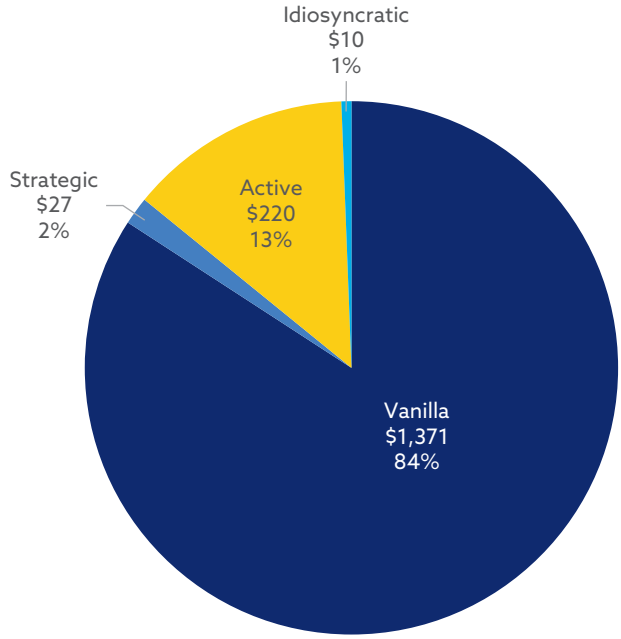
ETF Issuer Landscape

ETF investors have rewarded issuing firms unevenly, placing their trust and dollars primarily with a handful of issuers, especially BlackRock, Vanguard, and SSGA—that is, "the big three," which jointly controlled 74% of all US ETF assets as of 30 June 2024. The remaining 26% is split (unevenly, still) among 242 issuers.

Exhibit 18 shows the market share of the top ETF firms. The eight firms that managed at least $100 billion of the total assets are named. The rest are crammed into the "other firms" slice that represents just 11% of the market.

The big three, which were among the first to launch ETFs, are best known for their core portfolio products—that is, ETFs that offer broad-based, market-cap-weighted exposure to wide

Exhibit 17. US Bond ETF Strategy Group Categories: AUM ($ billions) and as a Percentage of Total, 30 June 2024



Source: Kashner, "U.S. ETF Flows."

swaths of the equity and bond markets. They have also had success in strategic beta offerings that complement the market-cap-weighted core exposure ETFs.

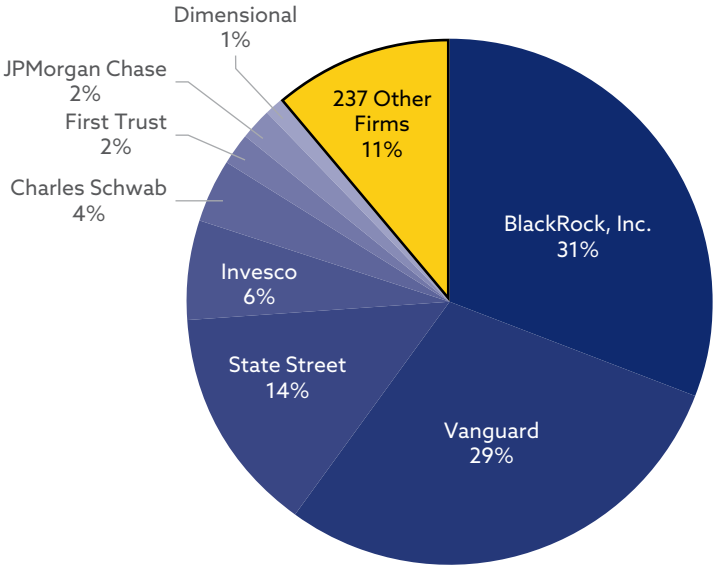
Landing the first punch in an ETF product category turned out to be critical. The firms that issued and popularized the first ETFs gained recognition along with assets. As they grew their product lines to span countries, sectors, sizes, and styles, some filled in both the "core" and the "explore" portfolio spaces favored by financial advisers. Others appealed to tactical investors by prioritizing low-cost liquidity.

Despite the dominance of BlackRock, Vanguard, and State Street, other asset managers have continued to enter and add to ETF offerings, even with the barrier to success that latecomers face, because of ETFs' phenomenal growth. Many firms have found opportunities, and some have established a strong presence and are expanding footholds in specialty areas, such as active, leveraged, and option-based ETFs.

Getting Tougher Every Year

The US ETF market's first decade offered plenty of opportunities. Its second decade presented numerous chances as well, but success was less certain. In the past 10 years, competition has become overwhelming, making success an exception, with even the most promising new entrants attracting just $10 billion to $20 billion apiece (unaffiliated, excluding mutual fund conversions). Even modest success—amassing just a few billion dollars in assets—has

Exhibit 18. US ETF Issuer Market Share, 30 June 2024



Source: FactSet.

become more elusive. Nevertheless, asset managers continue to enter the ETF market, especially since Rule 6c11 came into effect in December 2019.

To see the scale of first-mover advantage and the dwindling of opportunity for new entrants to the ten trillion-dollar ETF issuer space, we need scales in the low billions. ETF issuers do not need trillions to thrive, but most cannot survive with less than, say, $500 million after the first few years.

Exhibit 19 measures ETF issuer success (as of September 2022) in tiers: failed firms, those that had yet to amass $1 billion, those managing between $1 billion and $5 billion, and firms entrusted with more than $5 billion.

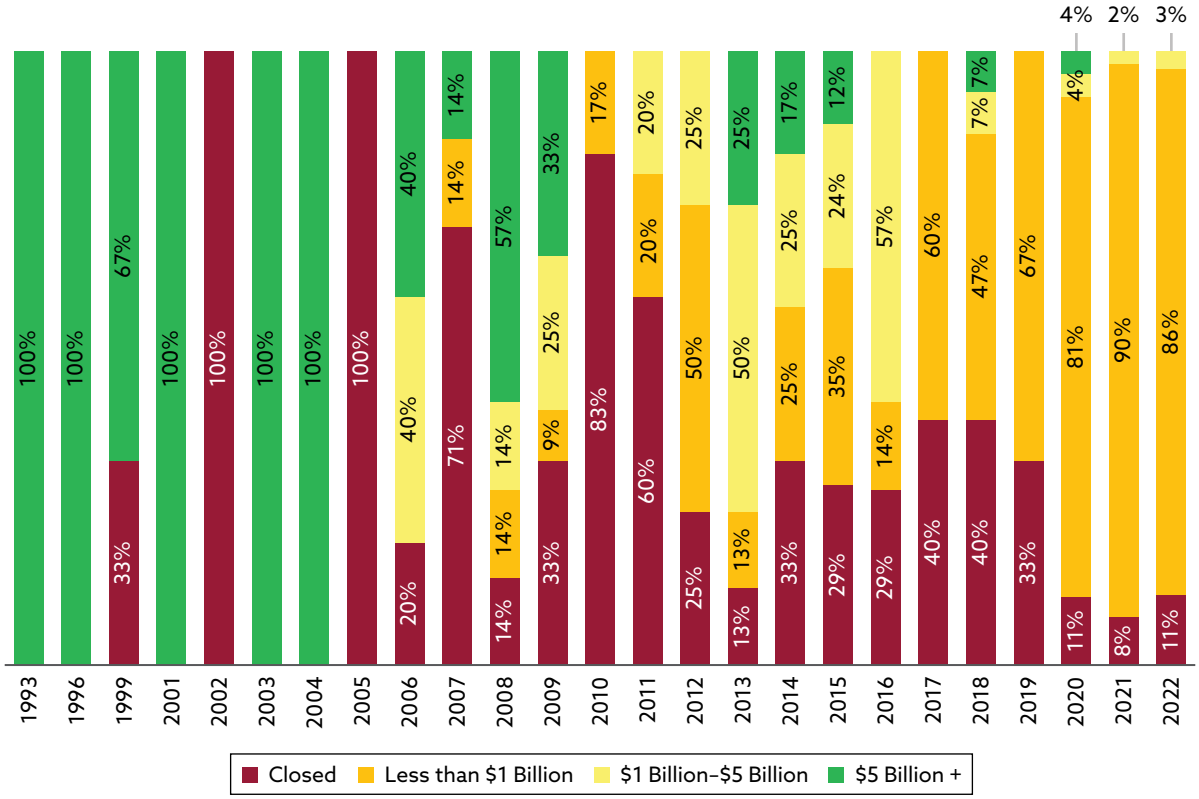
The left side of the chart, showing the earliest ETF entrants, is populated by firms with more than $5 billion, as all but a handful of the first movers have grown thriving businesses. Looking rightward, we see failed and floundering businesses alongside firms with less than $5 billion, as most newer entrants have struggled to amass assets or have quit the ETF business altogether.

Exhibit 20 tracks ETF issuers by year of entry and exit, through 31 August 2024.

The ETF marketplace was crowded before the onset of Rule 6c11; this situation has since intensified. Many new issuers target segments in which liquidity and capacity are the largest, such as US large-cap equity, which included 506 ETFs as of 6 September 2024. Perhaps it is unsurprising that the dropout rate has increased in tandem, as issuers trim their lineups or close shop.

Although closures are painful for the ETF issuer and for the few investors who hold an ETF that is scheduled to liquidate, the culling is a sign of health because it thins the field and allows

Exhibit 19. Issuer AUM Levels by Market Entry Year (unaffiliated), 30 September 2022



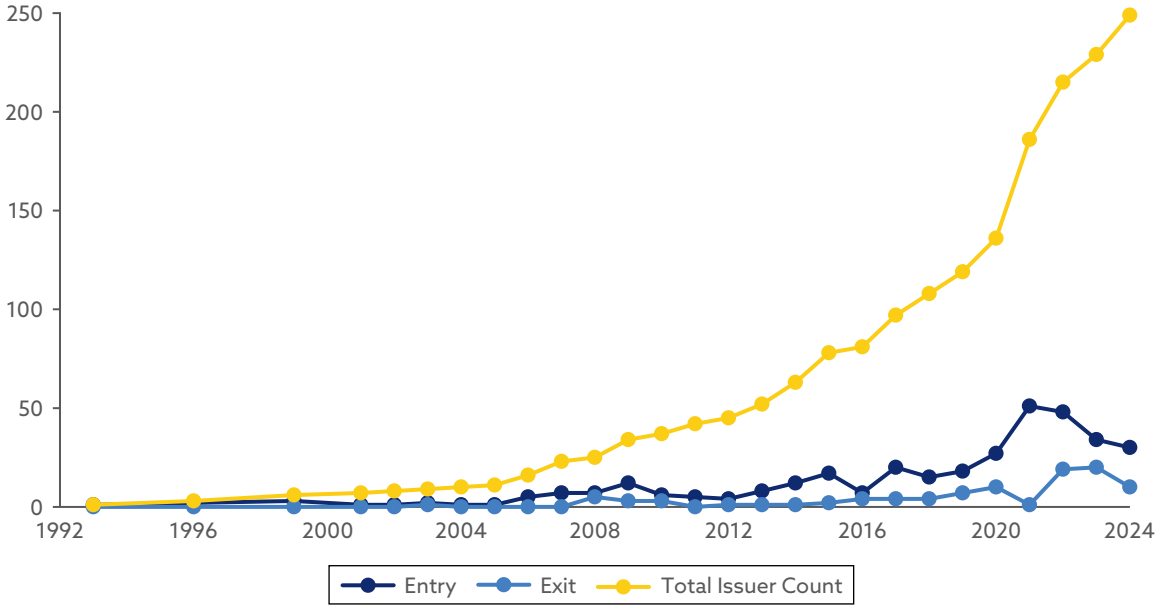
Source: E. Kashner, "Stepping into the ETF Business? Think Twice," FactSet (2 February 2023). https://insight.factset.com/stepping-into-the-etf-business-think-twice.

innovators to regroup. From 2008 to 2023, the US ETF closure rate averaged 6.4% per year, based on the total fund count at the end of the preceding year. The growth rate has been significantly higher, 17.2%, over the same time frame. No wonder that ETF investors are sometimes overwhelmed by the variety and number of ETFs available for sale.

Copycat products have become increasingly common, resulting in an overcrowded market, especially in such areas as US large-cap equity ETFs. This crowding, coupled with the different revenue models of major issuers, such as Vanguard's mutual ownership structure, has created a divergence between the issuers with the highest asset levels and those with the highest top-line revenues.

Closures of underperforming ETFs are frequent and rising, and this is a sign of a healthy, self-correcting market. Ultimately, investors are spoiled for choice in today's ETF landscape and will need to develop the skills to navigate this array of options effectively. (To help with this process, we will explain how to evaluate the array of ETF choices within a category in Module 2 of this series.)

Exhibit 20. Issuer Count by Year, 1992–2024



Source: FactSet.

ETFs as a Disruptive Invention

ETFs have changed the face of investing. Given their lower fees, greater transparency, expanded access, broad scope of strategies and asset classes, and greater tax efficiency relative to mutual funds, they have attracted assets at a rapid pace and have threatened classic fund distribution models. In the past decade, the largest active mutual fund managers have begun offering their most sought-after strategies in active ETF formats. Some have even added index-based ETF offerings to keep investors who would otherwise seek another provider.

ETFs have altered the trading landscape by providing a market in which hedge funds, pension funds, and other institutional investors can connect their order flow with that of high-net-worth and other individual investors and can engage in price discovery for less liquid assets, including bank loans, emerging market debt, and commodity exposure. ETFs have made top-down and cross-market investing more accessible by providing tools that can be used in asset or sector allocation, factor-tilt strategies, and thematic investing. They also have helped investors incorporate dynamic strategies into their portfolio management processes by allowing them to adapt to shifting return and risk opportunities.

Over the past few years, instances of backlash against ETFs and their role in the marketplace have occurred. People have accused ETFs of corrupting the price discovery mechanism of the stock market, of posing a systemic risk to finance and capital formation, and of steering investors into inappropriate and complex investments. Congressional hearings have been held, SEC and US CFTC studies have been conducted, and the financial media have extensively explored

the influence ETFs have on market structure and market operations. Ultimately, the harshest criticisms have not held water. They do highlight, however, that whenever a new and disruptive technology comes along, significant and in-depth education is needed.

ETFs are powerful tools that deliver lower costs, expand strategic choices, and provide ease of access with transparency. When investors use ETFs appropriately, they can be handy tools for portfolio construction, serving investor return and risk objectives. Like any powerful tool, however, if not properly understood or if misapplied, ETFs can be harmful. Therefore, investors should do their homework or seek the assistance of financial professionals experienced in ETF investment strategy management.

APPENDIX A. A BRIEF HISTORY OF THE ETF INDUSTRY FROM THE 1987 STOCK MARKET CRASH TO SPOT BITCOIN ETFs

Exchange-traded funds trace their beginnings to "program trading," a computer-based innovation in the 1980s that enabled investors to purchase or sell all the shares of a major index (such as the S&P 500) in a single trade order with a set list of index stock tickers and share counts. Since that time, several attempts have been made to package the trading of portfolios of stocks into a single product, but none truly caught on until the launch of the first ETFs in the early 1990s.

Along Came a Spider

Although many people consider the oldest ETF to be the S&P 500 SPDR (Standard & Poor's Depositary Receipt), with the ticker SPY, it was not actually the first: That honor goes to the Toronto Index Participation Shares, which launched on the Toronto Stock Exchange in 1990 and offered exposure to 35 of the largest companies in Canada. Despite some initial success, however, that ETF never truly caught on and was shut down.

SPY was the first ETF launched in the United States. It remains the oldest—and most successful—ETF in the world. The idea for SPY was born at the American Stock Exchange in the early 1990s in response to SEC postmortems of the stock market crash of 1987, which called for a single trading vehicle for the entire equity market. These SEC studies noted that portfolio trading was both inefficient and disruptive in a volatile market. Working with a variety of partners, including State Street Global Advisors (SSGA), Nathan Most and Steven Bloom of the AMEX created a structure that pioneered many of the key features of every ETF on the market today: SPY offered exchange-traded access to a major market index and relied on an ongoing creation and redemption mechanism to keep the ETF's market price tracking closely to fair value throughout the day. SPY ended its first year with $475 million in assets under management (AUM) and remains the largest ETF in the world.

The ETF industry did not sit idle for long. In 1995, SSGA added the second ETF to the market when it introduced the S&P 400 MidCap ETF, under the ticker symbol MDY. ETFs remained isolated products at that point, with minimal assets compared with index-based institutional accounts and mutual funds.

In 1996, when Morgan Stanley launched the World Equity Benchmark Shares (WEBS) and hired Barclays Global Investors to manage the product, the ETF industry really began to take off. These ETFs provided exposure to a variety of country indexes from Morgan Stanley Capital International (MSCI) and were revolutionary in three ways: First, they propelled Barclays Global Investors (BGI), a major institutional index manager, into the ETF universe. BGI would later negotiate a deal with Morgan Stanley to take control of the WEBS ETFs and rebrand them as iShares. Second, unlike SPY and MDY, which were both unit investment trusts, WEBS were organized as open-end funds under the Investment Company Act of 1940. This structure, already the basis

for US mutual funds, would become the norm for the ETF industry. Third, WEBS revealed the power of ETFs to offer price discovery in various markets. WEBS represented index exposure in equity markets such as Japan and France that were closed during all or part of the US trading day, investors could still act on their views on the stock prices in these countries during US equity market trading hours by purchasing or selling WEBS index products.

Qs and iShares Shift ETFs into Mainstream Financial Products

For most of the 1990s, despite the success of WEBS and the original SPDRs, ETF trading still accounted for a relatively small corner of the financial markets. As of 1998, total industry assets were only $15.6 billion. In 1999, two new participants broadened the product's appeal. In the age of extraordinary interest in technology stocks, the NASDAQ 100 Index, dominated by the largest stocks trading on the NASDAQ Stock Market, was the bellwether tech index. The Bank of New York created a trust based on the NASDAQ 100 Index and launched it as an ETF with the ticker QQQQ (now QQQ). The response was overwhelming: QQQQ attracted $18.6 billion in assets in its first year of trading. Moreover, it became the go-to tool for hedge funds, mutual funds, and others looking to tactically trade, hedge, or gain exposure to technology stock holdings. During a time when being out of the market for a week could mean missing an 8% move, the ability to equitize cash—intraday—was tremendously well received.

BGI (now BlackRock), under the leadership of CEO Patricia Dunn, also started getting serious about the ETF business. Dunn was convinced that by focusing on the marketing and distribution framework that promoted mutual funds, BGI could compete for the assets flowing into this industry by introducing a wide range of index-based ETFs. BGI was already a market leader in institutional index fund management. It had funds across a broad spectrum of benchmarks from top indexers (Standard & Poor's, Russell, and MSCI). The firm used this position to negotiate contracts with these index vendors, and in 2000, it launched more than 50 ETFs under the iShares label.

These ETFs included the original WEBS (renamed) and added products to provide a variety of exposures to US equities. By offering a wide portfolio of ETFs, iShares opened up new possibilities: Investors could now create *portfolios of ETFs*, rather than just use single products to equitize cash. BGI also created a substantial and sustained education effort to teach financial advisers about the merits of ETFs and index-based investing. Thus, ETFs began to penetrate the retail channel. BGI also fielded an ETF sales force, which helped financial advisers evaluate the investment (rather than just trading) features of ETFs.

Vanguard, PowerShares, and Other Entrants

As the leader in index mutual funds, Vanguard began thinking about this new distribution channel to capitalize on its already strong position. Despite objections from the founder, John C. Bogle—who publicly criticized ETFs as a trading vehicle that would tempt investors away from a long-term mindset—Vanguard innovated by devising (and patenting) a legal structure that issued ETFs as a special share class of its existing mutual funds. The Vanguard products, introduced in 2001, were initially called VIPERs (Vanguard Index Participation Equity Receipts).

PowerShares was the next firm to enter the market in a serious way. This independent firm launched two ETFs in 2003 tracking quant-based indexes aimed at outperforming the market.

These ETFs were the first designed specifically as buy-and-hold investments targeting the retail and financial advisory markets, and they had some success, attracting $1.14 billion in assets during the initial three years. This same year marked the introduction of the first bond ETFs in BGI's growing iShares suite.

With the slow recovery in the 2000s from the bursting of the technology bubble in the late 1990s, retail investors were turning away from equities and moving into fixed income and commodities. As a result, dreams of a large retail ETF user base were delayed. Throughout the middle part of the 2000s, hedge funds regularly accounted for 70%–80% of ETF trading activity and institutions dominated asset flows. ETF companies, however, continued to innovate, and they found new success in the commodity and fixed-income markets. The launch of SPDR Gold Shares (GLD) in 2006 was extraordinarily successful. GLD attracted more than $1 billion in assets in its first three days of trading.

In 2006, the first crude oil ETFs were launched, along with other products. Also in 2006, ProShares received SEC permission to launch leveraged and inverse ETFs (similar mutual funds had been available since 1993). The new ETFs relied on derivatives to provide both leveraged long and short exposure featuring a daily performance target that was an exact multiple of an index return. These products quickly grew to account for a significant part of ETF trading, offering the tools of leverage and shorting to a broad range of investors.

During the Global Financial Crisis of 2008, traders seeking liquidity turned to ETFs to adjust risk and manage tactical exposure. The crisis became a coming-out party for bond ETFs. When corporate bond markets seized up, corporate bond ETFs, such as LQD (investment grade) and HYG (high yield), traded heavily, thus earning a reputation as primary price discovery tools. Coming out of this period, individual investors realized buy-and-hold, long-term investing had limitations and became more desirous of tactical strategies; ETFs fit the bill perfectly. Investors also turned toward more index-based strategies as active managers failed to protect them to the extent they expected. As a result of their transparency, accessibility, and regulatory safeguards, ETFs became investment vehicles of choice as investors revisited their strategies after the deep bear market with banks front and center.

The pace of change in the ETF market changed in the 2010s, with more than 100 new ETF issuers coming to market and strong growth in many asset classes, including the launch of equity factors, thematic, and fixed-income strategy ETFs, culminating with the passage of Rule 6c11, which clarified the ETF playbook. The market turbulence around the pandemic in 2020 again tested ETFs' trading mechanisms. Trading activity surged in early 2020 with minimal fallout. Investors found that ETFs provided continuous trading and price discovery during turbulent markets, allowing them to adjust their portfolios as new information was absorbed into the marketplace. This new investor interest combined with the new flexibility offered by Rule 6c11 launched a boom of ETF product development that has continued into the current decade.

More recently, investors have been attracted to cryptocurrencies, and the launch of ETFs holding bitcoin in early 2024 by a host of issuers was hugely successful. This latest asset class to be made accessible through ETFs at low cost from almost a dozen experienced ETF managers has quickly attracted significant assets and broad-based issuer interest, gathering over $50 billion in net new assets in their first year. ETFs that embed derivative strategies for leverage, risk reduction, or shifting potential gains into income have also caught on in the last few years, with significant asset flows in 2024 and 2025.

APPENDIX B. ETF TIMELINE

The following timeline charts the evolving landscape of ETFs since inception.

1989: The Index Participation Shares for the S&P 500 launches.

1989: A Federal Court in Chicago rules that ETF funds work like futures contracts and have to be traded on the futures exchange.

1990: The Toronto Stock exchange launches the Toronto 35 Index Participation Units.

1993: SPY, the SPDR S&P 500 ETF Trust, launches.

1995: MDY, the SPDR S&P Midcap 400 ETF Trust, launches.

1996: Barclays Global Investors (now BlackRock) and Deutsche Bank (DB) launch country funds; DB funds close in 1997.

1998: Sector SPDRs launch, along with DIA, the price-weighted SPDR Dow Jones Industrial Average ETF Trust.

1999: PowerShares QQQ (now Invesco QQQ Trust), offering NASDAQ-listed stocks, launches.

2000: This year marks the beginning of "smart beta" investing in the ETF space as BGI and SSGA launch style box suites.

- BGI launches S&P and Russell style box suites. The S&P style box suite includes the iShares Core S&P 500 (IVV).
- SSGA launches an S&P style box suite.
- BGI launches a suite of sector-focused ETF.

2001

- Vanguard enters the ETF market with VTI, the Vanguard Total Stock Market Index Fund. Vanguard's ETFs are share classes of their index mutual funds, using a patented structure. The patent expired in 2023.
- BGI launches EFA, the iShares MSCI EAFE ETF.
- ETF.com starts covering the index investing space under the name IndexUniverse.

2002

- BGI and ETF Advisors launch the first bond ETFs. (ETF Advisors bond funds close in 2003.)
- BGI closes three funds. Its successor BlackRock will not close any ETFs until 2013.
- PowerShares (Now Invesco) launches the first emerging market ETF. ADRE used American Depositary Receipts to access emerging market securities.

2003

- BGI launches EEM, the iShares MSCI Emerging Markets ETF. EEM is the first ETF to invest in locally listed emerging market securities.
- BGI expands its smart beta offerings with its Select Dividend ETF (DVY).
- PowerShares gets into the smart beta game with the first "dynamic" multifactor ETF.
- First Trust enters the ETF space.
- Rydex (now Invesco) launches RSP, the Guggenheim S&P 500 Equal Weight ETF. RSP is not the first equal-weighted ETF, but it is the first to promote equal weighting as a vehicle for outperformance.
- Fidelity launches the Fidelity Nasdaq Composite Index ETF (ONEQ), which is its only ETF until 2013.
- BGI launches AGG, now called the iShares Core US Aggregate Bond ETF.
- The first ETN, Deutsche Bank's China Currency ETN (JCC), launches. It will close in 2005.

2004

- Vanguard launches US style box and sector suites.
- SSGA launches GLD, the first ETF structured as a Grantor Trust.

2005

- The Vanguard MSCI Emerging Markets ETF (VWO) launches.
- The first currency fund, the CurrencyShares Euro Trust (FXE), launches.
- BGI launches the first ESG (environmental, social, and governance) fund.
- BGI launches the first non-US growth and value funds, bringing smart beta to the developed markets.
- PowerShares brings dividend investing to the global ex-US space and launches a smart beta industry suite.
- Rob Arnott's flagship PowerShares FTSE RAFI US 1000 Portfolio (PRF) launches. Although a few other ETFs use fundamental metrics to select or weight securities, PRF is the first fund to promote the "smartness" of the fundamental strategy.

2006

- Commodity ETFs arrive:
  - Barclay's launches its first exchange-traded notes, breaking into the commodity space with the first futures-tracking funds.
  - PowerShares launches an optimized commodity tracker, the PowerShares DB Commodity Index Tracking Fund (DBC). This is the first ETF structured as a commodity pool.
  - US Commodity Funds launches USO, the United States Oil Fund LP.
- Geared funds arrive, thanks to ProShares.

- Rydex and Power Shares launch non-cap-weighted sector suites.
- Rydex launches the first multi-asset fund.
- Deutsche Bank teams with PowerShares to launch the first alternatives fund, the PowerShares DB G10 Currency Harvest Fund (DBV).
- Smart beta gains steam as WisdomTree launches the dividend investing approach, Rydex introduces pure value/growth, and PowerShares launches fundamental and multifactor sector funds.
- VanEck joins the ETF space, with GDX VanEck Vectors Gold Miners ETF.
- The 20th ETF closes.

2007

- Lehman Brothers defaults on its ETNs—the only time this has ever happened.
- Commodity funds expand into commodity sectors.
- Fixed income takes off, with 39 new launches, opening up municipals, T-bills, emerging markets, and high yield. Vanguard and SSGA enter the fixed-income space.
- First Trust launches its multifactor sector suite.
- First momentum fund launches.
- BGI launches the first emerging market bond fund.

2008

- The first actively managed ETF launches: the Guggenheim Enhanced Short Duration ETF (GSY).
- The ETF graveyard expands: 57 funds close in 2008, mostly launched in 2007–2008.
- This is a bad year to get into the ETF business. Failed issuers include Adelante, Ameristock, FocusShares, Healthshares, and MacroShares (although MacroShares holds on until 2009).
- Northern Trust makes its first attempt to enter the ETF space, only to retreat in 2009.
- BGI launches the first target date and target risk suites.
- The first geared fixed-income and commodity funds launch; Direxion launches geared funds to compete with ProShares.

2009

- BlackRock buys BGI. Guggenheim (now part of Invesco) buys Claymore.
- The first volatility funds launch.
- PIMCO launches its first ETFs, including the PIMCO Enhanced Short Maturity Active ETF (MINT).
- Schwab joins the ETF landscape.
- The first MLP ETN launches.
- 56 ETFs close.

- WisdomTree launches the first currency-hedged fund, the WisdomTree Europe Hedged Equity Fund (HEDJ). HEDJ follows a fundamental strategy, with a currency overlay.
- ALPS launches the first ETF-of-ETFs strategy.

2010

- The first robo-adviser, Betterment, launches.
- ETF assets in the United States reach $1 trillion, invested in more than 1,100 funds.
- BlackRock launches the first bullet maturity bond funds in January. Guggenheim follows in June.
- Vanguard launches the Vanguard S&P 500 Index Fund (VOO). VOO will become the largest ETF (by assets) in March 2025.
- Alternatives take off, with 16 launches.
- WisdomTree adds a currency hedge to DXJ and changes its strategy to focus on exporters.
- VanEck launches the first China A-shares fund.
- The flash crash creates a confidence crisis in ETF trading.

2011

- ETF.com launches ETF Analytics.
- Wealthfront launches its robo-adviser.
- Guggenhiem buys Rydex.
- The first senior loan fund, Invesco Senior Loan ETF (BKLN), launches.
- The first low-volatility funds, Invesco S&P 500 Low Volatility ETF (SPLV) and iShares MSCI USA Min Vol Factor ETF (USMV), launch.
- Deutsche Bank launches the first plain-vanilla currency-hedged ETFs.
- Russell makes a splashy but doomed attempt to enter the ETF business.
- Northern Trust launches the first target duration funds.

2012

- 180 ETFs launch.
- 103 ETFs are liquidated, including the Russell ETF lineup.
- BlackRock launches the low-price, broad-based core suite, including the iShares Core MSCI Emerging Markets ETF (IEMG) and the iShares Core MSCI EAFE ETF (IEFA).
- Northern Trust returns to the ETF industry with FlexShares.
- Exchange Traded Concepts becomes the first "ETF in a box" issuer, using the exemptive relief it purchased from FaithShares, which closed in 2011.
- Adviser Ken Fisher partners with UBS to launch proprietary strategies in an ETN (the first customized ETFs).

- Active ETF investing gets a shot in the arm with the launch of the PIMCO Total Return Active ETF (BOND), the first ETF with a famous manager at the helm (Bill Gross, at that time).

2013

- VanEck launches the first interest rate hedged fund. ProShares and WisdomTree follow.
- Currency hedging comes to dividend strategies.
- 163 ETFs launch; 71 ETFs close.
- BlackRock closes the iShares Diversified Alternatives Trust (ALT), opening the door to further fund closures at iShares.
- Vanguard enters the international bond space by launching BNDX.
- Schwab launches its fundamental suite, entering the smart beta game in earnest. Flows are lackluster until Schwab launches its robo-adviser in 2015, creating an in-house distribution channel for this product suite.
- Custom ETF investing takes off:
  - The Arizona State Retirement system commissions smart beta funds, seeding each with $100 million, the first pension plan to do so.
  - Adviser Ronald Blue works with startup Vident to launch Vident International Equity Strategy ETF (VIDI), designed to appeal to faith-based investors.
  - Ken Fisher expands his offerings, partnering with Barclays, Credit Suisse, and Deutsche Bank.
- First Trust launches the first open-end commodity fund.

2014

- 19 active equity ETFs launch, including suites from ARK, WBI, and MFS, doubling the total.
- 210 ETFs launch; 79 ETFs close.
- Women in ETFs is founded.
- Thematic launches pick up:
  - HACK will cross the $1 billion asset line within seven months, sparking a wave of thematic launches.
  - Seven funds focused on fast-growing corners of tech and biotech launch but gather few assets.
- The ETF-of-ETFs strategy gathers steam:
  - BlackRock uses the ETF-of-ETFs structure to launch currency-hedged funds.
  - First Trust launches FV and IFV, momentum-based strategies that hold five First Trust ETFs.
- Seven ESG funds launch, including two low-carbon funds.

2015

- 284 new ETFs launch; 102 ETFs close.
- ETF assets reach $2.1 trillion.
- The custom, thematic ETF XT launches.
  - Adviser Ric Edelman commissions the iShares Exponential Technologies ETF (XT), investing $560 million in XT on its second day of trading. Edelman Financial owns 85% of the shares of XT.
  - XT and HACK inspire a wave of six more thematic launches.
- Star bond investor Jeff Gundlach enters the ETF space with the SPDR DoubleLine Total Return Tactical ETF (TOTL).
- Currency-hedged launches accelerate. The first currency-hedged low-volatility fund launches.
- RBS closes its entire ETN lineup, in response to Dodd–Frank requirements.
- GICS spins off real estate as its own sector: The Financial Select Sector SPDR ETF (XLF) spins off the Real Estate Select Sector ETF (XLRE).
- Goldman Sachs enters the ETF business with multifactor funds.
- Another flash crash, in August, leads to many canceled trades.

2016

- 248 ETFs launch; 128 ETFs close.
- ETN closures driven by Dodd–Frank continue; 29 close in 2016.
- WIZE breaks barriers by closing only five months after launch.
- 26 thematic funds launch.
- 10 ESG funds launch; the most successful is the SPDR SSGA Gender Diversity Index ETF (SHE).
- Exactly half of all 2016 launches have closed as of 31 October 2024.

2017

- Flows increase into short volatility exposure through inverse VIX futures ETFs.
- Volatility for the S&P 500 in 2017 hits a new low of 6.7% on a 20% index gain.

2018

- The short volatility ETN VelocityShares Daily Inverse VIX Short-Term ETN (XIV) closes with large losses as VIX spikes.
- Beta Builders suite—J.P. Morgan's first ETF success—launches.
- Innovator launches buffer ETFs.
- GLDM launches, cannibalizing GLD.
- GICS reorganization creates XLC.

2019

- Active nontransparent ETFs (ANTs) are approved.
- ETF Rule 6c-11 goes into effect in December.
- Avantis launches.
- Corporate bond fee wars persist.
- SSPY converts from a private fund to an ETF; two more will follow in 2020.

2020

- To stabilize markets in the wake of the COVID-19 pandemic, the Fed buys bond ETFs (Vanguard and BLK).
- The JPMorgan Equity Premium Income ETF (JEPI) launches; it will vault into the top 10 flows list in 2022.
- ANTs launch; American Century is the first to market.
- The Invesco NASDAQ 100 ETF (QQQM) cannibalizes the Invesco QQQ Trust (QQQ).
- The SPDR Portfolio S&P 500 ETF (SPLG) changes index from the SSGA large-cap index to the S&P 500, undercutting SPY (3 bps, down to 2 bps in 2022).
- Collateralized loan obligation ETFs launch, begging the question: Did COVID-19 erase the collective memory of 2008?
- A huge wave of closures occurs, 11.8% of the total (as of the previous year's end).
- ESG and active inflows spike.

2021

- Flows approach $1 trillion ($942 billion).
- Mutual fund-to-ETF conversions include Guinness Atkinson, which is the first, and DFA, which is the largest.
- Bitcoin futures ETFs launch.
- Tactical trading of sector and thematic ETFs explodes.
- ARKK AUM and inflows peak.
- ESG inflows peak.
- Active inflows continue to climb.

2022

- Geared single-stock ETFs launch in the United States (available previously in Europe).
- ARKK flows shift negative.
- Active inflows continue to expand.
- Buy-write/buffer inflows crack the $10 billion mark.

2023

- Vanguard's ETF-as-a-share-class patent expires:
  - PGIA files for exemptive relief to launch ETF share classes of active mutual funds.
  - 53 applications are pending as of 31 March 2025.
- iShares 20+ Year Treasury Bond ETF (TLT) flows pop.
- Breaking a decades-long trend, some asset managers experiment with expense ratio increases.

2024

- Spot bitcoin ETFs launch; Ether follows.
- A set of geared single-stock ETFs linked to MicroStrategy struggles to deliver the promised return multiples as swap counterparties enforce their own position limits.
- Cambria Tax Aware ETF (TAX) pioneers tax-free diversification of concentrated equity positions via a section 351 exchange.

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