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ICI RESEARCH PERSPECTIVE

A Close Look at Exchange-Traded Funds and Their Investors

Key Findings

- **Exchange-traded funds (ETFs) have grown significantly in the United States since their introduction in 1993.** Over the past decade alone, total net assets have increased from $2.1 trillion at year-end 2015 to $11.5 trillion as of June 2025.
- **Demand for ETFs has been exceptionally strong in recent years.** Net share issuance of ETFs totaled a record $1.1 trillion in 2024 and is poised for another strong year with $543 billion already in the first half of 2025. Additionally, demand for active ETFs has surged in recent years following the introduction of the ETF Rule in 2019.
- **ETF ownership has surged to 16.9 million households, up from just 1 million in 2005.** These ETF-owning households represent a diverse group of everyday Americans. They represent 13 percent of all US households and span a wide range of demographics, with the majority earning less than $150,000 annually.
- **The growing popularity of ETFs is driven by investor interest in their specific features, alongside broader trends in the asset management industry.** Investors are drawn to ETFs for their relatively low cost, intraday tradability, transparency, tax efficiency, and exposure to specific markets or strategies. Additionally, ETF growth has been fueled by a sharp increase in ETF use among fee-based advisors and full-service brokers, the continued shift toward index investments, and a recent surge in actively managed ETF adoption by individual investors and advisors relying on model portfolios.
- **ETF prices on stock exchanges closely align with the value of the underlying securities, supported by the ability of authorized participants (APs) to create or redeem shares at net asset value (NAV) daily.** The growing number of APs over time, along with their increased activity during periods of market stress, have demonstrated the resiliency of the ETF ecosystem.
- **Most ETF trading occurs on stock exchanges, where investors directly trade ETF shares with each other, without typically impacting the prices of the underlying securities.** This trading enhances price discovery by offering investors real-time views of market valuations—especially when the underlying markets are disrupted—and often results in tighter bid-ask spreads for ETFs than for the underlying securities held by ETFs.

Key findings continued »

What's Inside

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For a complete set of data files for each figure in this report—including a statistical appendix with additional data—see https://www.ici.org/files/2025/per31-07-data.xlsx.

The following conditions, unless otherwise specified, apply to all data in this report: (1) funds of funds are excluded from the data to avoid double counting, (2) dollars and percentages may not add to the totals presented because of rounding, (3) this report calculates average expense ratios on an asset-weighted basis (see note 17 on page 43).

- **Average expense ratios for ETFs have declined substantially over the past two decades.** From 2005 to 2024, the average expense ratio for equity ETFs dropped by 43 percent, while the average for bond ETFs, reported from 2007 to 2024, dropped by 33 percent. This downward trend has been driven by several factors. Growing investor demand for lower-cost investment options has intensified competition among ETF providers. In response, firms have developed more cost-effective products. Additionally, as the ETF market has expanded, providers have benefited from economies of scale, further contributing to the reduction in expense ratios.
- **ETF creations and redemptions include several safeguards that protect shareholders from a default by an AP.** Creation and redemption orders processed through the National Securities Clearing Corporation (NSCC) carry trade guarantees, while those processed outside of NSCC typically require collateral.

I. Introduction

More than three decades ago, the first exchange-traded fund (ETF) was launched. It offered investors an innovative investment choice that combined the diversification benefits of pooled investment vehicles, such as mutual funds, with the intraday trading flexibility of individual stocks.[1] Since their introduction in 1993, ETFs have experienced remarkable growth, as both retail and institutional investors have increasingly turned to them to achieve their financial goals. ETF ownership among US households has surged over the past two decades, growing nearly 17-fold between 2005 and 2024. Almost 17 million US households now own ETFs, reflecting their broad appeal among everyday Americans.

The rising popularity of ETFs has been driven by several key factors. Investors are drawn to their relatively low costs and unique features, including intraday tradability, transparency, tax efficiency, and the ability to target specific market segments. In addition, broader trends in the asset management industry have played a significant role. These include a sharp increase in ETF usage among financial advisors, a continued shift toward passive investing, and a recent surge in the adoption of active ETFs by both individual investors and advisors who use model portfolios.

The ETF ecosystem has shown strong resilience, even during periods of significant market stress. This resilience is supported by a growing number of authorized participants (APs), who play a key role in creating and redeeming ETF shares—a process known as primary market activity. Beyond meeting changes in demand, this activity supports the arbitrage mechanism, helping ETF prices stay closely aligned with the value of their underlying assets. Additionally, the primary market includes safeguards such as trade guarantees and collateral requirements, which protect investors from potential AP defaults.

Primary market activity, however, accounts for only a small share of total ETF activity. Most ETF activity occurs on the secondary markets—such as stock exchanges—where investors directly trade ETF shares with each other. As a result, this secondary market activity in ETFs typically does not impact the prices of the underlying securities. Because ETFs have robust secondary market activity, they usually exhibit tighter bid-ask spreads than those of their underlying securities. In addition, secondary market prices of ETFs can provide price discovery, as they reflect real-time views of market valuations of the underlying securities.

Greater cost efficiency has helped fuel the growth of ETFs. Increased investor demand for lower-cost products has intensified competition among providers. Combined with economies of scale, this has contributed to a sharp decline in ETF expense ratios. Over the past decade, average expense ratios have dropped significantly across all investment objectives.

These developments underscore the importance of understanding how ETFs operate and how the industry has continued to evolve. Building on key insights from ICI's 2014 paper, this *ICI Research Perspective* offers an updated overview of several important aspects of the ETF landscape, including:

- **Section II** highlights the growing popularity of ETFs among American households and the factors driving their rapid adoption.
- **Section III** explores how APs support the ETF ecosystem in both normal and stressed periods.
- **Section IV** covers ETF activity in primary and secondary markets.
- **Section V** discusses trends in ETF expenses and fees.
- **Section VI** outlines the regulatory framework for ETFs in the United States, focusing on those registered with the Securities and Exchange Commission (SEC) under the Investment Company Act of 1940.
- **Section VII** details the clearing and settlement process for ETF share creation and redemption in the primary market, highlighting the interactions among APs, ETFs, and their agents through the National Securities Clearing Corporation (NSCC).

II. The Continued Success of ETFs and Their Rapid Adoption by American Households

ETFs are one of the most successful financial innovations in recent decades. Since they were first introduced in the early 1990s, demand for ETFs in the US has grown rapidly. Both institutional and retail investors are drawn to ETFs because of their unique features. In the past decade alone, total net assets of ETFs have increased more than five-fold, from $2.1 trillion at year-end 2015 to $11.5 trillion as of June 2025 (Figure 1, top panel). Throughout this period, domestic equity ETFs have consistently made up the largest portion of total ETF net assets.

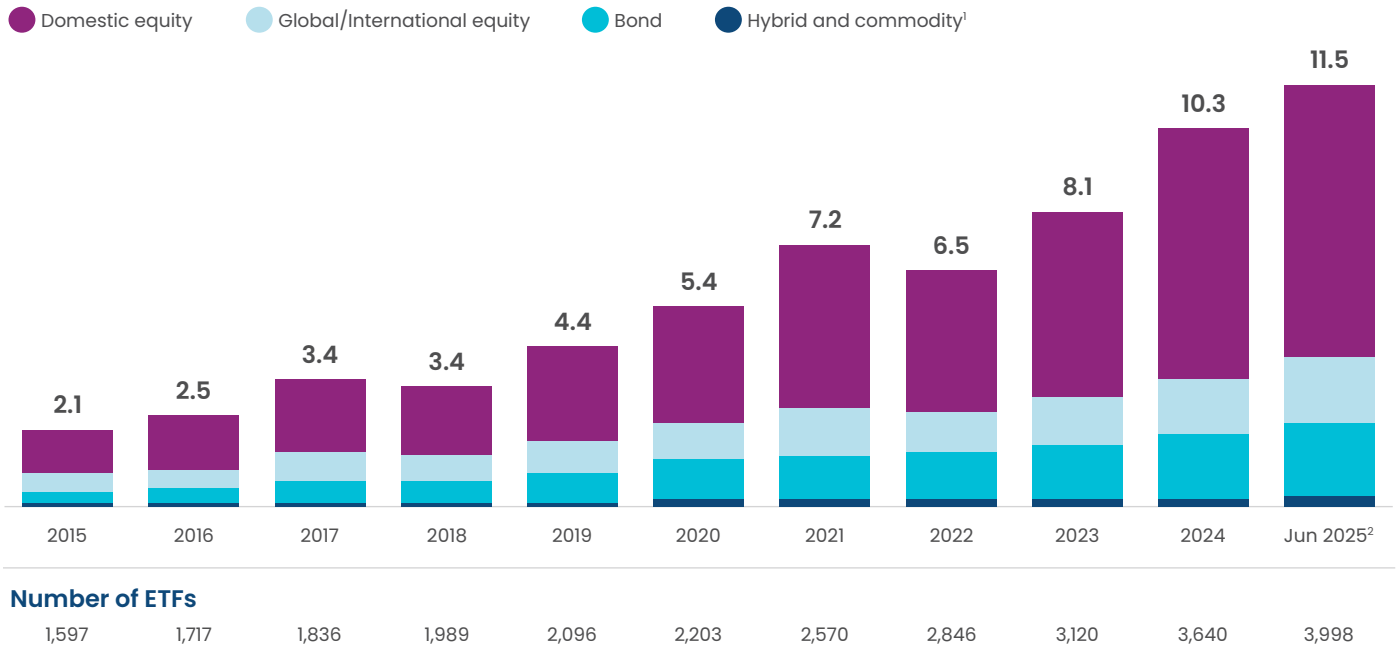
As of June 2025, they held $7.5 trillion in net assets, representing 65 percent of total ETF assets. Bond ETFs have also grown significantly in recent years, reaching $2.0 trillion as of June 2025, representing 17 percent of ETF net assets.

Investor demand for ETFs has surged in recent years. In 2024, net issuance of ETF shares—including reinvested dividends—hit a record $1.1 trillion, up from $231 billion in 2015 (Figure 1, bottom panel).[2] In response to this increase in demand, sponsors have introduced more ETFs with a greater variety of investment objectives. As of June 2025, the number of US-registered ETFs had grown to 3,998—more than double the number available at year-end 2015.

FIGURE 1

ETF Total Net Assets Surpassed $11.5 Trillion in June 2025

Trillion of dollars, year-end

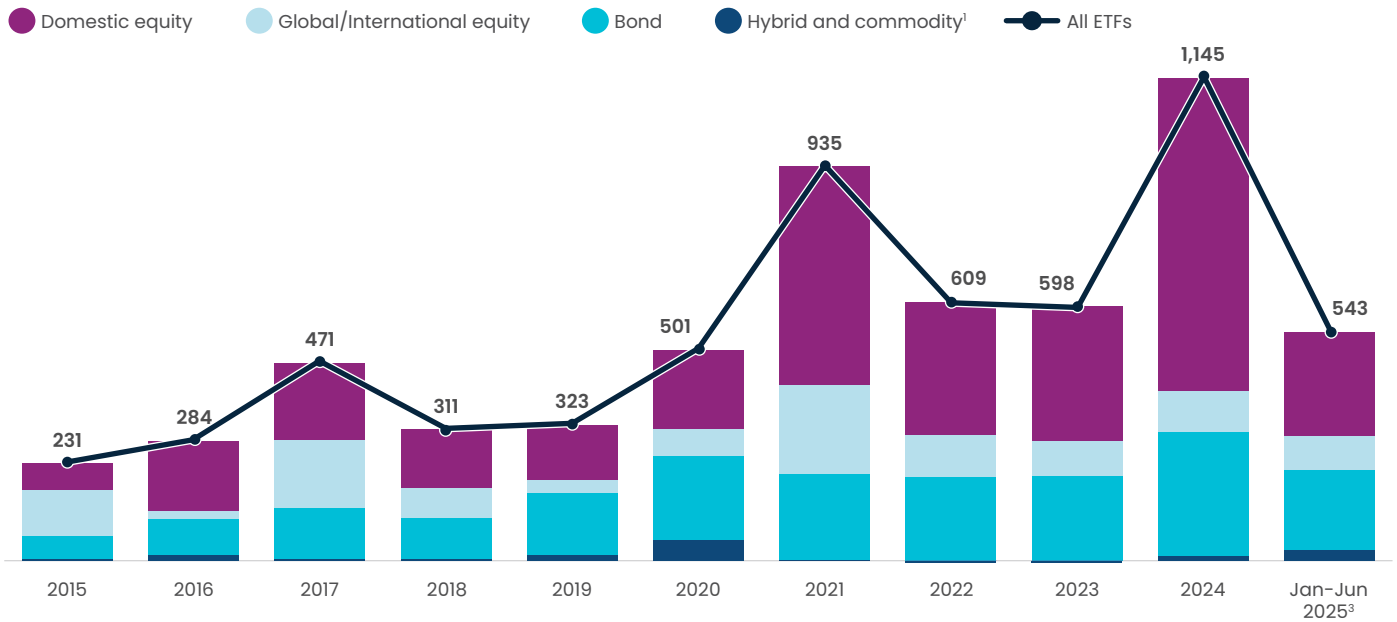


Number of ETFs

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Jun 2025[2]
1,597	1,717	1,836	1,989	2,096	2,203	2,570	2,846	3,120	3,640	3,998

Net Share Issuance of ETFs on Pace for Another Strong Year in 2025

Billions of dollars, annual



[1] Commodity ETFs include funds—both registered and not registered under the Investment Company Act of 1940—that invest primarily in commodities, currencies, and futures.

[2] Data for total net assets are as of June 2025.

[3] Data for net share issuance data are through June 2025.

Note: Data for net share issuance include reinvested dividends.

Source: Investment Company Institute

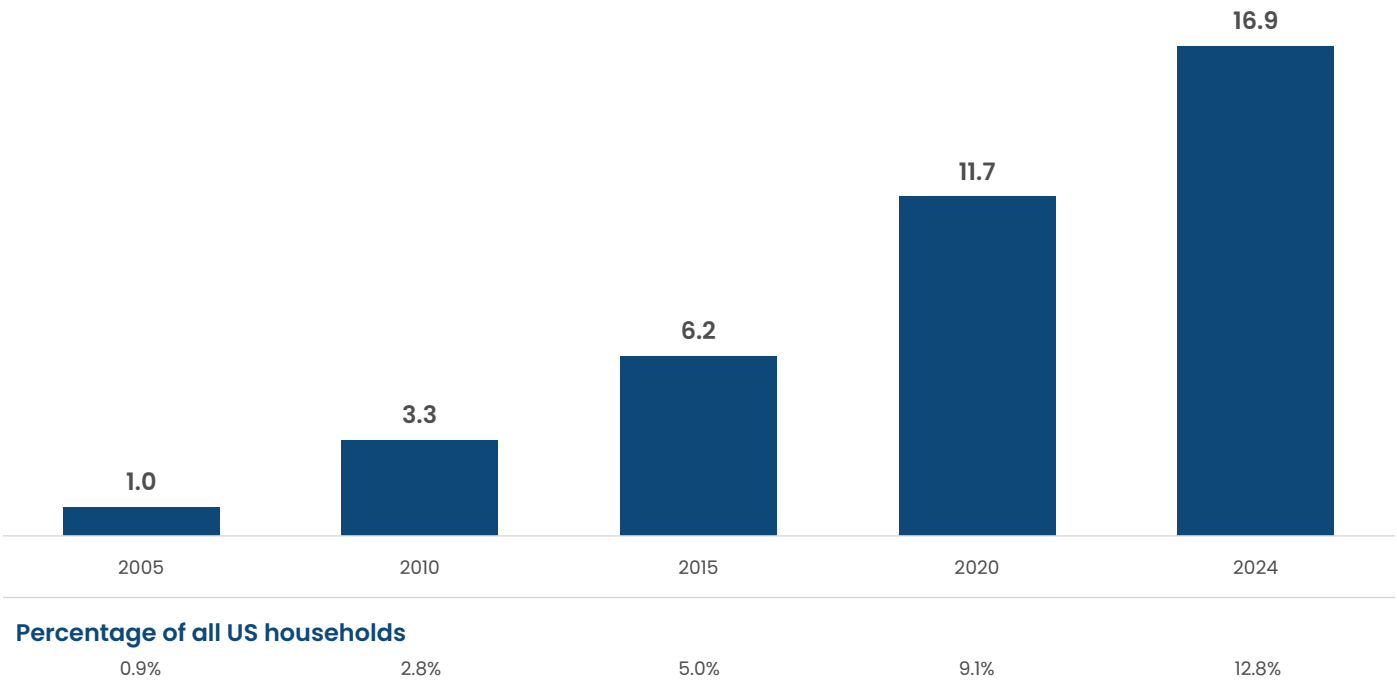
ETFs Go Mainstream: Rapid Growth in US Household Ownership

ETF ownership among US households has grown dramatically over the past two decades, rising from just 1.0 million households in 2005 to 16.9 million in 2024 (Figure 2). This nearly 17-fold increase highlights the growing appeal of ETFs among households as a tool for achieving their financial goals. By 2024, 13 percent of all US households owned ETFs, up from just 1 percent in 2005.

FIGURE 2

ETF Adoption Has Surged Among US Households

Number of US households owning ETFs in millions



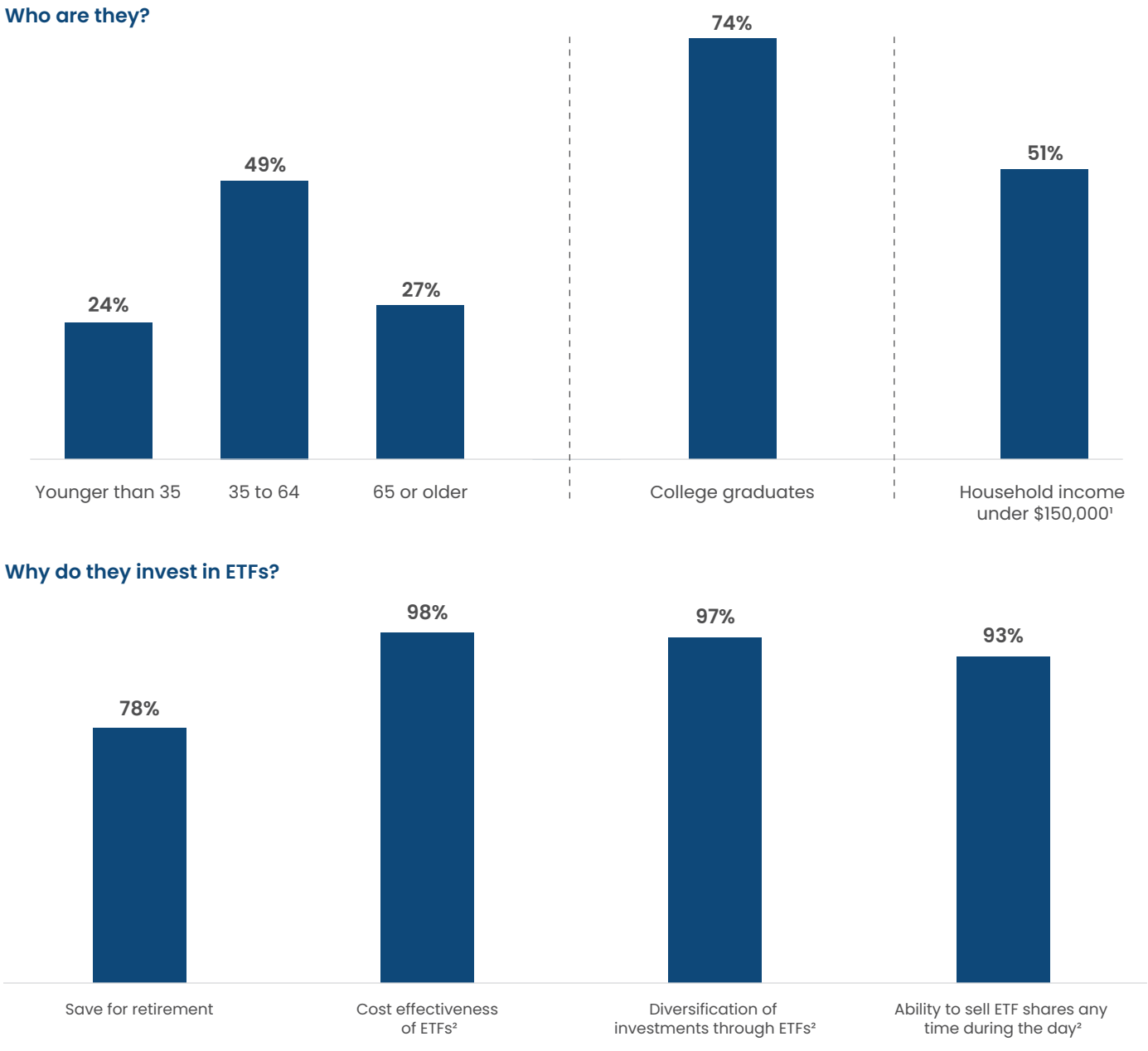
Sources: Investment Company Institute and US Census Bureau. For more information, see *ICI Research Data Release,* "Profile of ETF-Owning Households, 2024."

ETF-owning households span a wide range of demographics. Nearly half are 35 to 64 years old, almost three-quarters hold college degrees, and about half earn less than $150,000 a year (Figure 3). ETF-owning households are drawn to a variety of features that ETFs offer. In 2024, 93 percent reported that they appreciate the intraday tradability of ETFs. Additionally, nearly all ETF-owning households indicated that they invest in ETFs for diversification and their cost-effectiveness.

FIGURE 3

ETF-Owning Households Are Diverse and Value ETFs' Key Features

Percentage of US households owning ETFs, 2024



[1] Total reported is household income before taxes in 2023.

[2] Percentage of ETF-owning households indicating the feature was "very important," "somewhat important," or "not very important" in their ETF purchase decision.

Source: *ICI Research Data Release*, "Profile of ETF-Owning Households, 2024"

Key Structural Features Driving Continued Growth in ETFs

Several factors have contributed to the growing popularity of ETFs. Some are tied to the unique features that make ETFs appealing to investors, while others reflect broader trends in investing and asset management.

Intraday tradability: ETFs trade like stocks, allowing investors to buy and sell shares at market prices during trading hours across exchanges and other trading venues. This intraday liquidity gives quick access to a broad range of asset classes. Originally used by institutions to "equitize" cash—creating an equity position from idle funds to minimize portfolio drag—ETFs are now widely used by institutional investors for hedging, portfolio rebalancing, and managing transitions between fund managers. ETFs are also increasingly used by retail investors for long-term savings.

Tax efficiency: ETFs are popular, in part, because they rarely distribute capital gains. Since many ETFs track indexes, they generally have lower turnover than actively managed ETFs and mutual funds, which helps reduce taxable distributions. ETFs also use in-kind redemptions—swapping securities instead of selling them—which do not trigger capital gains. These in-kind transactions help ETFs minimize tax overhang and allow investors to defer taxes until they sell their ETF shares. However, these tax benefits aren't relevant for investors who hold their shares in IRAs, 401(k)s, or other tax-deferred accounts, where income and gains are already tax deferred.

Access to specific markets or strategies: ETFs offer access to markets and strategies that may be difficult to reach through direct investments—such as foreign markets with regulatory barriers. Instead of navigating complex requirements, such as foreign investor status, a local bank account in a foreign jurisdiction, or a local custodian, investors can simply buy an ETF with the desired international exposure. ETFs are also widely used for hedging, such as allocating to gold or commodities during inflation or geopolitical uncertainty. Beyond these traditional uses, ETFs provide access to niche themes like crypto assets, leveraged and inverse strategies, and sub-sectors, such as AI or electric vehicles, that may be difficult to access through traditional investment vehicles. This flexibility and innovation continue to attract both institutional and retail investors.

Price efficiency: Generally, the price at which an ETF trades in the secondary market is a close approximation to the market value of its underlying securities. This fairly tight relationship makes ETFs a convenient and easy option for investors who want to minimize the possibility that the share price could trade at a substantial premium or discount to the net asset value (NAV) of the fund.

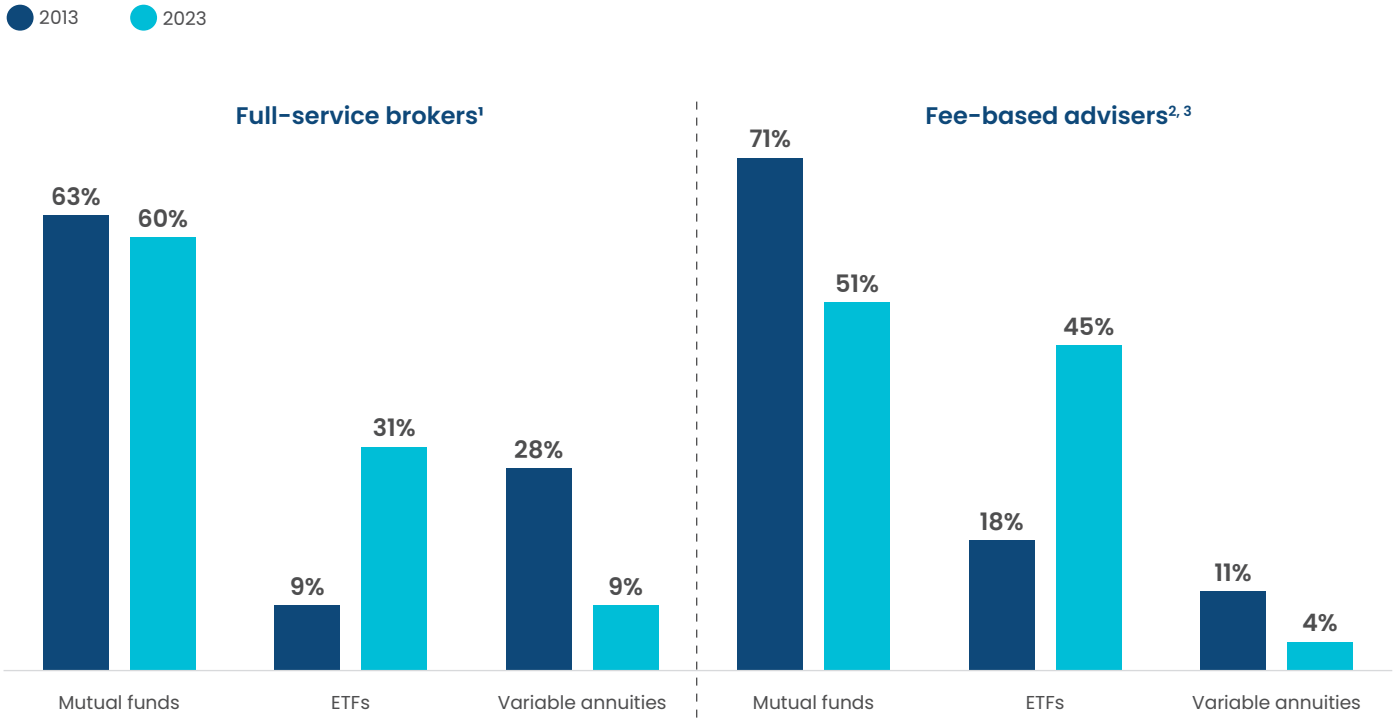
How Industry Dynamics Are Driving ETF Adoption

Increasing use of ETFs by financial advisors: More brokers and fee-based advisors are incorporating ETFs into their clients' portfolios, driven by their growing use of third-party asset-allocation models (i.e., model portfolios) to manage client assets. In 2023, full-service brokers allocated 31 percent, and fee-based advisors allocated 45 percent, of their household clients' assets to ETFs—up from just 9 percent and 18 percent, respectively, in 2013 (Figure 4). This trend is also supported by the industry's shift toward fee-based compensation, where clients pay advisors directly based on assets managed. ETFs align well with this model, as their expense ratios generally exclude distribution, servicing, and maintenance fees.

FIGURE 4

Fee-Based Advisers Are Directing Larger Portions of Client Portfolios Toward ETFs

Percentage of household assets invested in investment category by adviser type



[1] This category includes wirehouses as well as regional, independent, and bank broker-dealers.

[2] This category includes registered investment advisers and dually registered investment adviser broker-dealers.

[3] This category excludes an unknown portion of assets from investors who received fee-based advice but implemented trades themselves through discount brokers and fund supermarkets.

Note: In this figure, household assets include household holdings of mutual funds, variable annuities, and ETFs.

Source: Cerulli Associates, *"The State of US Retail and Institutional Asset Management, 2024"*

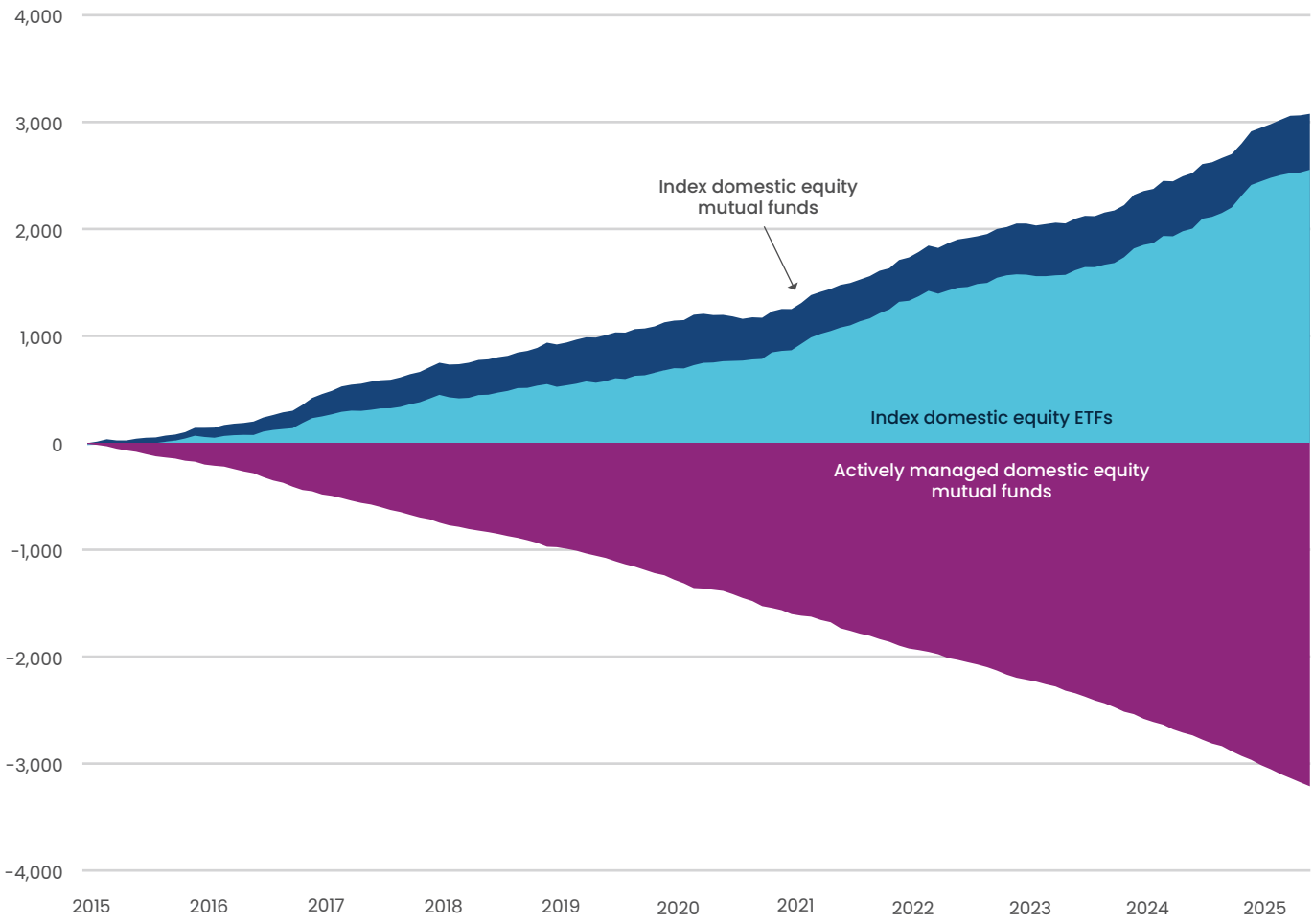
Rising popularity of index investments: Index mutual funds, introduced in the 1970s, were followed by index ETFs in the 1990s. By June 2025, combined total net assets in both reached $17.5 trillion, accounting for 52 percent of all long-term mutual fund and ETF net assets—up from just 15 percent at the end of 2015.

Investor demand for index-oriented products—particularly in domestic equity—has surged. From January 2015 through June 2025, index domestic equity mutual funds and ETFs attracted $3.1 trillion in cumulative net new cash and reinvested dividends, while actively managed domestic equity mutual funds experienced outflows, even including reinvested dividends, of $3.2 trillion over the same period (Figure 5). Index domestic equity ETFs, in particular, have seen strong investor demand—attracting nearly five times more net inflows than index domestic equity mutual funds since 2015.

FIGURE 5

Some of the Outflows from Domestic Equity Mutual Funds Have Gone to ETFs

Cumulative flows to domestic equity mutual funds and net share issuance of index domestic equity ETFs, billions of dollars, monthly, January 1, 2015–June 30, 2025



Note: Mutual fund data include net new cash flow and reinvested dividends; ETF data for net share issuance include reinvested dividends.
Source: Investment Company Institute

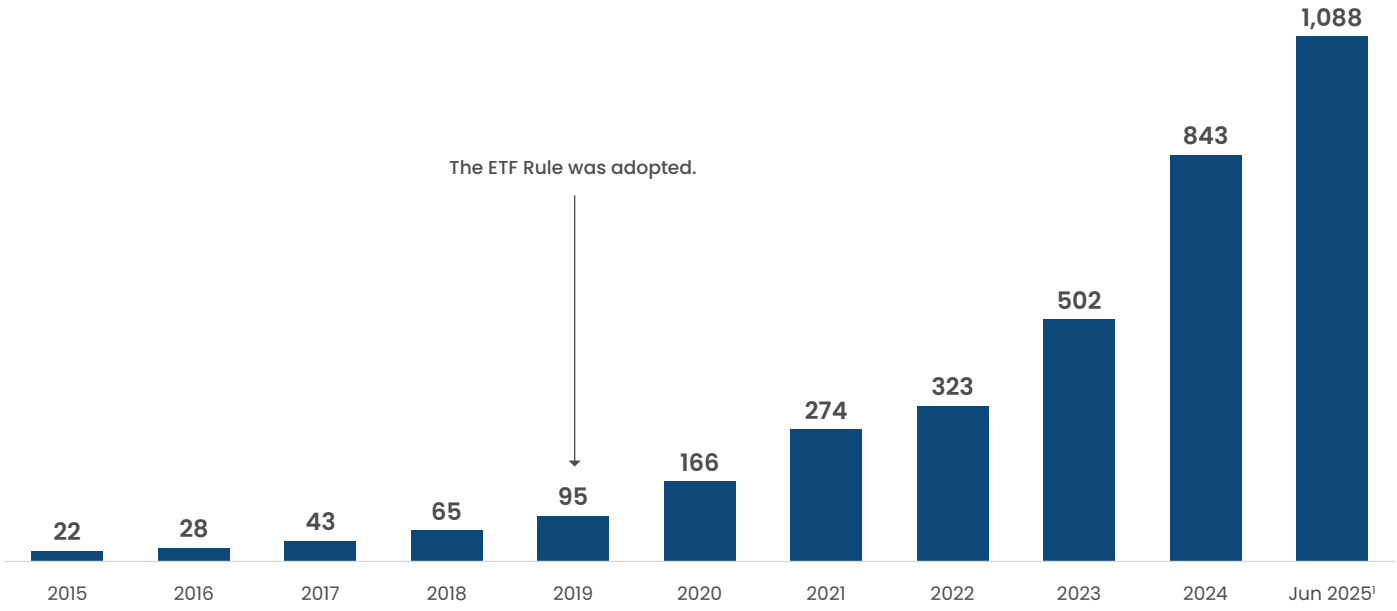
The rise of active ETFs in recent years: In early 2008, the SEC granted exemptive relief allowing fund sponsors to offer fully transparent actively managed ETFs that meet certain requirements.[3] Unlike index ETFs, active ETFs are not designed to replicate a specific benchmark. Instead, fund managers actively select securities to pursue specific investment objectives, manage risk, and enhance returns. Today, active ETFs are commonly used alongside index strategies to target specific exposures or objectives. From 2008 to 2019, active ETFs remained a niche segment, accounting for just 1 percent of total ETF assets.

However, the landscape shifted following the SEC's adoption of Rule 6c-11 (the "ETF Rule") in late 2019, which streamlined the process for launching ETFs. Since then, growth has accelerated: the number of active ETFs rose from 435 at year-end 2020 to 1,935 by June 2025, with a commensurate increase in assets from $166 billion to $1.1 trillion—a nearly seven-fold increase over the past four and a half years (Figure 6). As of June 2025, active ETF assets accounted for a significantly larger portion (10 percent) of the ETF market.

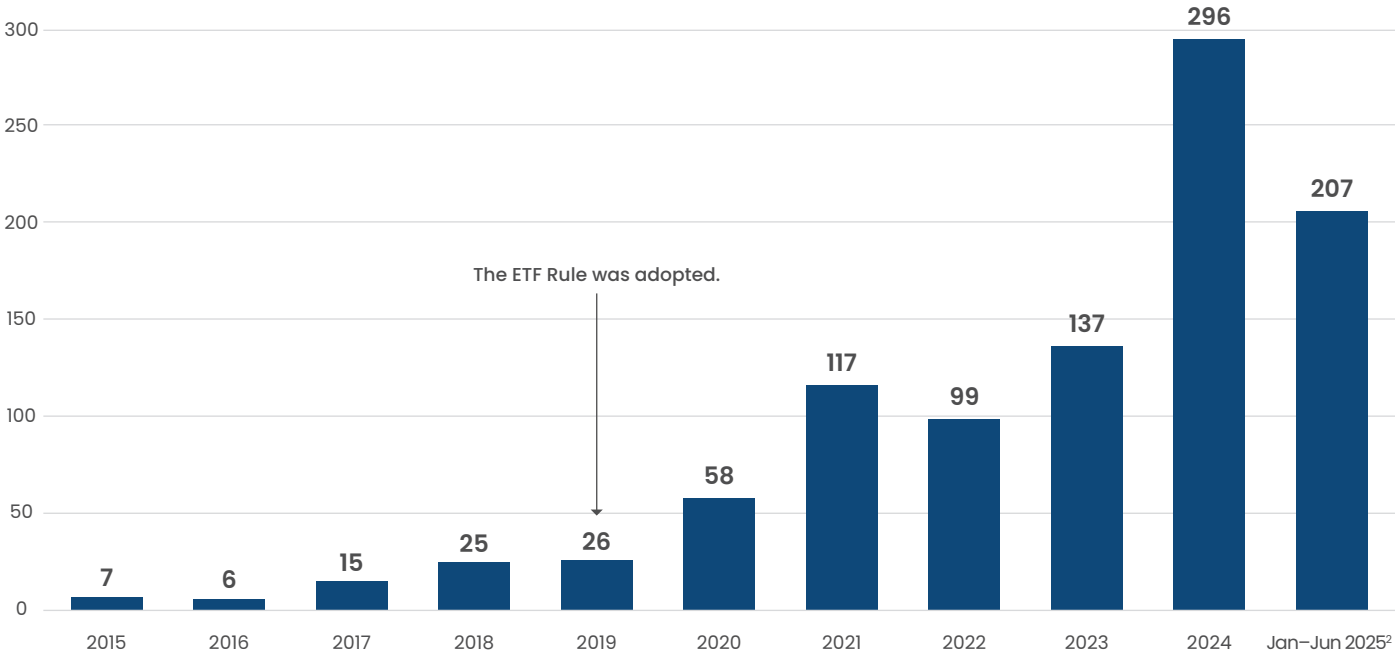
FIGURE 6

Active ETF Net Assets and Net Share Issuance Have Grown Sharply Since the Adoption of the ETF Rule

Total net assets, billions of dollars, year-end



Net share issuance, billions of dollars, annual



Number of ETFs

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Jan–Jun 2025
111	131	166	226	285	435	686	901	1,134	1,605	1,935

[1] Data for total net assets are as of June 2025.

[2] Data for net share issuance data are through June 2025.

Note: Data exclude commodity ETFs.

Source: Investment Company Institute

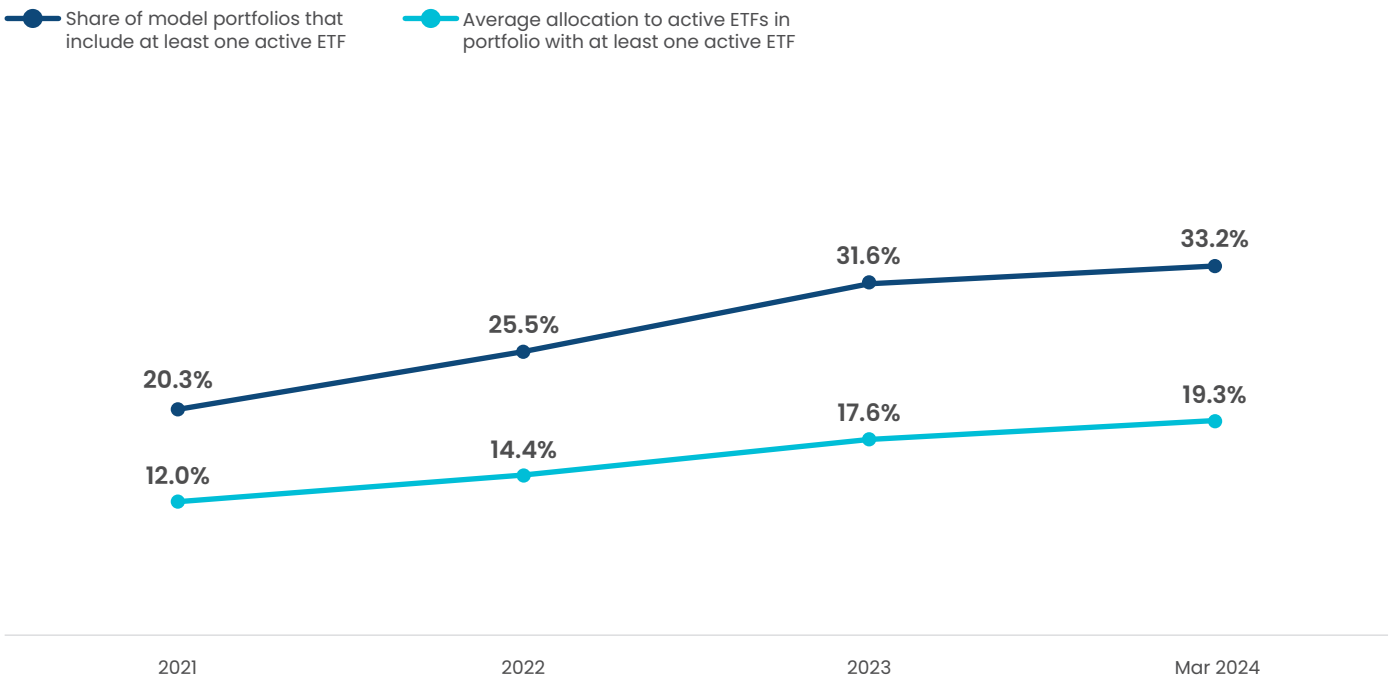
Several key developments have contributed to the expansion of actively managed ETFs since the implementation of the ETF Rule. Among them are the broader use of active ETFs by financial advisors, particularly in model portfolios, increased adoption by individual investors, and the appeal of thematic active ETFs to tech-savvy investors. Thematic ETFs focus on specific long-term trends or themes—such as artificial intelligence, clean energy, or cybersecurity—rather than traditional sectors or indices.

First, financial advisors are increasingly incorporating active ETFs into model portfolios. As a result, both the share of model portfolios that include at least one active ETF and the average allocation to active ETFs within those portfolios have steadily increased in recent years. For example, the share of model portfolios using active ETFs rose from 20 percent in 2021 to 33 percent in the first quarter of 2024 (Figure 7). Over the same period, among portfolios with exposure to active ETFs, the average allocation rose from 12 percent to 19 percent.

FIGURE 7

Advisor Use of Active ETFs in Model Portfolios Continues to Rise

Percentage of model portfolios allocating to active ETFs, year-end



Note: Data reflect the percentage of model portfolios that include at least one active ETF and the average portfolio weight to active ETFs, based on advisor model data collected by BlackRock. Figures are based on three 12-month periods ending December 31 of 2021, 2022, and 2023, and a three-month period ending March 31, 2024. Models are grouped into risk profiles determined by equity weight. The average weight is calculated across all portfolios that hold at least one active ETF.

Source: BlackRock, *"Decoding Active ETFs,"* July 2024

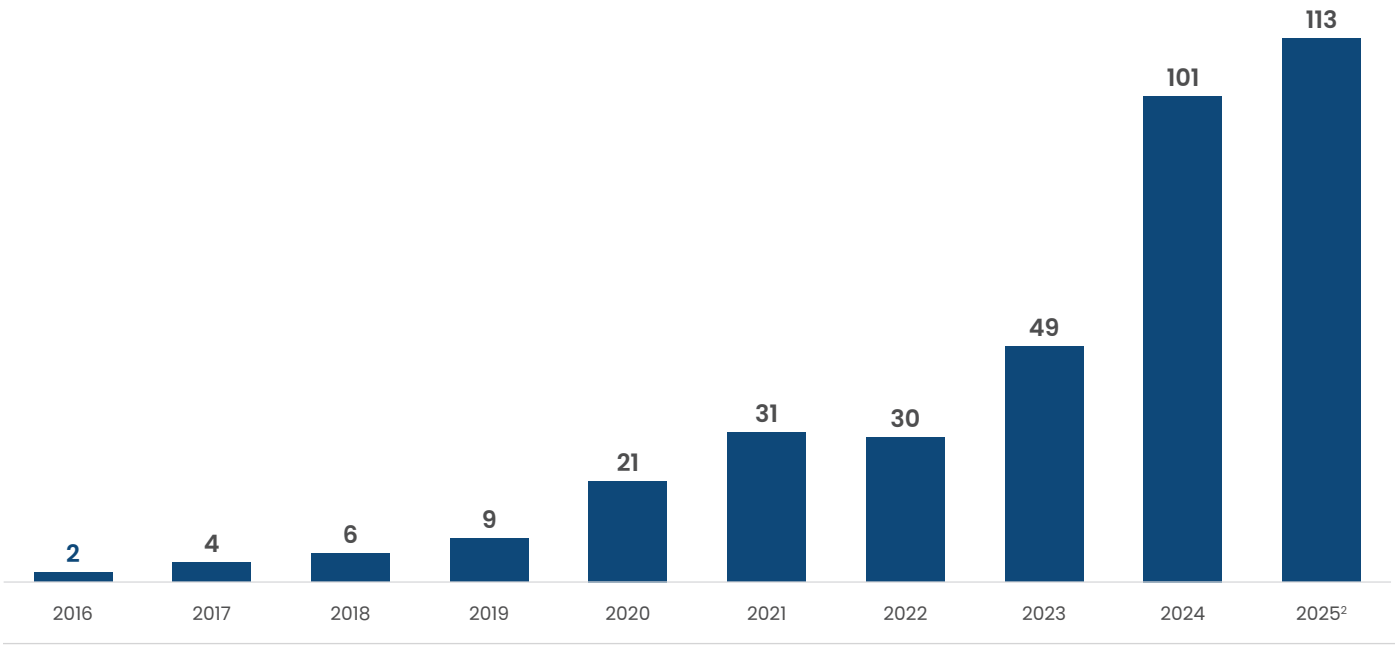
Second, the rise of online discount brokerage platforms has expanded access to a broad range of investments, including active ETFs. The shift to commission-free trading on these platforms has made it easier for individual investors to manage their own portfolios and access diverse investment strategies. Thus, there has been a surge in active ETF use by individual investors.

From year-end 2016 to March 2025, total net assets held directly by retail investors (through discount platforms) in active ETFs increased from $2 billion to an estimated $113 billion (Figure 8). During this period, the share of active ETF assets held directly by retail investors through these platforms rose from 6 percent to 13 percent.

FIGURE 8

Retail Investors Have Gravitated to Active ETFs in Recent Years

Total net assets,[1] billions of dollars, year-end



[1] Calculated based on assets held in active ETFs through discount platforms, which are typically used only by retail investors.

[2] Data are as of March 2025.

Note: Data exclude assets held by retail investors through full-service brokers and other channels.

Source: Broadridge Global Market Intelligence

Third, active ETFs appear to offer features that resonate with a younger, tech-savvy demographic.[4] This could be due to targeted exposure to narrow investment themes—such as artificial intelligence, semiconductors, blockchain, or electric vehicles.

These specialized themes make investment decisions more straightforward, customizable, and innovative. Consequently, assets in thematic funds have grown more than ten-fold over the past decade, from $10 billion in 2014 to $101 billion in 2024.[5]

III. Role of Authorized Participants in Supporting the ETF Ecosystem

Authorized participants (APs) play a key role in the ETF ecosystem. They are the only entities allowed to interact with ETFs in the creation and redemption of their shares.

What Is an Authorized Participant?

An AP is typically a large financial institution that enters into a legal contract with an ETF distributor to create and redeem shares of the fund. This agreement grants the AP the right—but not the obligation—to engage in these transactions with the ETF distributor. In addition, APs are US-registered, self-clearing broker-dealers that can process all required trade submission, clearance, and settlement transactions on their own account. They are also full participating members of the National Securities Clearing Corporation (NSCC) and the Depository Trust Company (DTC).

APs are responsible for creating and redeeming ETF shares in the primary market. This activity accommodates changes in demand for ETF shares and facilitates the arbitrage mechanism, which helps keep ETF market prices closely aligned with the value of their underlying assets. While some APs act as market makers in ETF shares, not all market makers are APs.[6, 7] Market makers and some proprietary trading firms provide continuous bid-ask quotes on ETF shares, fostering smooth trading in ETF shares on the secondary market. APs, market makers, and proprietary trading firms can engage in arbitrage when there are price discrepancies between an ETF's market price and the value of its underlying securities.[8] The arbitrage process is essential to the efficient functioning of ETFs.

APs and ETF Primary Market Activity

Since 2019, the number of APs participating in the ETF market has grown, promoting stronger competition and supporting the growth of the ETF ecosystem. In 2024, 57 APs had registered agreements with ETF sponsors, and 40 were active APs—meaning they created or redeemed ETF shares during the year (Figure 9, top panel). This compares to 51 registered and 35 active APs in 2019. The difference between registered and active APs reflects that some APs maintain agreements without engaging in primary market activity. This buffer can support market resilience by allowing other APs to step in when creation and redemption activity temporarily spikes.

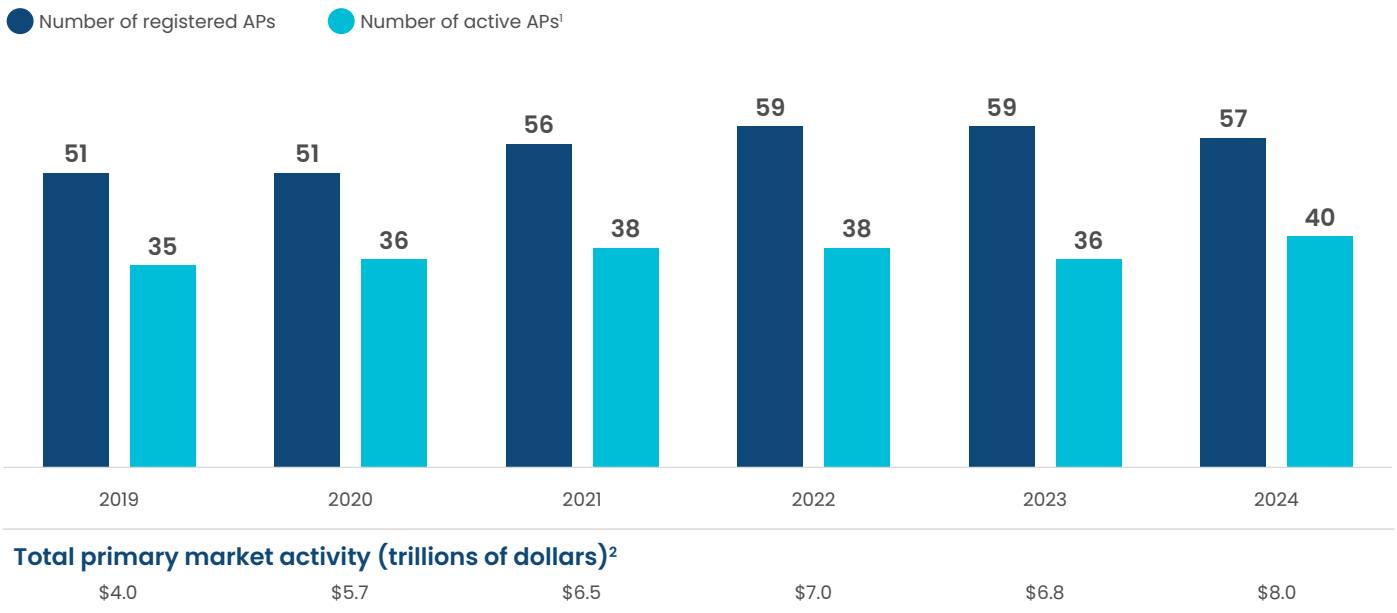
Over the past six years, the capacity of APs has expanded to accommodate a dramatic increase in ETF primary market activity. In 2024, ETF gross creations and redemptions totaled $8 trillion—double the $4 trillion recorded in 2019. This growth reflects both the expansion of the ETF ecosystem and the important role APs play in supporting it.

APs typically register with and are active in a broad set of ETFs, enabling them to support a wide range of primary market activity. For example, in 2024, the top five APs collectively had agreements with 95 percent of the 3,640 ETFs and were active in 91 percent of them.[9] Over the past six years, these APs have maintained consistent market coverage.

FIGURE 9

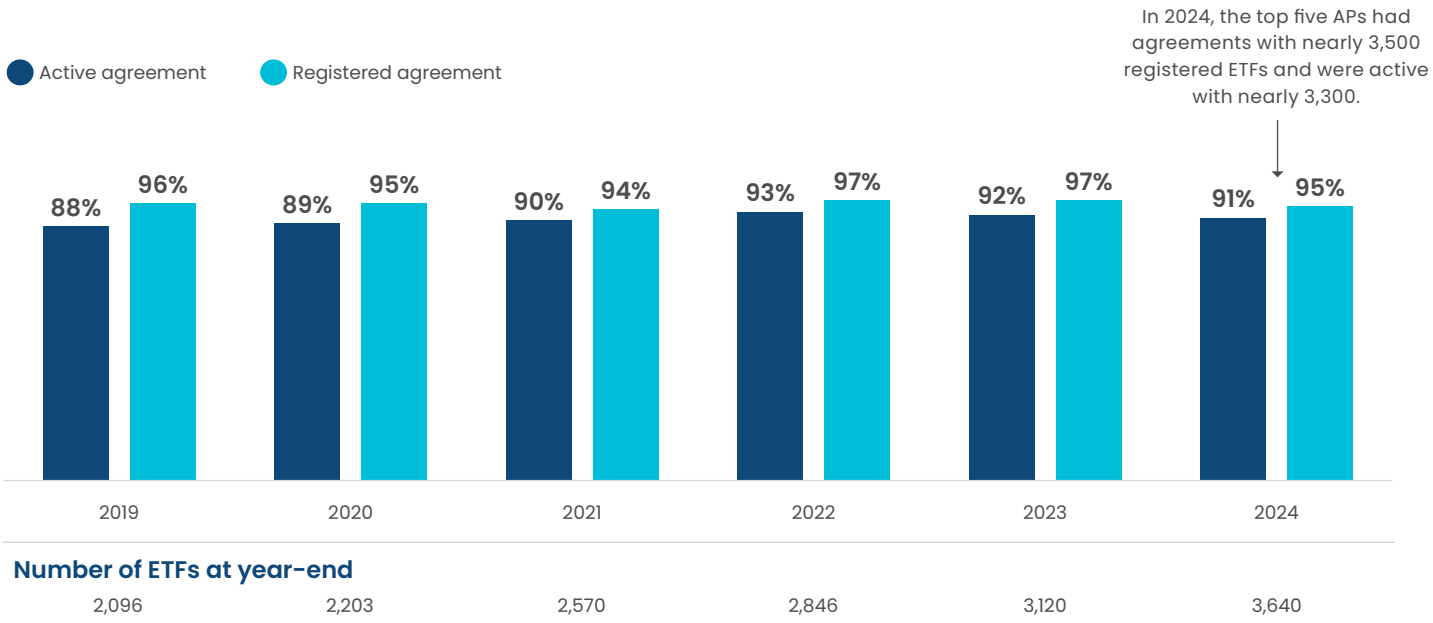
The Number of APs Has Increased Since 2019, Supporting Stronger Competition in the ETF Ecosystem

Total number of registered APs that had registered agreements with ETF sponsors, annual



Top Five APs Have Maintained Broad Coverage Across Registered ETFs Since 2019

Percentage of ETFs with agreements from the five largest APs,[3] annual



[1] Active APs include those having at least one creation or redemption during the year.

[2] Total primary market activity is measured as the total of gross creations and gross redemptions of ETF shares in each category.

[3] The five largest APs are those with the largest total primary market activity.

Note: Data include ETFs that filed a Form N-CEN in each calendar year from 2019 to 2024 and had not liquidated or merged at any point during the year. If a merger occurred during the year, the number of registered APs includes the acquired AP if it filed a Form N-CEN before the merger date in that calendar year, and the number of active APs includes the acquired AP if it also engaged in any trading activity prior to the merger date.

Sources: Investment Company Institute and publicly available Form N-CEN data

APs Stepped Up Their ETF Primary Market Activity During the COVID-19 Crisis

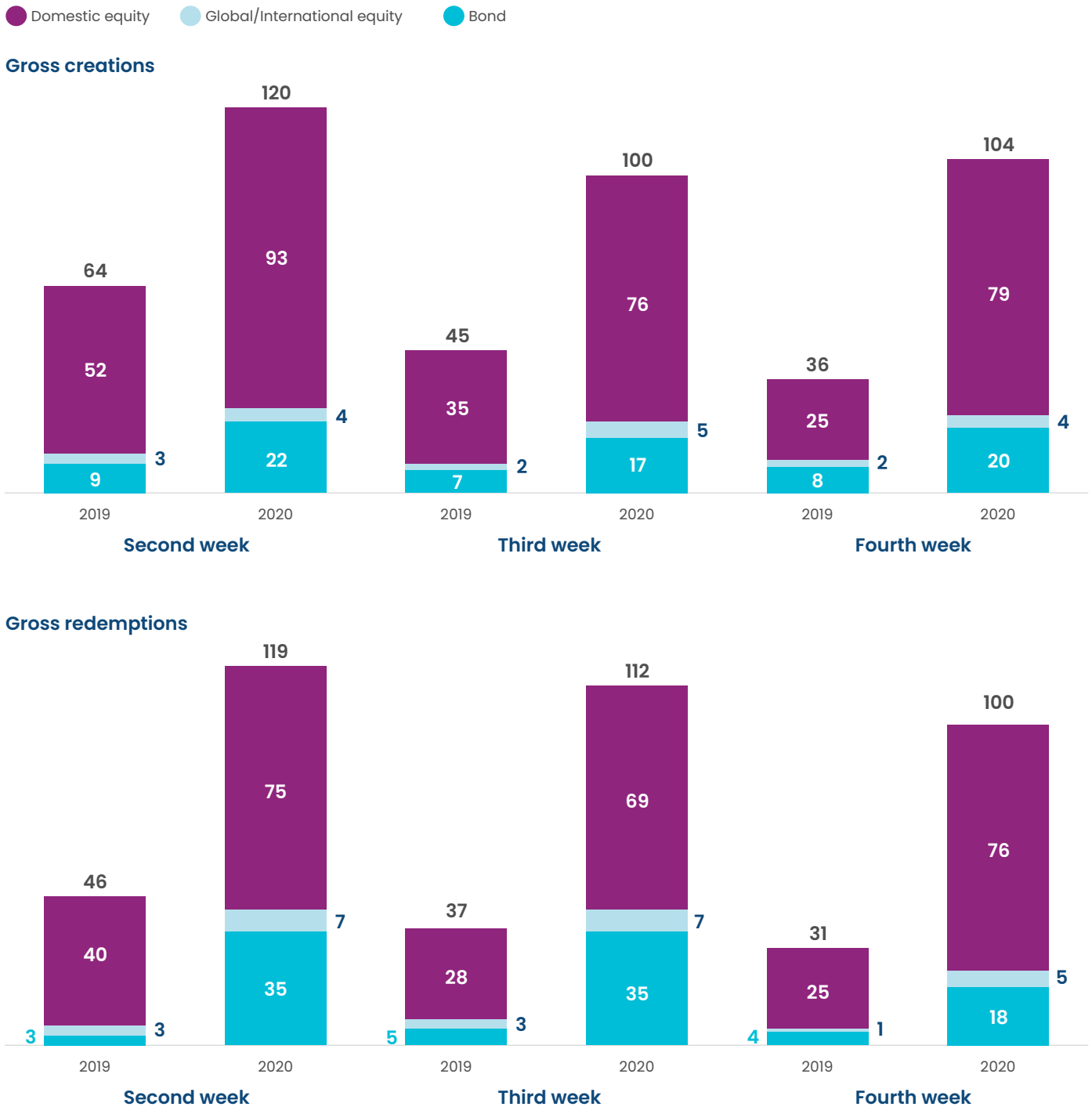
Policymakers have long voiced concerns that APs might withdraw from their role in facilitating ETF share creations and redemptions during periods of market stress. However, ICI analysis of AP activity during the COVID-19 crisis suggests the opposite.[10] In March 2020, amid heightened market volatility, APs increased their activity significantly, with additional APs stepping in to facilitate a higher volume of ETF primary market transactions, compared with the March 2019 normal period.

For instance, the total dollar volume of ETF creations and redemptions rose to $654 billion in March 2020—more than double the $259 billion recorded in March 2019 (Figure 10). While redemptions rose to $331 billion, from $114 billion, ETF share creations also climbed sharply to $324 billion, compared with $145 billion the year prior. This increase in creations indicates that investor demand for ETF shares remained strong, and the market was not overwhelmed by redemption pressure.

FIGURE 10

Level of Primary Market Activity Increased Across ETF Investment Objectives During March 2020

Billions of dollars, weekly, March 11–March 29, 2019, and March 9–March 27, 2020



Memo: total primary market activity (billions of dollars)*

2019	2020	2019	2020	2019	2020
110	239	82	211	67	204

* Total primary market activity is measured as the total of gross creations and gross redemptions of ETF shares in each category.

Source: Investment Company Institute survey of ETF sponsors

This trend was consistent across asset classes. Gross creations of domestic equity, international equity, and bond ETFs were all higher in March 2020 than in March 2019. For example, bond ETFs saw $59 billion in gross creations during the March 2020 stress period, compared with $24 billion in the same month a year earlier. This analysis underscores the resilience of the ETF ecosystem and the critical role APs played in maintaining market function during a time of extreme stress.

IV. ETF Market Activity and Resilience During Stress Periods

ETFs are unique in that they operate in two distinct markets: the primary market, where creations and redemptions occur via APs, and the secondary market, which includes exchanges and other trading venues where market makers and liquidity providers intermediate ETF share transactions between investors.

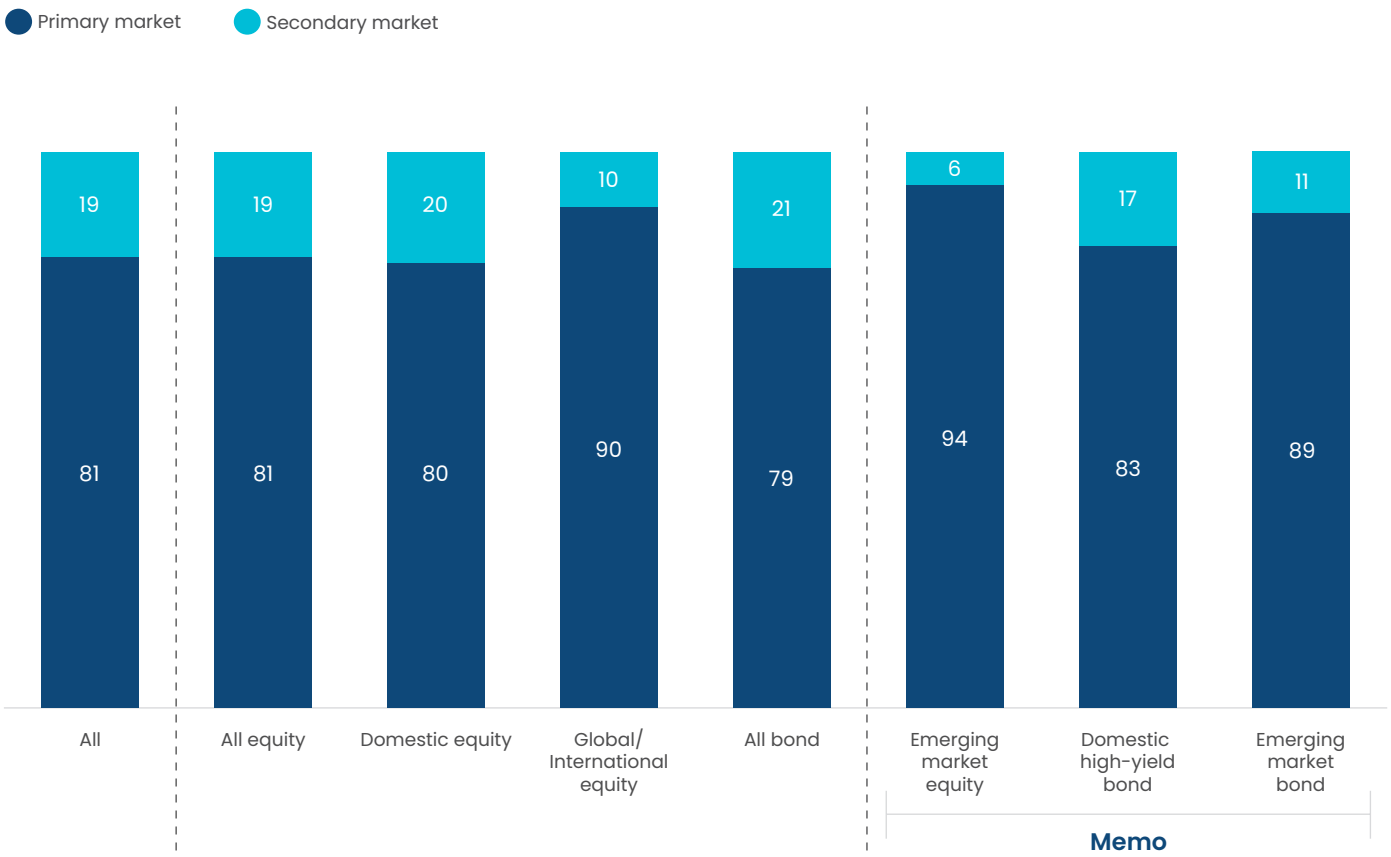
ETF Primary and Secondary Market Activity

Large institutional investors often have access to both the primary and secondary markets. Retail investors, on the other hand, generally can access them only in the secondary market.[11] Across all asset classes, most ETF activity occurs in the secondary market rather than the primary market. In 2024, an average of 81 percent of total ETF activity occurred in the secondary market, compared to just 19 percent in the primary market. Even in more specialized asset classes—such as emerging market equity, domestic high-yield bonds, and emerging market bonds—the bulk of activity took place in the secondary market (94 percent, 83 percent, and 89 percent, respectively) (Figure 11). These secondary market trades primarily involve investors exchanging ETF shares among themselves and, as a result, typically do not directly impact the underlying securities.

FIGURE 11

Most ETF Activity Occurs on the Secondary Market

Percentage of primary market activity[1] and secondary market activity[2] relative to total activity,[3] 2024



[1] Primary market activity is measured as the total of gross creations and gross redemptions of ETF shares in each category.

[2] Secondary market activity is measured as total dollar volume of ETF shares traded in each category.

[3] Total activity is measured as the sum of primary market and secondary market activity.

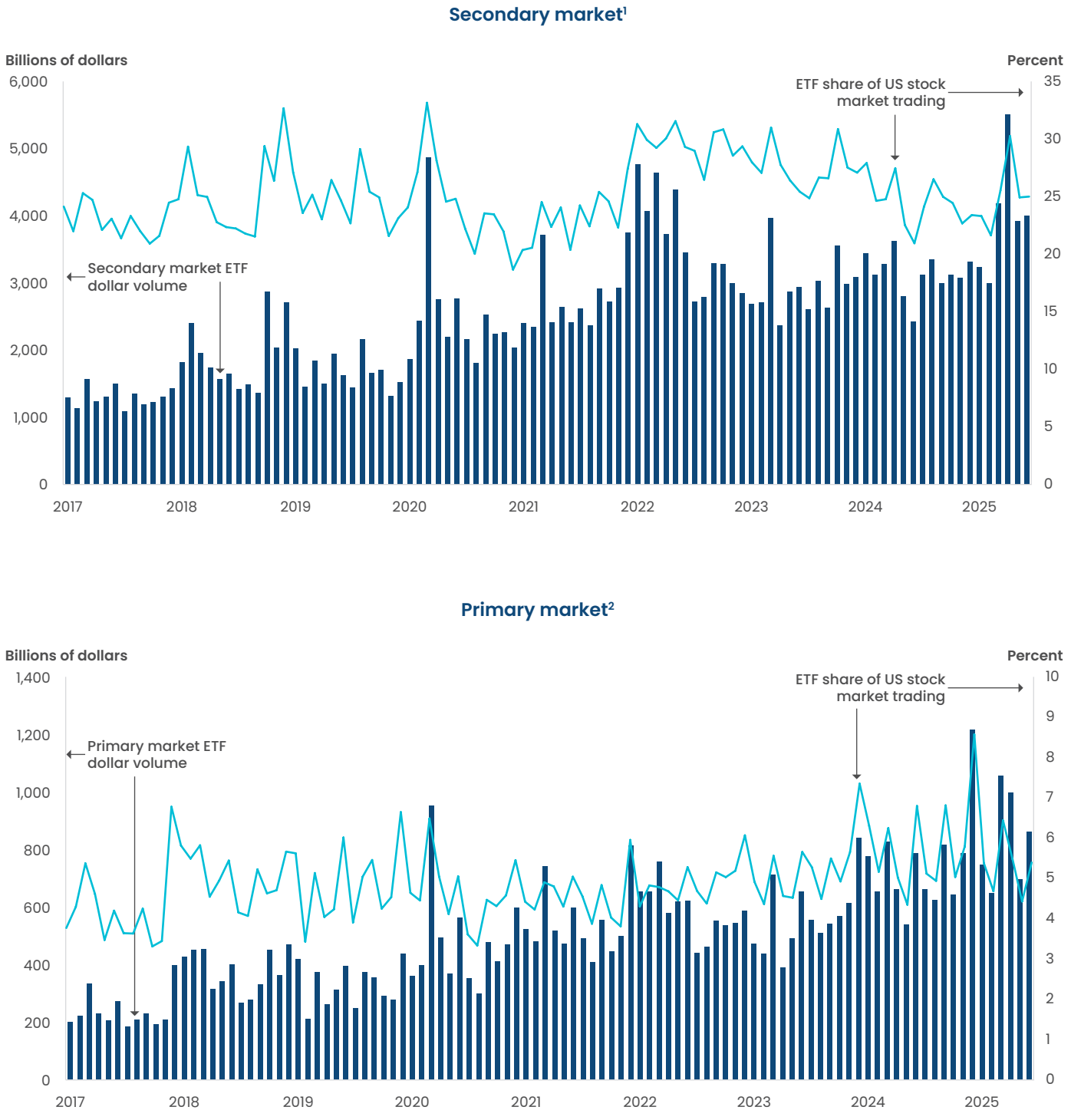
Sources: Investment Company Institute and Refinitiv

Given ETFs' role in helping investors rebalance holdings and manage risk, it is no surprise that ETFs account for a substantial share of total trading on US stock exchanges and other venues. Nonetheless, despite tremendous growth in ETFs over the past decade, their average daily share of total stock market trading has remained relatively steady, averaging 25 percent between January 2017 and June 2025 (Figure 12, top panel). Primary market activity of domestic equity ETFs has accounted for only a modest share of trading in company stocks, representing just 5 percent of daily trading in company stocks since January 2017 (Figure 12, bottom panel).[12]

FIGURE 12

ETF Market Activity in Secondary and Primary Markets

Monthly, January 1, 2017–June 30, 2025



[1] Secondary market activity is measured as total dollar volume of ETF shares traded.

[2] Primary market activity is measured as the total of gross creations and gross redemptions of ETF shares.

Sources: Investment Company Institute, Refinitiv, and Cboe Exchange, Inc.

Resilience of ETFs During Periods of Market Stress

ETF secondary market trading volumes rise during periods of market volatility, as investors, particularly institutions, turn to ETFs to quickly and efficiently reallocate capital and manage portfolio risk. For example, in March 2020, during the COVID-19 crisis, ETF trading volume accounted for 33 percent of total stock market trading. Similarly, during the regional banking crisis in March 2023, that share reached 31 percent. More recently, in April 2025, amid rising global trade uncertainty, ETF trading volume increased to 30 percent of total stock market trading.

These spikes in ETF secondary market trading during times of stress highlight their resilience, especially when liquidity in the underlying markets deteriorates. ETFs also contribute to price discovery, offering real-time insights into investor sentiment and their views on market valuations. This is particularly important when trading in the underlying securities is limited or disrupted. Some policymakers have recognized this beneficial feature of ETFs. For example, a BIS paper highlights how ETFs served as "alternative conduits for price discovery in corporate bond markets" during the COVID-19 stress period.[13]

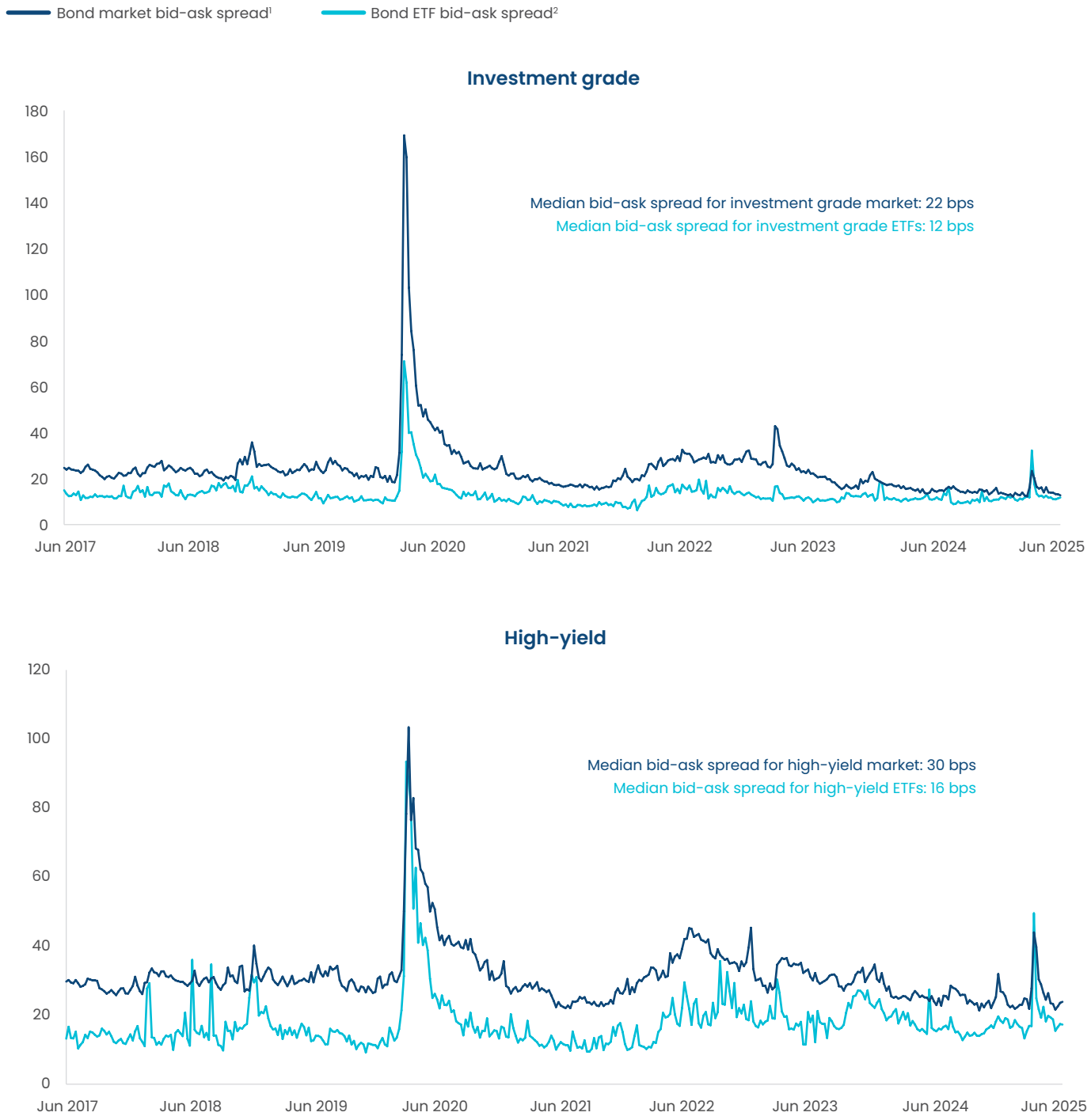
Bid-Ask Spreads

As the ETF market has grown, higher trading volumes and competition among dealers has led to improved liquidity in ETFs. Bid-ask spreads—the difference between the bid and ask prices[14]—on ETFs are often narrower than their underlying securities, making it cheaper to trade ETFs rather than the underlying securities. Policymakers often examine bid-ask spreads to gauge financial market resilience, particularly during times of stress. During such stress periods, spreads for all securities typically widen as dealers seek compensation for increased risk. Nevertheless, even during stress periods, ETFs often maintain narrower spreads than their underlying securities (Figure 13). For example, in March 2020, weekly bid-ask spreads on investment grade bonds spiked to 169 basis points, while spreads on investment grade bond ETFs peaked at 71 basis points. High-yield bond ETFs also experienced smaller spreads compared to the underlying high-yield bonds, reflecting the better liquidity in high-yield bond ETFs.

FIGURE 13

Bid-Ask Spreads on ETFs Tend to be Lower Than Those on Their Underlying Securities, Even During Periods of Market Stress

Basis points, weekly, June 5, 2017–June 30, 2025



[1] Bond market bid-ask spreads are measured using the USD-denominated investment grade and high-yield CP+ BASI indexes.

[2] Weekly simple average ETF bid-ask spreads.

Source: Investment Company Institute, Refinitiv, and MarketAxess

ETF Premiums and Discounts

Policymakers often monitor differences between ETF market prices and their end-of-day net asset values (NAVs), especially during periods of market stress. ETFs can trade at a premium (above NAV) or a discount (below NAV). Because ETF shares trade continuously on exchanges, their prices incorporate up-to-date investor views on the value of the underlying portfolio and estimated transaction costs, including the bid-ask spreads, of the underlying securities. By contrast, NAVs are based on estimated fair values of the underlying securities usually provided by pricing services, which use a combination of actual trade prices and estimated values for securities that did not trade.

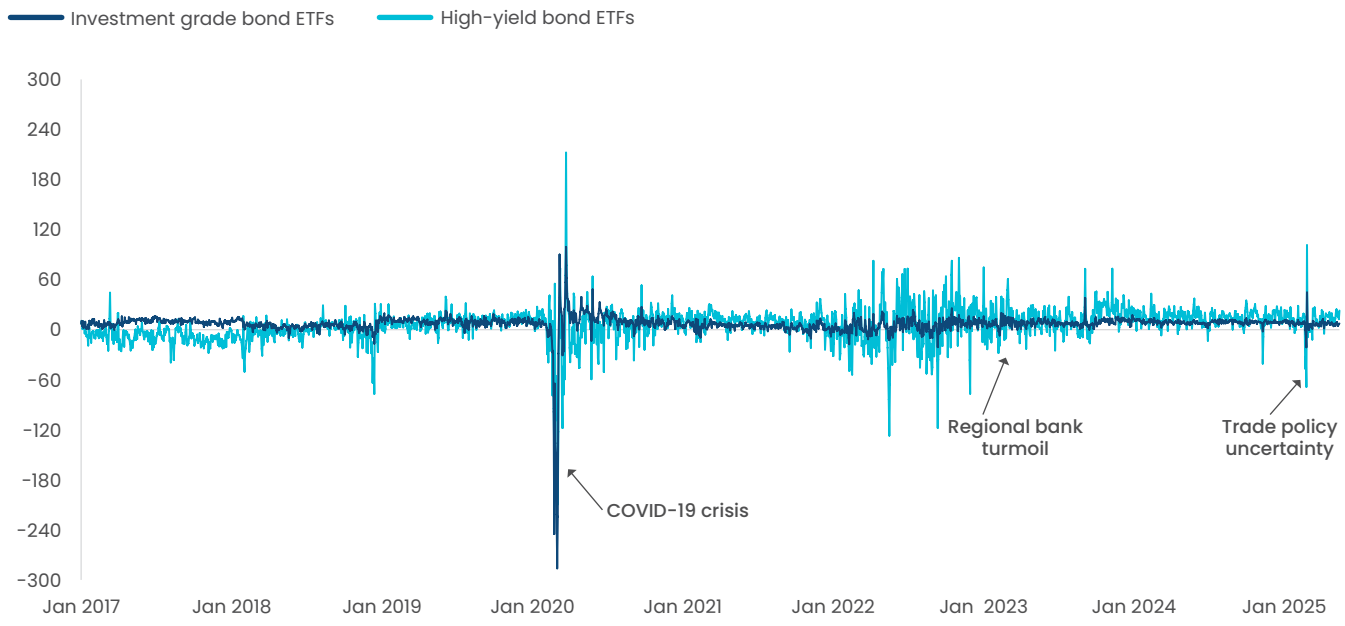
For most domestic equity ETFs, premiums and discounts are typically small due to the high liquidity and transparent pricing of both the ETF and its underlying stocks. Fixed income ETFs also generally trade close to NAV, but during periods of stress, deviations can widen. For example, at the peak of the crisis in March 2020, investment grade bond ETFs traded at average discounts of nearly 300 basis points, while high-yield bond ETFs traded at average discounts of more than 200 basis points.

While some policymakers initially viewed these discounts as structural flaws, they largely reflected increased liquidity costs in the bond markets. In fact, ETF prices provided valuable real-time insight into market conditions, serving as a critical tool for price discovery at a time when bond market liquidity was under strain. Indeed, a 2020 SEC staff report concluded that the "liquidity and potential price discovery characteristics [of bond ETFs] were evident in March 2020 when the information environment was changing rapidly and volatility and stress more generally were high."[15] The staff further noted that "during that period, ETFs generally functioned as expected, allowing investors to transfer diversified bond risk on the secondary market without transacting directly in the underlying bonds."

FIGURE 14

Discounts on Bond ETFs Can Widen During Periods of Severe Stress, but Are an Important Source of Price Discovery in the Market

Asset-weighted average premium/discount,* basis points, daily, January 1, 2017–June 30, 2025



* Daily premium/discounts are weighted to month-end assets of the same month.

Sources: Investment Company Institute and Refinitiv

V. ETF Expenses and Fees

ETFs are a cost-effective investment vehicle, often offering lower fees, which appeal to a broad range of investors. Like any investment product, ETFs incur operating expenses, but they typically do not charge sales loads, 12b-1 fees, or redemption fees.[16] Operating expenses represent the ongoing costs of managing and administering an ETF. These expenses include investment advisory fees, custodial service fees, transfer agency fees, and legal and accounting fees. In some cases, ETFs also incur distribution and marketing expenses.

ETF Expense Ratios Have Declined Substantially Since the Mid-2000s

The expense ratio of an ETF represents the total annual cost of operating the fund, expressed as a percentage of its average net assets. It provides a comprehensive measure of the fund's ongoing operating expenses. These costs, applied proportionately based on the fund's stated annual expense ratio, are deducted daily from the fund's assets and are reflected in its NAV. Fund expenses are included in a fund's reported performance, meaning the published total returns already account for these daily deductions.

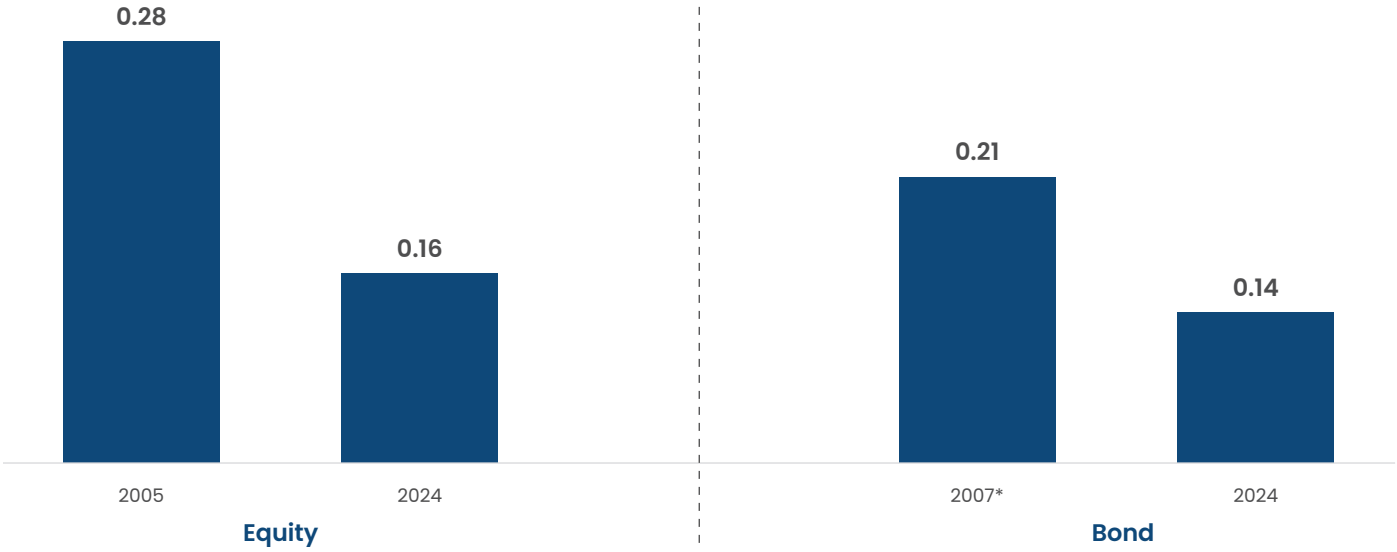
On an asset-weighted basis, average expense ratios incurred by ETF investors have fallen substantially since the mid-2000s (Figure 15).[17, 18] In 2005, equity ETF investors incurred average expense ratios of 0.28 percent, or $0.28 for every $100 in assets. By 2024, that average had declined to 0.16 percent, a 43 percent decrease. Average expense ratios of bond ETFs have also declined considerably, from 0.21 percent in 2007 to 0.14 percent in 2024, a 33 percent decline.

Several factors have contributed to the steady decline in average expense ratios. Increased investor demand for cost-effective investment options, increased competition in product offerings, and rapid growth in the number of equity and bond ETFs have all played a role. At the same time, as total net assets have grown, economies of scale have enabled many funds to reduce their expense ratios and pass those savings on to investors.[19]

FIGURE 15

Average ETF Expense Ratios Have Declined Since the Mid-2000s

Asset-weighted average expense ratio, percent



* Bond ETF data are excluded prior to 2007 due to a limited number of funds.

Note: Data exclude ETFs not registered under the Investment Company Act of 1940.

Sources: Investment Company Institute and Morningstar

Expense Ratios Vary for Different Types of ETFs

ETF expense ratios—like the prices of most goods and services—vary widely across products. The differences are driven by various factors, including the fund's management style (i.e., active or index), investment objective, and size.

Index ETFs aim to replicate the performance of a specific market index. Under this approach, often referred to as passive management, portfolio managers buy and hold all, or a representative sample of, the securities in their target indexes. Because this strategy requires less hands-on management, index ETFs tend to have lower expense ratios. Active ETFs, on the other hand, give portfolio managers discretion to adjust exposure to sectors or securities within the fund's investment mandate. Active managers may also conduct in-depth research on individual stocks or bonds, market sectors, or geographic regions. This approach offers investors the chance to earn superior returns or to meet other investment objectives such as limiting downside risk, managing volatility, under- or over-weighting various sectors, or shifting asset allocations in response to market conditions. But these characteristics may also make active ETFs more costly to manage. For example, in 2024, index equity ETFs had an average expense ratio of 0.14 percent. By comparison, the average expense ratio of active equity ETFs was 0.44 percent (Figure 16).

Nevertheless, average expense ratios have steadily declined across both index and active ETFs. By 2024, average expense ratios for index equity ETFs, index bond ETFs, and active equity ETFs had fallen to nearly half their 2015 levels. Over the same period, the average expense ratio for active bond ETFs declined to roughly one-third of its 2015 level.

FIGURE 16

Average Expense Ratios of Active and Index ETFs Have Fallen

Asset-weighted average expense ratios, percent

Note: Data exclude ETFs not registered under the Investment Company Act of 1940.

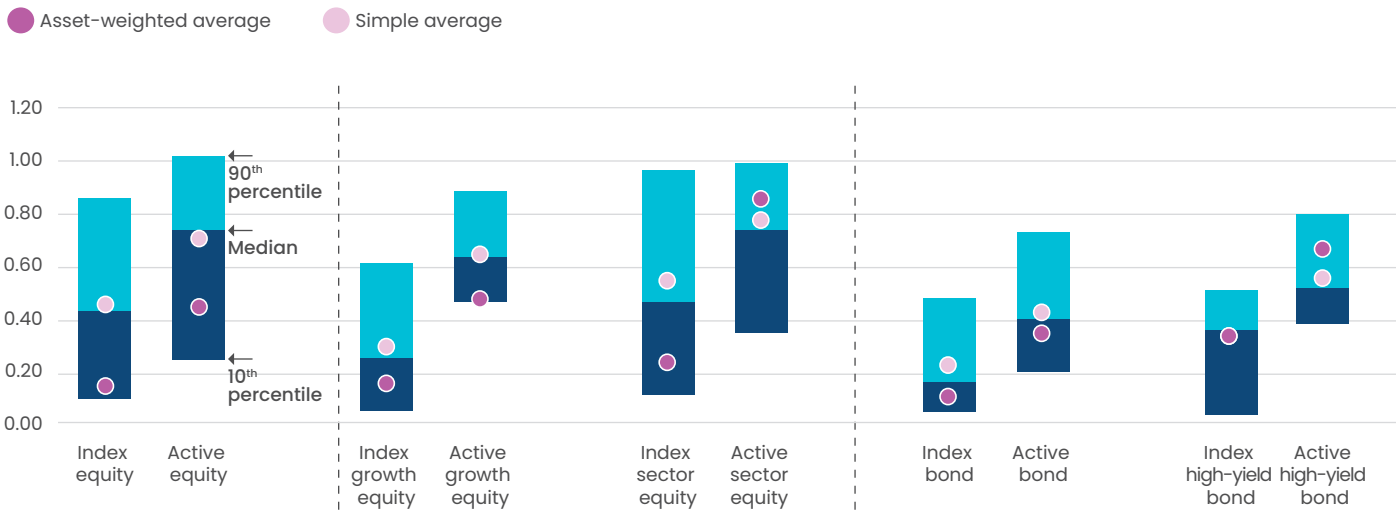
Sources: Investment Company Institute and Morningstar

Expense ratios also can vary considerably across ETFs within the same investment objective. For instance, among active equity ETFs focused on growth stocks, 10 percent had expense ratios of 0.43 percent or less, while another 10 percent charged 0.85 percent or more (Figure 17). This variation reflects, among other things, the fact that some growth funds focus more on small- or mid-cap stocks while others focus more on large-cap stocks. Portfolios of small- and mid-cap stocks tend to cost more to manage because information about these stocks is less readily available, and portfolio managers may need to spend more time doing research. Similarly, expense ratios of index equity ETFs focused on growth stocks also varied widely, from 0.04 percent or less for the 10 percent of funds with the lowest expense ratios to 0.60 percent or more for the 10 percent of funds with the highest expense ratios.[20]

FIGURE 17

Index and Active ETF Expense Ratios Vary Across Investment Objectives

Percent, 2024



Note: Each fund's share class is weighted equally for the simple average and the median, 10th, and 90th percentiles. Data exclude ETFs not registered under the Investment Company Act of 1940. For additional data on ETF expense ratios for other investment objectives, see Figure S1 in the statistical appendix.

Sources: Investment Company Institute and Morningstar

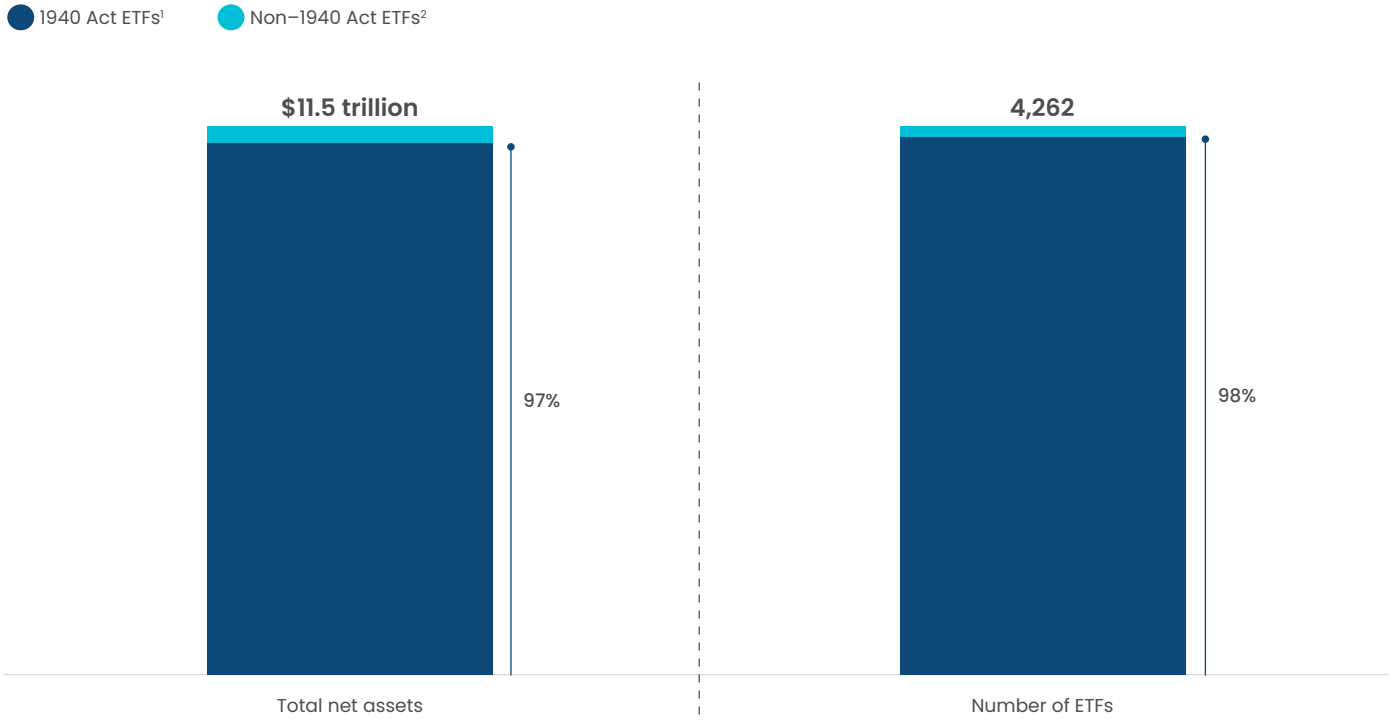
VI. Regulatory Framework for ETFs in the United States

The vast majority of assets in ETFs are in funds registered with and regulated by the SEC under the Investment Company Act of 1940 (Figure 18). Other ETFs invest in commodity futures and are regulated by the Commodity Futures Trading Commission (CFTC) or invest solely in physical commodities and are regulated by the SEC under the Securities Act of 1933. In this section, we largely focus on the regulatory framework for ETFs registered under the Investment Company Act.

FIGURE 18

ETFs by Legal Structure

June 30, 2025



[1] The funds in this category are registered under the Investment Company Act of 1940.

[2] The funds in this category are not registered under the Investment Company Act of 1940 and invest primarily in commodities, currencies, and futures.

Note: ETF data for number of funds include funds of funds.

Source: Investment Company Institute

ETFs Registered Under the Investment Company Act

An ETF that primarily invests in securities, as opposed to other assets such as physical commodities or currencies, must register as an investment company under the Investment Company Act. Like other registered investment companies, ETFs must follow strict limitations on their investment in illiquid assets, use of leverage, and transactions with affiliates. They must maintain strict custody of fund assets, separate from the assets of the fund's adviser and any AP. They are overseen by a board that is subject to certain minimum independence requirements. ETFs, like other registered funds, also are subject to specific reporting requirements and disclosure obligations relating to investment objectives, risks, expenses, and other information in their registration statements and periodic reports. ETFs relying on Rule 6c-11 are also subject to certain specific reporting requirements and disclosure requirements pursuant to that rule.

These ETFs generally are regulated under three additional securities laws:

- Securities Act of 1933 which requires registration of the ETF's shares and the delivery of a prospectus;
- Securities Exchange Act of 1934 which regulates the trading, purchase, and sale of fund shares and establishes anti-fraud standards governing such trading; and
- Investment Advisers Act of 1940, which regulates the conduct of fund investment advisers and requires those advisers to register with the SEC.

ETFs Organized as Open-End Management Investment Companies

As of June 2025, 91 percent of the assets in SEC-registered funds were held in more than 3,900 ETFs that are structured as registered open-end management investment companies—the same structure as mutual funds. These ETFs typically are organized as corporations or business trusts, with boards of directors (or trustees). Unlike ETFs that are structured as UITs, as discussed below, open-end ETFs have greater flexibility with respect to portfolio management, investment of dividends, and the lending of portfolio securities.

ETFs Organized as Unit Investment Trusts (UITs)

As of June 2025, 4 ETFs were structured as registered UITs under the Investment Company Act. They were among the earliest ETFs; the most recent was launched in 1999. UITs are organized under a trust agreement or similar instrument and have a trustee but not a board of directors. They must have fixed portfolios, and substitution of securities may take place only under limited circumstances. Additionally, UITs do not have investment advisers. ETFs structured as UITs, therefore, are generally limited to replicating (rather than sampling) the index they track and may not participate in activities that require an investment adviser, such as selecting securities and engaging in securities lending. As a result, this structure is generally not used for newer ETFs. Still, because some of the earliest ETFs track the most widely used indexes, including the SPDR® Trust (replicating the S&P 500® index), the SPDR® Dow Jones Industrial Average SM ETF Trust, and the Invesco QQQ (replicating the NASDAQ-100 index), this small group of ETFs held substantial assets—$1.1 trillion in June 2025.

Rule 6c-11 Provides Exemptive Relief Under the Investment Company Act Pursuant to Certain Conditions

ETFs registered under the Investment Company Act are generally subject to the same regulatory requirements as other registered funds; however, unlike other types of funds, ETFs must rely on an exemptive rule, Rule 6c-11 under the Investment Company Act, providing relief from certain provisions of the Investment Company Act before they can commence operations (ETFs also need relief from certain provisions of the Securities Exchange Act; see Appendix B). The core protections underlying the Investment Company Act, which are designed to protect investors from various risks and conflicts, still apply to Investment Company Act–registered ETFs. Broadly speaking, the relief granted under Rule 6c-11 relates to the ability to create and redeem shares at NAV and in creation units with APs, while at the same time allowing ETF shares to trade on a secondary market (i.e., an exchange) at negotiated prices rather than at NAV. By contrast, mutual funds may only sell and redeem shares at NAV and must redeem shares presented by any shareholder. To grant an exemption, the SEC must find that it is "necessary or appropriate in the public interest and consistent with the protections of investors and the purposes fairly intended by the policy and provisions" of the Investment Company Act.

Rule 6c-11 requires an ETF to comply with certain conditions designed to protect investors and to be consistent with the purposes fairly intended by the policy and provisions of the Investment Company Act. Rule 6c-11 requires:

- **Website disclosure.** Rule 6c-11 requires an ETF to disclose certain information on its website as a condition to the rule. Specifically, it must disclose the following publicly and prominently on its website:
  - The portfolio holdings that will form the basis for each calculation of net asset value per share. They must be the ETF's portfolio holdings as of the close of business on the prior business day. The disclosure must be available each business day before the opening of regular trading on the primary listing exchange of the ETF's shares. For each holding, the ETF must disclose the following information (as applicable):
    - ticker symbol;
    - CUSIP or other identifier;
    - description of holding;
    - quantity of each security or other asset; and
    - percentage weight of the holding in the portfolio.
  - The ETF's current net asset value per share, market price, and premium or discount, each as of the end of the prior business day;
  - A table and line graph showing information regarding the ETF's premiums and discounts during the most recently completed calendar year and calendar quarters of the current year (or the life of the ETF, if shorter);
  - If the ETF's premium or discount was greater than 2 percent for more than seven consecutive trading days, disclosure that the premium or discount was greater than 2 percent, along with a discussion of the factors that are reasonably believed to have materially contributed to the premium or discount; and
  - The median bid-ask spread over the most recent thirty calendar days.
- **Baskets.** An ETF must adopt and implement written policies and procedures governing the construction of baskets and the process that it will use for the acceptance of baskets. Rule 6c-11 provides an ETF with flexibility to use "custom baskets"—such as those composed of a non-representative selection of the ETF's portfolio holdings—if the ETF has adopted written policies and procedures that: (1) set forth detailed parameters for the construction and acceptance of custom baskets that are in the best interests of the ETF and its shareholders, including the process for any revisions to, or deviations from, those parameters; and (2) specify the titles or roles of employees of its investment adviser who are required to review each custom basket for compliance with those parameters.

The major elements of the exemptive relief provided by Rule 6c-11 are discussed below.

Relief to Create and Redeem with Authorized Participants

As defined under the Investment Company Act, both mutual funds and UITs issue redeemable securities, which are themselves defined as securities that any holder may present to the issuer in exchange for approximately the holder's share of the issuer's current net assets. Since ETFs only redeem securities from APs in creation units, they require relief from these provisions to redeem fund shares bundled in creation units, rather than in individual shares, and to redeem only from APs rather than any fund shareholder. Through Rule 6c-11, the SEC classified ETF shares as redeemable securities, meaning that any ETF that relies on the rule's conditions and requirements will be subject to the requirements imposed under the Investment Company Act and the rules that apply to open-end funds.

Relief to Trade in the Secondary Market at Negotiated Prices

The Investment Company Act and its rules require redeemable securities to be sold at NAV. Rule 6c-11 provides exemptive relief to permit trading of ETF shares at negotiated prices that may be different than the ETF's current NAV. Relief is provided for ETFs that comply with conditions that facilitate the arbitrage mechanism (such as transparency of the ETF's portfolio and listing on a national securities exchange where ETF shares are traded at negotiated prices), which helps maintain the equilibrium between market price and NAV.

Relief to Permit In-Kind Transactions with Certain Affiliates

The Investment Company Act prohibits affiliated persons of a fund from buying securities from or selling them to a fund in certain circumstances, which may capture the in-kind creation process that is fundamental to ETFs. An affiliated person includes, among others, persons owning 5 percent of an issuer's outstanding voting securities.

As a result, until an ETF has created more than 20 creation units, every AP that purchases a creation unit is deemed an affiliate of the fund. ETFs require exemptive relief from this prohibition to allow in-kind purchases and redemptions of creation units by persons affiliated with the ETF.

Relief to Permit Additional Time for Delivering Redemption Proceeds

The Investment Company Act prohibits a fund from postponing the date of satisfaction of redemption requests for more than seven days. ETFs trading in foreign markets may occasionally need additional time to transfer securities in-kind to a redeeming AP, particularly when foreign delivery cycles interact with foreign market holidays to cause additional delays. Rule 6c-11 provides an exemption that permits an ETF to delay satisfaction of a redemption request in the case of certain foreign investments for which a local market holiday or the extended delivery cycles of another jurisdiction make timely delivery unfeasible.

Commodity Exchange-Traded Products (ETPs)

As of June 2025, $206 billion in assets were held by commodity-based funds, which were not registered with or regulated as investment companies under the Investment Company Act. Rather, ETPs that primarily invest in commodities or commodity derivatives operate under one of two alternative regulatory structures.

Physical Commodity ETPs

A number of commodity ETPs hold physical commodities, typically precious metals or currencies. These ETPs register their securities with the SEC under the Securities Act and are subject to regulation by the stock exchanges. They are structured as trusts and taxed as grantor trusts. Investors in these ETPs are taxed as though they own the underlying assets, so they're taxed on any net gains from the sales of commodities in the trust, such as to pay trust expenses or when they sell shares of the ETF for a gain.

Derivatives-Based Commodity ETPs

Other commodity ETPs invest in commodity derivatives, typically futures and/or options, to obtain exposure to commodities, including precious metals, oil and gas, and currencies, among others. These ETPs are regulated primarily by the CFTC as commodity pools. They also register their securities with the SEC under the Securities Act and are subject to regulation by the stock exchanges. They are typically structured as trusts and taxed as limited partnerships, so each investor receives an Internal Revenue Service Form K-1 reporting their share of the fund's taxable income and gains from sales of assets.

Exchange-Traded Notes (ETNs)

ETNs are unsecured debt securities, which, like bonds, can be held to maturity by an investor. These securities are registered under the Securities Act but not under the Investment Company Act.

ETNs and ETFs are similar in that they both trade throughout the day on an exchange. Also, like many ETFs, an ETN's value is linked to the performance of a given benchmark index or strategy; however, ETNs are not funds because they do not hold a pool of securities. Instead, an ETN's value depends on the creditworthiness of the ETN provider. Thus, the value of ETNs can be affected by the credit rating of the ETN issuer. A downgrade in the issuer's credit rating, for example, could cause the value of the ETN to decline.

The Exchange Listing Process

ETFs list their shares on a national securities exchange. To do this, they must comply with the listing requirements of the chosen exchange. Section 19(b) of the Securities Exchange Act requires an exchange to obtain SEC approval for the listing or trading of any new ETF. Rule 19b-4(e) creates an exception from this requirement for ETF shares that meet "generic listing requirements" that have already been approved by the SEC. The SEC has approved rules for many exchanges allowing ETFs relying on Rule 6c-11 that meet the generic listing requirements to be listed without SEC approval.

In addition to requiring compliance with Rule 6c-11, the generic listing standards also list several requirements that ETF shares must meet on an initial and continued listing basis. These include the maintenance of an information firewall to prevent the dissemination of material non-public information about changes to an ETF's portfolio, minimum shareholder requirements, and surveillance and periodic certifications regarding the ETF's compliance with Rule 6c-11. For semi-transparent actively managed ETFs, the exchange must file a proposed rule change under Rule 19b-4 using Form 19b-4 to obtain the necessary SEC approval to list the ETF.

VII. Clearing and Settlement of Primary Market ETF Shares

One of the defining features of the ETF ecosystem is its operational infrastructure—or "plumbing" that supports primary market clearing and settlement. While this process may seem like a "black box" to some, it's simply the mechanism through which ETF shares are created or redeemed in exchange for underlying securities. This section aims to demystify the clearing and settlement process by providing a detailed description of the timeline for domestic equity ETFs, starting from the day before a creation/redemption (CR) order is submitted (T-1) through to settlement two days later (T+1).[21] Although the process is broadly similar for fixed-income and internationally-focused ETFs with in-kind baskets, notable differences are discussed later in the section.

APs interact with ETF sponsors to create and redeem ETF shares by exchanging a specified basket of securities and/or cash for ETF shares. This primary market activity increases or decreases the ETF's total shares outstanding. Similar to stocks, CR orders typically settle in one business day, with the ETF and AP exchanging the basket and ETF shares on the following business day.

CR orders also have safeguards that protect an ETF and its shareholders from default by an AP. When processed through NSCC, CR orders carry the same guarantee as domestic stocks—NSCC becomes the central counterparty and ensures that the ETF

is made whole in the event of an AP default. For CR orders processed outside of NSCC, APs typically post collateral to cover the risk of delivery failures. Whether a CR order qualifies for NSCC processing depends on the eligibility of the underlying securities in the ETF's basket. Baskets composed of NSCC-eligible securities—such as domestic equities, municipal bonds, corporate bonds, and cash—can be cleared through NSCC. By contrast, baskets containing ineligible securities—including international stocks and bonds, US Treasuries, agency securities, mortgage-backed securities, and derivatives—are generally processed outside of NSCC. However, if the ETF sponsor permits cash in lieu of ineligible securities, the CR order may still qualify for NSCC processing. This flexibility helps maintain operational efficiency and reduce settlement risk.

The ETF sponsor and its custodian decide whether to process CR orders through NSCC. In practice, CR orders for almost all domestic equity ETFs and some municipal and domestic corporate fixed-income ETFs are processed through NSCC. By contrast, internationally-focused ETFs and most domestic fixed-income ETFs are typically processed outside NSCC.[22]

Date = T-1

At the end of each trading day, the ETF manager issues the portfolio composition file (PCF), which lists the names and corresponding quantities of securities and/or cash that make up the creation and redemption baskets for the following business day. Typically, each basket corresponds to 50,000 ETF shares.

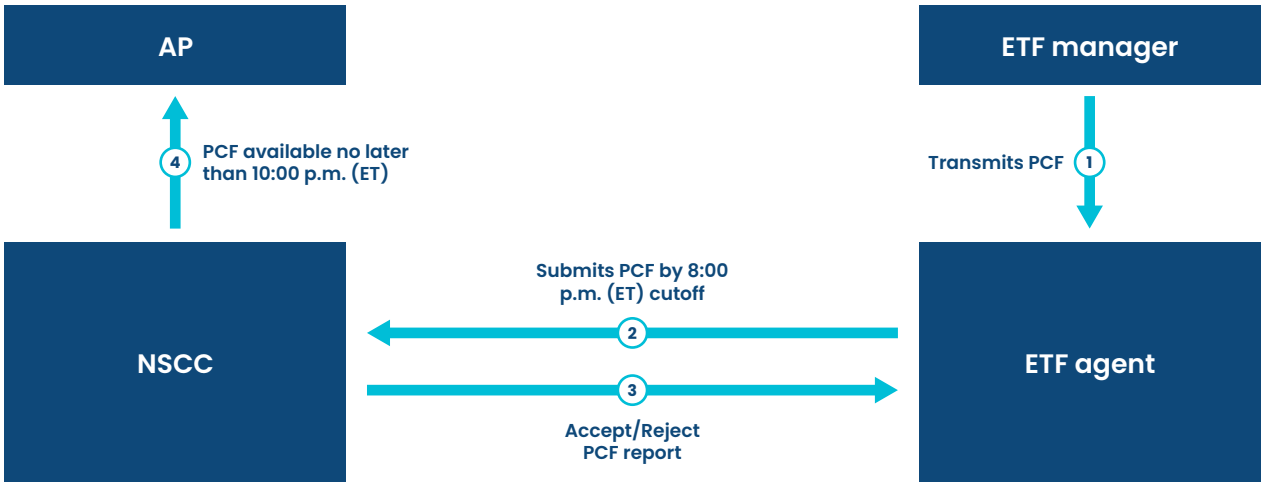
ETF baskets often reflect the fund's portfolio, either through a pro-rata slice or a representative sample. However, managers can adjust the composition to address liquidity needs or operational constraints. In some cases, especially with fixed-income ETFs, baskets may include only a subset of holdings. This flexibility in basket construction is commonly referred to as a custom basket.

NSCC's PCF process accommodates several basket types, allowing for flexible order customization. A standard basket represents a pro-rata slice of the ETF's portfolio holdings and can be used for both creation and redemption. Create-only baskets and redeem-only baskets represent the portfolio composition required for creation and redemption orders, respectively. Restricted baskets (formerly identified as custom baskets by the Depository Trust and Clearing Corporation [DTCC]) and negotiated baskets contain a non-representative selection of the ETF's holdings that are agreed upon by the ETF issuer (or its agent) and the AP. Pricing baskets reflect the full fund holdings' composition and are often used to calculate the intraday net asset value, which informs trading decisions.[23]

FIGURE 19

Processing of the Portfolio Composition File (PCF)

Date = T-1

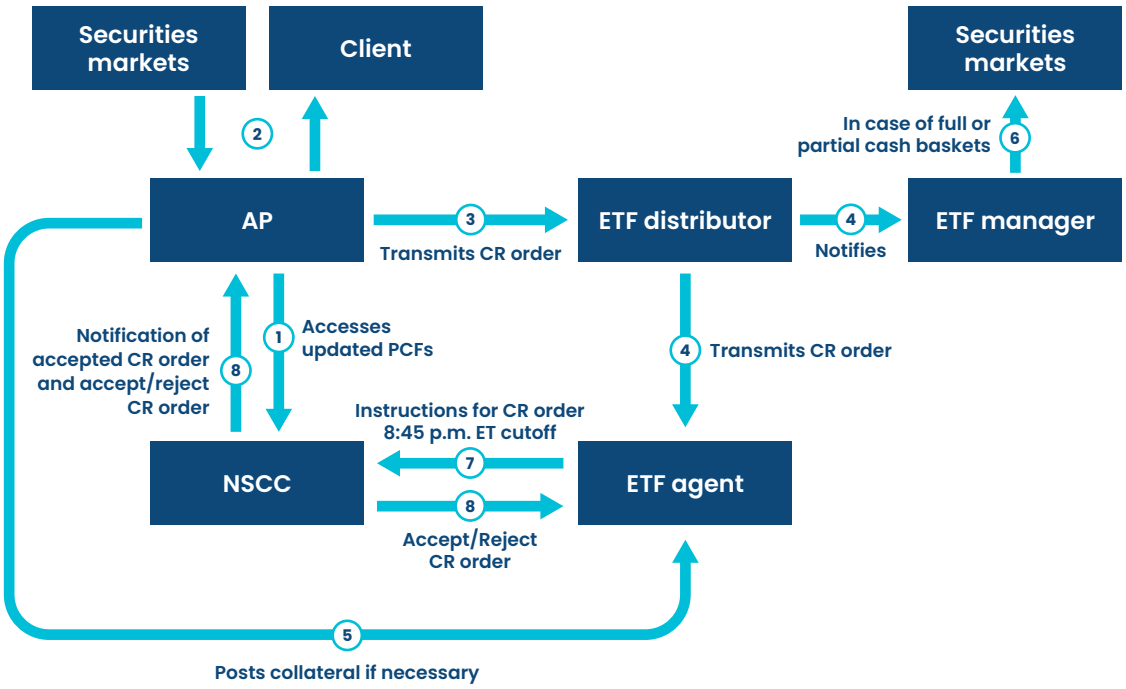


1. **ETF Initiation:** The ETF transmits the PCF to the ETF agent which is the fund's custodian. This agent also often provides fund accounting, fund administration, and transfer agent services.[24]
2. **Submission to NSCC:** The ETF agent submits the PCF to NSCC by the 8:00 p.m. cutoff. All times are in Eastern time (ET) unless otherwise indicated. If multiple versions are submitted before the cutoff, NSCC uses the most recent version received.
3. **Validation by NSCC:** NSCC performs near real-time checks for errors and inconsistencies. It then sends a report back to the ETF agent, either confirming acceptance or rejecting the PCF.[25]
4. **Distribution to APs:** NSCC consolidates PCFs from over 1,900 ETFs and makes them available to APs via the NSCC ETF browser by 10:00 p.m.[26]

FIGURE 20

Processing of ETF Creation/Redemption (CR) Order

Date = T



Date = T

1. **PCF Modifications via NSCC Supplemental Process:** An ETF manager, through its ETF agent, can modify or replace a previously submitted PCF between 12:30 a.m. and noon on T using NSCC's supplemental process. This usually occurs when the previously submitted PCF contains an error and needs to be modified. Once accepted, the updated PCF replaces the earlier version, appears immediately in NSCC's ETF browser, and is distributed to APs in a data file starting at 1 p.m. on T.

2. **APs Accumulate Orders:** APs accumulate orders to create and redeem ETF shares based on a mix of client demand and proprietary trading. They facilitate large transactions for institutional clients and take advantage of arbitrage opportunities when ETF prices deviate from the value of the underlying securities.

3. **Order Submission and Cutoff Times:** APs can submit one netted order to the ETF's distributor before the order deadline for that particular ETF, although some APs may submit orders throughout the day. Cutoff times generally vary by asset class and type of basket:

   a. Domestic equity ETFs (in-kind baskets): usually 4:00 p.m.

   b. Domestic equity ETFs (all-cash baskets): usually 3:30 p.m.

   c. Domestic fixed-income ETFs (restricted and negotiated baskets): usually 30–90 minutes before bond market close.

   d. Internationally-focused ETFs: Varies based on local market hours and overlap with US trading hours.

4. **CR Order Routing:** When a CR order is sent to the ETF distributor, the distributor, in turn, transmits the CR order to the ETF agent and notifies the ETF manager.

5. **Non-NSCC CR Orders and Collateral:** For CR orders not processed through NSCC, the AP interacts directly with the ETF agent or the ETF. In some cases, especially for internationally-focused ETFs, the AP must post collateral as required by the contract signed with the ETF. ETFs require cash collateral to protect current ETF shareholders from an AP's failure to deliver either the underlying securities for a creation order or the ETF shares for a redemption order.

6. **End-of-Day Trading for Cash Baskets:** For ETFs with partial or full cash baskets, the ETF manager needs time at the end of the trading day to either purchase securities with incoming cash from creations or to sell them to provide the outgoing cash for redemptions. For index ETFs, this helps minimize tracking error relative to the ETF's benchmark.

7. **NSCC Instruction Submission and Adjustments:** The ETF agent submits CR instructions to NSCC during its primary cycle (2:30 p.m.–8:45 p.m.). These instructions, however, can be modified during NSCC's supplemental cycle, from 9 p.m. to 11:29:59 p.m. Each instruction must specify the AP, the number of units to be created or redeemed, and any cash amount. Even if an ETF has an in-kind redemption basket, a small cash component may be necessary to balance out the transaction in some instances. For example, an AP may receive or have to pay the net of accumulated dividends and accrued fund expenses as of the market close on T when redeeming ETF shares. Also, a cash adjustment (positive or negative) may be required to equate the value of the securities in the creation or redemption basket to the NAV of the ETF on the market close of T.[27]

8. **NSCC Validation and Lock-In:** After receipt of the CR order, NSCC validates the eligibility of the AP and the ETF agent to transact in the particular ETF and then checks the CR order for errors. Shortly after the 8:45 p.m. cutoff, NSCC distributes a file with the accepted creation and redemption instructions to both parties. These instructions serve as the contract for the creation or redemption activity. NSCC assigns the closing price of each component of the ETF basket as of T to calculate its contract value, then aggregates these values along with the cash amount provided by the ETF agent to determine the total contract value. At this point, the CR order is considered "locked in."

Although the CR order is locked in, the contract can be cancelled or modified if there are errors, similar to how trading errors are handled in secondary market transactions. On T+1, both the ETF agent and the AP each reconcile the information in the NSCC instruction file (distributed on T) with their own records. Any inconsistencies, such as discrepancies in closing prices or in quantities in any of the basket components or creation units, are flagged, investigated, and rectified. These issues are worked out between NSCC, the AP, and the ETF agent. If necessary, the instructions file is modified to reflect any corrections.

T+0 Settlement

In 2024, DTCC introduced a same-day settlement cycle (or T+0 settlement) for primary market ETF shares. Under this process:

- The T+0 settlement window opens at 12:30 a.m. and closes firmly at 1:30 p.m. on T.
- ETF agents must submit their CR instructions to NSCC by this deadline.

An important requirement for T+0 settlement is the 3 percent Cash Collateral Amount, calculated based on the prior end-of-day NAV. This collateral provides an additional layer of protection and flexibility, allowing APs and market makers to execute transactions even in volatile markets, while mitigating risks from discrepancies between expected and actual NAVs.

Throughout the trading day, ETF agents monitor market activity and NAV fluctuations. Once the NAV is finalized at day's end, agents submit an additional order file to include the Collateral Cash Adjustment (or "true-up"). DTCC processes this true-up to reconcile T+0 settlement orders with the final NAV.

This expedited settlement process reduces settlement times and simplifies workflows, enhancing operational efficiency.

Date = T+1

On the settlement date (T+1), if all securities settle as expected, only the cash component is processed through the Continuous Net Settlement (CNS) system—NSCC's centralized platform that nets daily trades into a single long or short position per security. This cash amount includes:

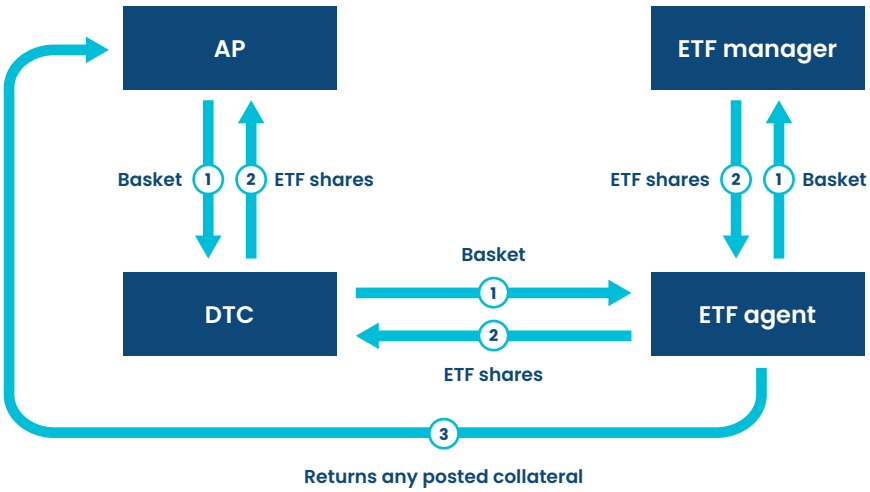
- accumulated dividends;
- fund fees;
- balancing adjustments, if needed, to align with the ETF's contract value; and
- a transaction fee collected on behalf of the agent.[28]

If any securities fail to settle, CNS marks them to market based on the closing prices of the ETF and its components. These open positions are carried into the next business day's netting and settlement cycle.

FIGURE 21

Settlement of ETF Share Creation

Date = T+1



1. **Basket Transfer:** For an ETF share creation, DTC electronically transfers ownership of the basket consisting of NSCC-eligible securities and/or cash from the AP to the ETF agent, which then allocates those securities to the ETF.
2. **ETF Share Transfer:** At the same time, DTC electronically transfers ownership of the ETF shares from the ETF agent acting on behalf of the ETF to the AP.
3. **Non-NSCC Orders:** For CR orders processed outside NSCC, the transfer of ownership of the basket takes place outside of NSCC and DTC. For example, in the case of an internationally-focused ETF, one or more international clearing agencies transfer the basket components to the ETF agent directly. The ETF agent then authorizes DTC to transfer the ETF shares to the AP and returns the collateral to the AP.

For ETF share redemptions, the transfer of ownership of the basket and ETF shares is reversed. Like all securities, sometimes the settlement of primary market ETF shares may be delayed past T+1. Although these transactions are reported as "failures to deliver" by NSCC to the SEC, SEC rules require clearing firm participants, such as broker-dealers, to take prompt action to resolve failures in all equity securities, including ETFs.[29]

Most often, primary market ETF redemptions that are delayed past T+1 occur because an AP has failed to deliver the ETF shares to DTC for transfer to the ETF agent. The AP may be unable to deliver the ETF shares by T+1 for several reasons, including:

- Market makers, which can include APs acting as market makers or agents to market makers, have an additional day to settle trades (a total of T+2) if their failure to deliver is the result of bona fide market making.[30] This mismatch in timing can create delays in the settlement of both primary market ETF redemptions and secondary market ETF trades, as market makers often use ETFs to hedge their inventories.
- The AP or the AP's clients (if the AP is acting as an agent in the redemption) have loaned out the ETF shares and cannot recall them by the T+1 settlement date.

- When an AP is acting as an agent in a redemption transaction, it relies on the client to deliver the ETF shares. These shares must be transferred to DTC by T+1 to complete the transaction. If the client fails to deliver the ETF shares on time, the redemption may be delayed.

If an AP does not deliver the ETF shares by T+1, what happens next depends on whether the redemption order was processed through NSCC.

- If the redemption order was processed through NSCC and the AP fails to deliver the ETF shares by T+1, the shares will be recorded as a failure to deliver. In this case:
  - The AP must post collateral to NSCC to cover the mark-to-market adjustment on the missing ETF shares.
  - The AP is required to purchase or borrow the ETF shares to close out the position—a process identical to handling failures in other NSCC-eligible securities.

  Because the ETF has its own security identification number, NSCC's system separates the settlement of the ETF shares from the settlement of the NSCC-eligible securities in the basket. On T+1:

  - The basket is transferred to the AP from the ETF agent, provided the ETF agent has placed the basket in their account at DTC.
  - NSCC, acting the counterparty, guarantees that the ETF will receive the delayed ETF shares if the AP defaults.

  As an additional layer of protection for fund shareholders, APs are contractually obligated under their agreement with the ETF sponsor to settle their CR orders.
- For non-NSCC-eligible ETFs, if the AP has already posted collateral with the ETF agent on T, the amount of the collateral is adjusted for the delayed ETF shares. If the AP has not posted collateral, the ETF agent requires the AP to do so in order to complete the transaction. Once the collateral is determined to be sufficient, the ETF agent authorizes DTC to transfer the basket of securities and/or cash to the AP.

Primary market ETF share creations processed through NSCC are rarely delayed because one of the responsibilities of the ETF agent is to ensure that the ETF shares are at DTC by T+1. Again, because the ETF has its own security identification number, NSCC's system separates the ETF settlement from the settlement of the NSCC-eligible securities in the basket. The ETF shares are transferred from the ETF agent to the AP on T+1, but the ETF agent may not receive all of the NSCC-eligible securities in the basket if the AP has not delivered them. As with the delayed ETF shares (described above), the missing securities are reported as a failure to deliver. In such cases, the AP must post collateral with NSCC and is obligated to obtain and deliver the missing securities. Furthermore, the ETF's contractual agreement requires the AP to fulfill its settlement obligations.

Primary market ETF share creations processed outside of NSCC also are rarely delayed because of widespread use of collateral. Generally, if an AP is missing some of the basket securities at T+1, collateral—if not already posted on T—is required before the ETF agent authorizes DTC to transfer the ETF shares to the AP.

Appendix A

How ETF Shares Are Created or Redeemed

The creation or redemption of ETF shares—activity directly involving the ETF's underlying securities—is categorized as primary market activity. The creation and redemption mechanism in the ETF structure allows the number of shares outstanding in an ETF to expand or contract based on demand. Each business day, ETFs publish the creation and redemption baskets for the next trading day. These baskets are specific lists of names and quantities of securities, cash, and/or other assets that generally reflect the composition of the ETF's underlying portfolio.

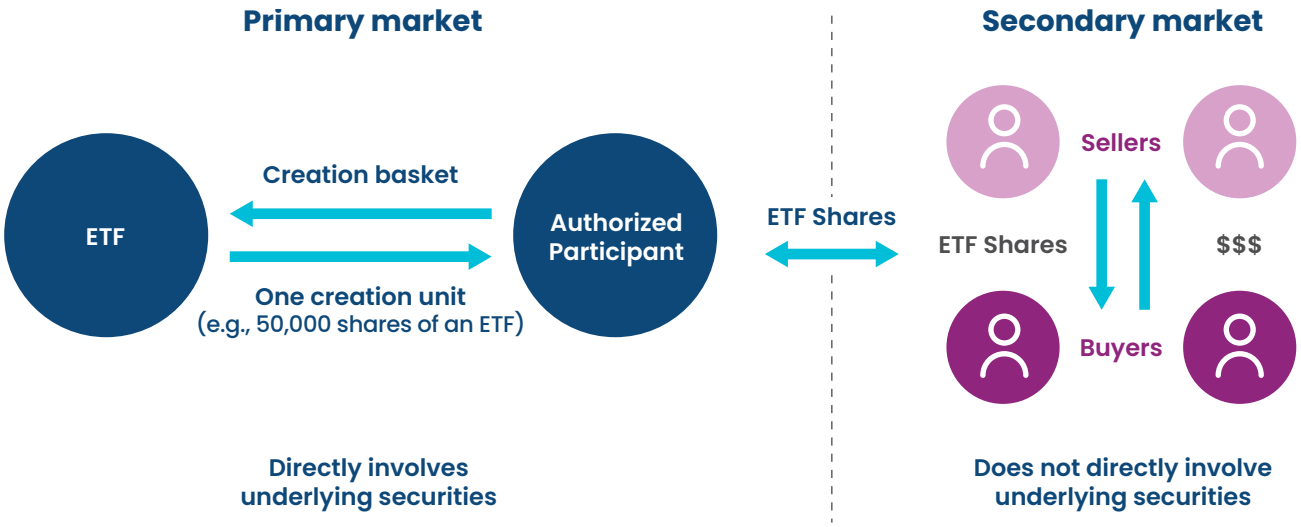
ETF shares are created when an AP submits an order for one or more creation units. A creation unit consists of a specified number of ETF shares, typically 50,000 shares. The ETF shares are delivered to the AP when the specified creation basket is transferred to the fund.

The fund may permit or require an AP to substitute cash for some or all of the securities or assets in the creation basket. This generally occurs when an instrument in the creation basket is difficult to obtain or may not be held by certain types of investors (such as certain foreign securities). An AP also may be charged a cash adjustment or transaction fee to offset any transaction expenses the fund undertakes. The value of the creation basket and any cash adjustment equals the value of the creation unit based on the ETF's NAV at the end of the day on which the transaction was initiated.

The AP can either keep the ETF shares that make up the creation unit or sell all or part of them to its clients or to other investors on a stock exchange or on other trading venues. Purchases and sales of existing ETF shares among investors, including APs, are referred to as secondary market trading or activity.

FIGURE A1

Creation of ETF Shares



Note: The creation basket represents a specific list of securities, cash, and/or other assets.

The redemption process in the primary market is simply the reverse of the creation process. A creation unit is redeemed when an AP acquires the number of ETF shares specified in the ETF's creation unit and returns the creation unit to the fund. In return, the AP receives the daily redemption basket of securities, cash, and/or other assets. The total value of the redemption basket and any cash adjustment is equivalent to the value of the creation unit based on the ETF's NAV at the end of the day on which the transaction was initiated.

Each ETF must disclose prominently on its publicly available website the ETF's portfolio holdings that will form the basis for the ETF's next calculation of NAV (i.e., the ETF's portfolio holdings as of the close of business on the prior business day). An ETF relying on Rule 6c-11 is permitted to use custom creation and redemption baskets that do not reflect a pro-rata representation of the ETF's portfolio and/or that differ from other baskets used in creation or redemption transactions on the same business day.

How ETFs Trade

The price of an ETF share on a stock exchange is influenced by the forces of supply and demand. Though imbalances in supply and demand can cause the price of an ETF share to deviate from its underlying value, substantial deviations tend to be short-lived for most ETFs. Two primary features of an ETF's structure help promote trading of its shares at a price that approximates the ETF's underlying value: portfolio transparency, or other means of transmitting information about the contents of the portfolio to market participants, and the ability for APs to create or redeem ETF shares at NAV at the end of each trading day.

Information about an ETF's holdings allows investors to identify and profit from price discrepancies between the ETF's market price and its underlying value. For example, when an ETF trades at a discount, investors may buy ETF shares and/or sell the underlying securities—increasing demand for the ETF and reducing demand for the underlying securities—helping to close the gap. Conversely, when the ETF trades at a premium, investors may sell ETF shares and/or buy the underlying assets. These actions help keep ETF prices closely aligned with their NAV. This type of trading, often accompanied by a corresponding hedge, is common among (but not limited to) market makers maintaining a two-sided market in ETFs.

APs also help maintain price alignment by creating or redeeming ETF shares, either on their own behalf or on behalf of other market participants. When ETFs trade at a premium, APs may short the ETF and buy the underlying securities, then deliver the creation basket to receive ETF shares and cover the short position. When trading at a discount, they may buy ETF shares and short the underlying securities, redeeming shares for the basket to close their position. These arbitrage opportunities help keep the market-determined price of an ETF close to its underlying value.

To learn more about the history of ETFs and their origination process, see the ETF Resource Center, available at www.ici.org/etf.

Appendix B

ETFs also must be granted relief from various Securities Exchange Act provisions and rules governing, among other things, certain activities of broker-dealers related to the distribution of ETF shares. The SEC has issued class relief for most types of ETFs that meet certain conditions, which obviates the need for these funds to obtain their own individual relief.[31]

Relief to Extend Margin on ETF Shares

The Securities Exchange Act generally prohibits a broker-dealer that participates in distributing a new issue of a security from extending credit to customers in connection with the new issue within 30 days of the distribution. The SEC has granted exemptive relief to permit APs and broker-dealers to extend credit on ETF shares beginning 30 days after an ETF is launched, provided the APs and broker-dealers do not receive any payment, compensation, or other economic incentive from the ETF to promote or sell the ETF's shares.[32]

Relief to Exclude Certain Information from Customer Confirmations

Rule 10b-10 requires a broker-dealer effecting a transaction in a security for a customer to give or send written notification to the customer disclosing the information specified in the rule. Compliance with Rule 10b-10 would be very burdensome for an ETF, as it would be required to provide detailed information about each of the securities (potentially hundreds or thousands) comprising the creation or redemption basket. The SEC has granted exemptive relief from the rule's requirements to allow broker-dealers to exclude certain information from the confirmations about the creation or redemption of shares in creation units, provided that all information required by the rule will be furnished upon request in a timely manner.

Relief from Certain Tender Offer Provisions

Rule 14e-5 prohibits a person from directly or indirectly purchasing, or arranging to purchase, securities of a cash tender offer or exchange offer except as part of that offer. Without relief, the rule could be read as restricting the ability of a dealer-manager of a tender offer for a particular security included in an ETF's portfolio from purchasing and redeeming ETF shares directly with the ETF or in secondary market transactions during the tender offer period. The SEC has granted exemptive relief from this requirement.

Relief from Disclosure of Broker Relationships

Rule 15c-5 requires a broker-dealer to disclose to its customers any control relationship between the broker-dealer and the issuer of the security being purchased or sold. Similarly, Rule 15c-6 requires a broker-dealer effecting a transaction with a customer in connection with a distribution in which the broker-dealer is interested to disclose the existence of such an interest to its customer. The SEC has granted exemptive relief to confirm that these rules do not require disclosure of a broker-dealer's relationship with any issuer of a security held in the ETF's portfolio.

Notes

[1] ETFs are pooled investment vehicles with shares that investors can buy and sell throughout the day on a stock exchange at a market-determined price. Investors may buy or sell ETF shares through a broker or in a brokerage account just as they would trade shares of any publicly traded stock. To learn more about how ETF shares are traded, created, or redeemed, see Appendix A.

[2] A portion of this net share issuance in recent years reflects mutual fund conversions to ETFs. For example, between 2021 and June 2025, 145 mutual funds holding $87 billion in total net assets at the time of conversion, have converted to an ETF structure. However, these conversions represent only 2 percent of total ETF net issuance of $3.8 trillion over the same period—indicating that while conversions contribute to growth, they remain a relatively small part of overall ETF expansion.

[3] Each business day, these actively managed ETFs must disclose on their publicly available websites the identities and weightings of the component securities and other assets held by the ETF.

[4] See Shaw 2025.

[5] See Blackrock 2025b.

[6] Some APs operate as clearing brokers rather than dealers. These APs do not trade ETF shares for their own account but instead act as agents on behalf of other market participants—such as investment advisers, hedge funds, market makers, or proprietary trading firms—to facilitate ETF share creations and redemptions. In these cases, APs earn compensation through service fees for managing the operational and settlement aspects of the process.

[7] For more information on market makers, see Antoniewicz and Heinrichs 2015.

[8] For more information on the arbitrage mechanism, see Appendix A.

[9] In 2024, ETF creations and redemptions facilitated by the top five APs—Bank of America, Goldman Sachs, JP Morgan, ABN Amro, and Morgan Stanley—collectively accounted for 67 percent of the $8 trillion in gross primary market activity.

[10] See Antoniewicz 2020.

[11] ETF investors trading in the secondary market are generally not motivated by arbitrage. Instead, they use ETFs to gain or reduce exposure to specific asset classes or investment strategies, diversify their portfolios, or hedge investment risks.

[12] Even in years with significant market volatility—such as 2018, 2020, and 2022—creations and redemptions of ETFs accounted for only a small share of trading in company stocks, averaging 27, 26, and 32 percent of daily stock market activity, respectively.

[13] See Aramonte and Avalos 2020.

[14] The bid represents the highest price a buyer is willing to pay, while the ask is the lowest price a seller is willing to accept. The difference between these two prices—the "bid-ask spread"—reflects the transaction cost of buying and selling each ETF share. A wider spread indicates higher costs, whereas a narrower spread suggests lower costs.

[15] See US Securities and Exchange Commission, Division of Economic and Risk Analysis 2020. For more information, see Bank of England 2020 (noting that ETFs became one of the key mechanisms for price discovery during the COVID-19 shock), Aramonte and Avalos 2020, Baxter 2020, and Financial Times 2020.

[16] See US Securities and Exchange Commission 2025.

[17] ICI uses asset-weighted averages to summarize the expense ratios that shareholders pay through funds. In this context, asset-weighted averages are preferable to simple averages, which would overstate the expense ratios of funds in which investors hold few dollars. ICI weights the expense ratio of each ETF by its year-end total net assets.

[18] For detailed analysis of fees and expenses, see Li and Atamanchuk 2025.

[19] For a more in-depth look at the factors influencing equity and bond ETF expense ratios over time, see Duvall and Johnson 2023.

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[21] For more information, see the DTCC Learning Center. For a discussion on ETF settlement timelines, see DTCC Learning Center 2024.

[22] Although nearly all municipal and domestic corporate fixed-income securities are eligible for NSCC processing, many domestic fixed-income ETFs do not use NSCC for their creation and redemption activities. This is primarily because their baskets often include non-NSCC-eligible securities, such as US Treasury securities, which are cleared and settled through Fedwire, not NSCC. While ETF sponsors could allow cash substitutions for these non-NSCC-eligible securities, many choose to maintain consistency in their settlement processes by avoiding mixed settlement channels.

[23] This is especially useful for authorized participants dealing with fixed-income ETFs, where baskets can be customized through intraday negotiations.

[24] The ETF agent must be a full settling member of NSCC and DTC. Also, some ETF sponsors permit the ETF agent to generate the PCF.

[25] In rare instances when an error occurs, the ETF agent may submit multiple PCFs before the deadline. The last PCF, accepted by NSCC will be the final version that is available to APs. For ETFs that did not need to submit a new PCF or alternatively had their PCF rejected and were unable to resubmit another file for acceptance by the deadline, their PCF from the previous trading day is carried forward.

[26] APs must subscribe to the secure ETF browser at NSCC in order to obtain the daily PCFs in a data file. Also, most, if not all, ETF sponsors have a secure file transfer protocol site for APs to login and access their funds' daily creation/redemption baskets. In addition, some ETF sponsors provide supplemental information on market values, prices, currency denominations, accrual factors, derivatives, and other information in these files that may be helpful to APs and market makers to price the ETF.

[27] A discrepancy may occur if the basket is not an identical replication of the ETF's portfolio holdings, which is considered in the calculation of the ETF's NAV.

[28] This fee is not guaranteed by NSCC and is settled separately via money settlement on T+1 for both standard and custom CR orders.

[29] Under Rule 204(a) of Regulation SHO under the Securities Exchange Act, a participant of a registered clearing agency (such as a broker-dealer) that fails to deliver equity securities by the settlement date—currently T+1 for most transactions—must, subject to certain exceptions, close out the fail-to-deliver position by purchasing or borrowing the securities no later than the beginning of regular trading hours on the following settlement day (i.e., T+2).

[30] Rule 204(a)(3) provides that, subject to certain conditions, failures resulting from certain bona fide market making activity must be closed out by the beginning of regular trading hours on the next settlement day after settlement date (i.e., T+2).

[31] In connection with the adoption of Rule 6c-11, the SEC issued an Order Granting a Conditional Exemption from Exchange Act Section 11(d)(1) and Exchange Act rules 10b-10, 15c1-5, 15c1-6, and 14e-5 for Certain Exchange Traded Funds, Release No. 34-87110 (September 25, 2019).

[32] Similarly, Rule 11d1-2 provides an exemption from Section 11(d)(1) by permitting a broker-dealer to extend credit to a customer on newly sold mutual fund shares or UIT units after the customer has owned the shares or units for 30 days.

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