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# The ETF Ecosystem: Myths vs Reality

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Paul Volcker once famously said that the only useful recent innovation in finance was the ATM. We respectfully disagree. The former Fed chair had obviously forgotten about Exchange Traded Funds (ETFs) when he made that comment. Since their creation in the early 1990s, largely at the instigation of regulators, these vehicles have proved to be enormously popular ways for investors to access financial markets. The way in which they combine both traditional fund structures, along with the daily exchange trading of single securities, has led to a surge in assets under management (AUM), and a proliferation in the number of funds and the types of assets they hold.

The original idea for ETFs was born out of the 1987 crash, when the Securities and Exchange Commission (SEC) sought alternative channels for market liquidity in order to help cushion against significant shocks to capital markets. This mechanism for index and basket trading, facilitated by a collection of independent market makers, sought to help market participants better manage market volatility. The early 90s experienced a number of the first ETF launches, primarily focused in large domestic equity markets. In recent years, ETFs have increasingly gained traction as a preferred investment vehicle across asset classes, now spanning across global fixed income and credit markets among others.

With the rapid adoption of these low-cost, more liquid instruments, the ETF market has experienced dramatic growth in recent years. The global ETF market now stands at around \$5 trillion (tn), about \$4tn of which is domiciled in the U.S. Of the \$4 billion (bn) in U.S. ETF AuM, about three-quarters is allocated to equity ETFs and about 20% is allocated to fixed income ETFs, with the balance of the assets in alternatives and money markets. Similarly, the European ETF market is roughly 70% equities, 20% fixed income, and 5%–10% in other asset classes. Figure 1 highlights the rapid growth of the ETP landscape.

While the growth in ETFs has been a largely global phenomenon, certain characteristics of ETF capital markets have experienced regional and market segmentation as the ETF market has evolved. Whereas in the United States, ETFs are largely traded electronically across multiple exchanges (NYSE, NASDAQ, BATS), which are supplemented by electronic crossing networks (ECNs) and dark pools, the European ETF market still primarily trades OTC, or over-the-counter. In addition, U.S. ETF markets are governed by transparency rules introduced by the SEC in 1997.

In Europe, there naturally exists more segmentation. ETFs are traded across multiple exchanges and multiple countries; and as a result, the European ETF market is far more fragmented than its US counterpart. Due to the nature of trades between institutions and brokers, most trades take place off-exchange on Multilateral Trading Facilities (MTFs). This introduces difficulty getting visibility on information such as trading volumes. And despite reporting requirements post MIFID II to report these trades, the lack of a centralized trading venue in Europe presents ambiguity in measuring aggregate trading volumes of ETFs. For investors, this necessitates ongoing partnerships across the market structure, between investors, broker/dealers and ETF issuers.

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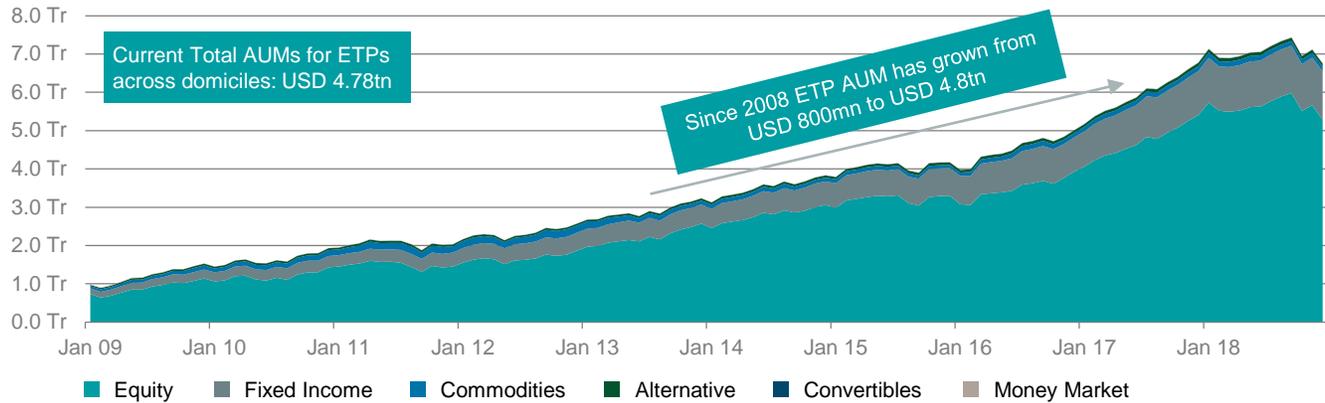
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**FIGURE 1: ASSETS BY ETPs, BY ASSET CLASS (All domiciles, USD trillion)**



Source Morningstar, Deutsche AM Calculations, Data from 31 Jan 08 to 30 Apr 18.

In both markets, efficient ETF trading relies on the dependability of market participants to perform their respective functions within the ETF ecosystem. The continuous liquidity provided by ETFs relies largely on the ability of authorized participants (AP) to create and redeem shares of an ETF as well as the profit incentive of APs to arbitrage ETFs relative to the underlying basket of securities in order to best align ETF prices to the NAV (net asset value), or intrinsic value of the securities that make up the units of the ETF. This requires reliable market depth, independence of APs and profit seeking behavior (as APs are not obligated to create or redeem ETFs). In theory, the prices of ETFs are simply a reflection of the true economics of the underlying market that are passed on to investors by APs.

As with any popularized market instrument, the considerable shift of investor assets into ETFs and indexed products has introduced questions about the structural efficiency of ETF trading (especially in times of market stress) and the effects, if any, of basket and index investing more broadly. As such, a considerable number of papers and presentations have been circulated, inquiring as to the ability of ETF capital markets to both support market efficiency and to continue to function as intended as the size and scope of ETF assets continues to expand.

This paper seeks to provide an informed view addressing many of the concerns around ETFs by addressing the most pressing questions that market participants have brought to light. The paper addresses specific myths about ETFs, by

examining both the “macro Impact”—the impact of increased ETF trading and ownership on broader market dynamics—and the “Micro Impact”, or the ability of ETF markets to function as designed, across different asset classes, especially in periods of heightened market stress. The concerns covered:

1. ETFs are Detrimental to Markets
2. ETFs are Detracting from Price Discovery
3. ETFs are Dangerous Tools in Unsafe Hands
4. ETFs are Destined to Break when Markets go South
5. ETFs are Tails Wagging the Asset Class Dog

## ETFs – Five Myths, and Five Realities

### The macro impact

**Myth 1: ETFs are detrimental to markets** – What impact has the precipitous rise in ETF AUM, and trading, had on underlying markets?

To address this question we consider liquidity, volatility and correlations that we can observe in the market. The meteoric rise in ETF AUM has led many investors to fear that ETF asset flows and trading activity may interfere with the liquidity of their underlying market, especially during periods of market stress. To address this concern, and to provide an instructive example, we took a look at the U.S. high yield bond market and broke down trading activity into three categories: underlying market activity, primary market activity and secondary market activity. In the context of ETFs,

underlying market activity refers to direct trading of single name bonds, primary market activity refers to creation and redemption activity of high yield ETFs, and secondary market activity refers to the trading of outstanding ETF shares between market participants. The data illustrates the scope of high yield bond ETF trading relative to the broader market.

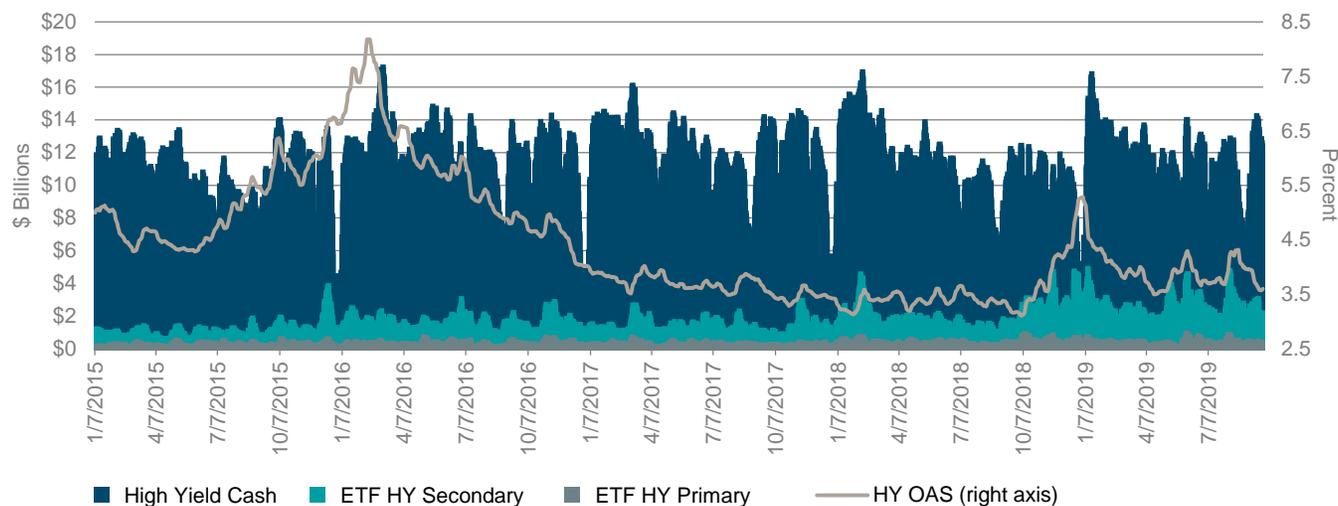
As shown in Figure 2, the portion of trading activity by U.S. high yield bond ETFs in the primary market (i.e. the creation and redemption orders of ETFs that impact individual bonds, represented by the gray area on the chart) is very small relative to the total dollar amount of cash high yield trading (i.e. the total dollar amount of bonds that change hands in a given day) that occurs. In fact, over the period shown, daily primary ETF trading activity, on average, represented less than 3% of daily high yield cash trading—a low percentage that speaks to the limited impact that ETFs have on underlying securities.

In addition, the turquoise shaded area indicates the total dollar amount of ETF shares that traded hands, and this highlights the additional level of liquidity that ETFs have introduced to the market. Importantly, such liquidity can be viewed as additive to the liquidity found in the high yield market. This is so, because trading in ETFs enables cash

investors to turn on or turn off high yield bond exposure without buying or selling underlying bonds directly in the underlying cash market. This is an extraordinary feature of ETFs: They trade on the secondary market without impacting individual underlying securities, thus enhancing the overall liquidity profile of the market. This point is key.

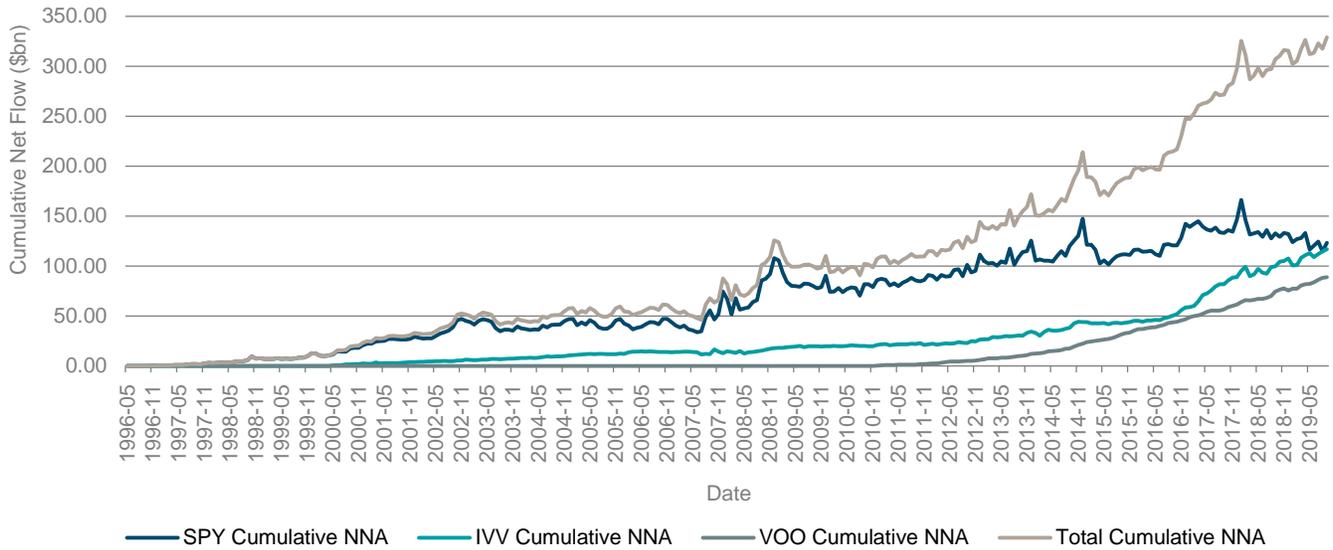
Turning to volatility, ETF skeptics may argue that ETFs create a mechanism by which huge swathes of assets can be traded at the push of a button, which could have the unintended side effect of increasing market volatility. However, when discussing volatility in the context of ETFs, it is important to point out that definitively knowing what the volatility of markets that currently have ETF exposure would have been without the presence of ETFs is impossible, since one cannot directly observe how markets would have behaved otherwise, without the presence of ETFs. Take the S&P 500 index for example. In the following exercise we aim to get a sense for how the S&P 500 behaved alongside large inflows over time into ETFs that track this popular benchmark. Consider three of the largest and most popular S&P 500 ETFs in the U.S. market: SPY, IVV, VOO. Figures 3 and 4 show the cumulative net dollar inflow into these ETFs, and the VIX Index, a gauge of S&P 500 volatility, over the same time period.

**FIGURE 2: U.S. HIGH YIELD CORPORATE BOND MARKET TOTAL USD TRADING VOLUME (5-day rolling averages)**



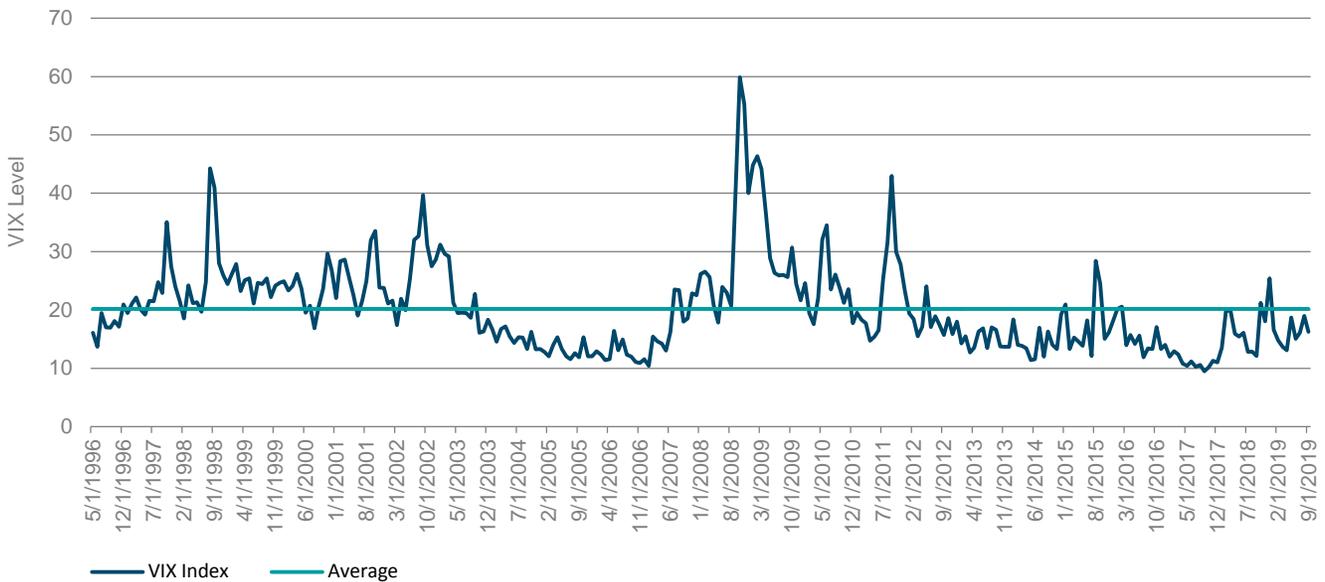
Source: Bloomberg, DWS calculations as of 9/26/19. Subject to change and may not be indicative of future results. High Yield Cash data is derived from FINRA trace data (Source: Bloomberg as of 9/26/19; ETF HY Secondary, Bloomberg and DWS calculations as of 9/26/19; ETF HY Primary, Bloomberg and DWS calculations as of 9/26/19; HY OAS, the Bloomberg Barclays U.S. HY OAS (Source: Bloomberg as of 9/26/19).

**FIGURE 3: CUMULATIVE FLOW INTO SPY, IVV, VOO (USD billions)**



Source: Morningstar as of 10/4/19. Subject to change and may not be indicative of future results.

**FIGURE 4: CBOE VOLATILITY INDEX**



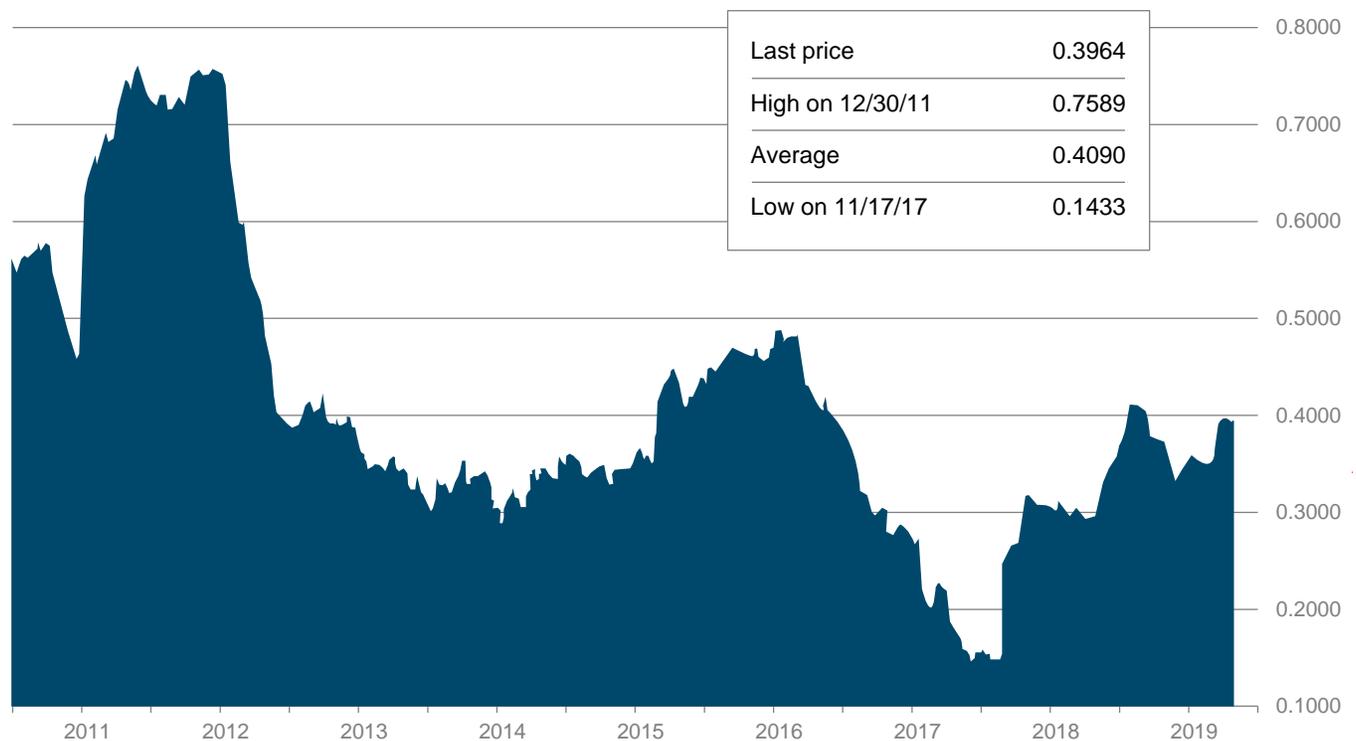
Source: Bloomberg as of 10/4/2019. Subject to change and may not be indicative of future results.

As you can see, there appears to be no immediately noticeable trend in S&P 500 volatility that coincides with the massive growth in assets of S&P 500 Index ETFs. Although the total AUM of these ETFs is still small relative to the market cap of the S&P 500 (i.e. comparing around \$0.4 Trillion in these S&P 500 ETFs to close to \$30 trillion for the S&P 500 Index market cap) they still represent a sizeable portion of the S&P 500 at current levels. Ultimately, while this is not definitive proof, it provides evidence in support of the fact that as ETF AUM rises, it does not necessarily change the volatility profile of the market that underlies those particular ETFs.

In terms of correlation, market participants may worry that as ETFs increase in market representation, correlations between underlying securities within the respective indices could increase and therefore elevate risk within the market. Proponents of this argument propose that when passive

funds buy or sell baskets of stocks all at once, it could cause stock prices to move simultaneously more so than they otherwise would have, thus increasing inter-stock correlations. However, the graph below shows the average realized one- year correlation of S&P 500 stocks over the last nine years, a time period over which US ETFs assets nearly quadrupled from around \$1trillion USD to around \$4 trillion USD. It seems that there is no noticeable trend that indicates that correlations have been rising over this time period coinciding with a massive rise in ETF AUM. In fact, inter-stock correlations between S&P 500 members seemed to have trended downward over the period. Had the opposite been true, in other words, if average correlations between individual S&P 500 stocks had been on the rise over the period, this would still only potentially indicate that ETFs could have been the culprit, since observing a correlation between two trends does not necessarily imply causation.

**FIGURE 5: S&P 500 ONE YEAR REALIZED CORRELATIONS**



Source: Bloomberg as of 9/30/19. Subject to change and may not be indicative of future results.

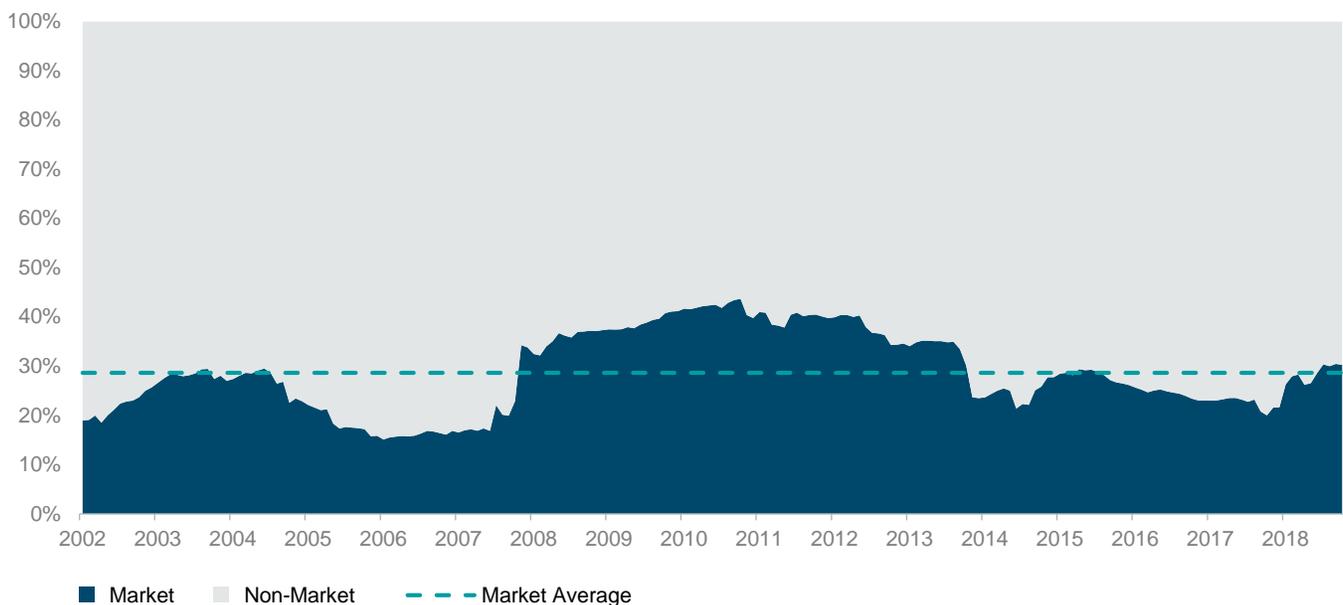
**Myth 2: ETFs detract from price discovery** – Has one of the useful economic functions of markets —asset price discovery – been impaired by ETFs? If fewer people are using active management does that imply a less useful price signal?

The extent to which and how long individual assets are “mispriced”, or do not properly reflect fundamentals is a concern often voiced by critics of ETF and index investing AUM growth. While the topic is admittedly complex, we can attempt to alleviate these concerns by first examining shifts in the dynamic between cash trading volumes and ETF volumes in the current market. In Myth 5, below, we go into greater depth to exhibit that ETF trading volumes represent a small percentage of cash trading of underlying stocks and bonds over time. At the same time, a noticeable trend across equity and fixed income markets is that cash security trading in these markets has become more efficient; equities have shifted predominantly to electronic trading, and bond trading is better facilitated by platforms such as Market Axess.

Across the asset management industry, passive vehicles have grown to represent 24% of all AUM, up from just 10% in 2007 (source: Morningstar, DWS calculations). A reasonable conjecture might be that the resulting dispersion across

stocks would diminish, as passive investors are indiscriminately buying each stock at its current market weight, either directly or through the ETF. Dispersion is often viewed as a strong indicator of the opportunity set for alpha generation through material differentiation between fundamentally overvalued and undervalued stocks. Along the same lines, low levels of correlation and high levels of idiosyncratic risk might typically indicate a healthy market for fundamental price discovery. In Myth 1, we touch on S&P 500 realized correlations as not having obviously increased over the past decade as passive AUM has gained market share. Along the same lines, invoking the Capital Asset Pricing Model or (CAPM) framework, we can break the S&P 500 into two components: 1. systematic or market risk, and 2. idiosyncratic or non-market risk. The figure below shows that over the past 2 decades, the proportion of idiosyncratic, often referred to as company-specific risk, as a percentage of the total variance of the S&P 500 has been largely unchanged, other than a spike in market risk during the Global Financial Crisis. Although there are other factors at play, the lack of a clear trend higher in the prevalence of systematic or market risk suggests that moves in the prices of S&P 500 constituents are still largely determined by idiosyncratic company-specific factors even as passive investments have grown in size.

**FIGURE 6: S&P 500 CONTRIBUTION TO VARIANCE**



Source: Bloomberg, DWS Calculations as of 9/30/19. Subject to change and may not be indicative of future results.

There is an argument to be made that diminishing analyst coverage of companies across banks and asset managers would eventually be reflected in less rational prices based on less complete information. There is certainly a link between the shift from active management into lower cost ETFs and index products, but it's difficult to distinguish just how much of the decline in analyst coverage is directly caused by these flows vs. other factors such as reform measures (MiFid II) and client coverage models. Whether alpha generation across the asset management community has been challenged because of less efficient markets or flows into passive is unlikely to be resolved with any degree of confidence. We can, however, see that the universe of potential active share still demonstrates similar levels of company-level price dispersion that at least provide a toolkit for differentiable returns.

**Myth 3: ETFs are dangerous tools in unsafe hands** – Has the ease and increase of ETF trading (and passive generally) created a bubble in markets from naïve flows buying all stocks? Has it led to people overtrading, or speculating, in markets (sometimes illiquid markets) they may not understand?

**Market bubble?**

If flow simply represents a shift of assets from active to passive, then the net effect on the market should be marginal—money is simply being re-allocated, not introduced. If the flow represents net new assets (NNA), then all else equal, higher demand for ETFs should lead to higher demand for individual securities in those ETFs' underlying

markets, which in turn should lead to higher asset prices—higher prices do not necessarily indicate a bubble if they are justified (i.e. consider the interest rate environment and whether fundamentals have been improving).

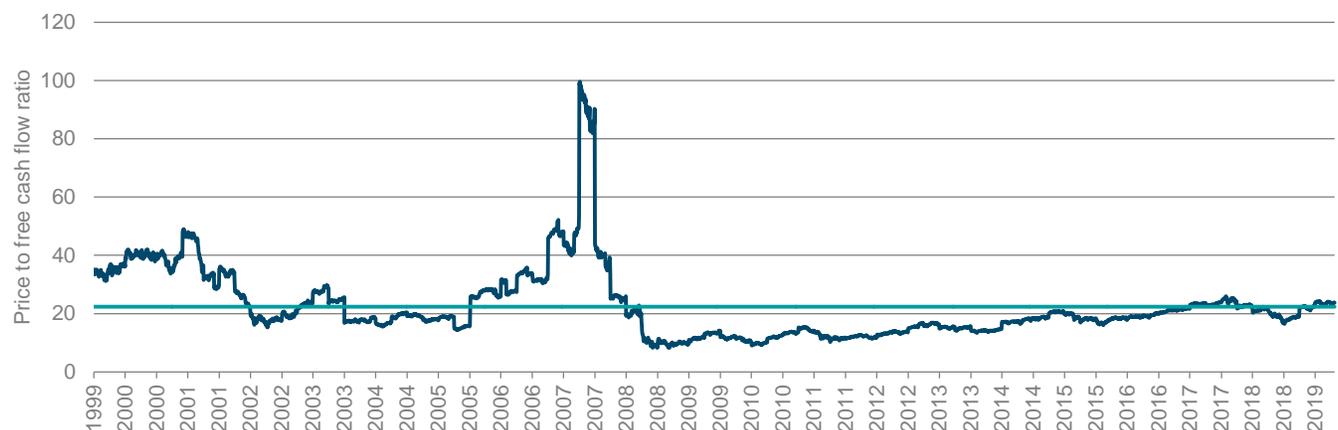
Notably, the exhibit below does not clearly evidence that the S&P 500 is in a bubble. In Figure 7, examining the S&P 500 price to free cash flow ratio as a measure of valuation, there is no obvious increase in valuations over the past 20 years. In fact, we are currently trading at a similar valuation to the long term average in spite of the significant flows driven into the S&P 500 via ETFs and other index products.

**Speculation, overtrading?**

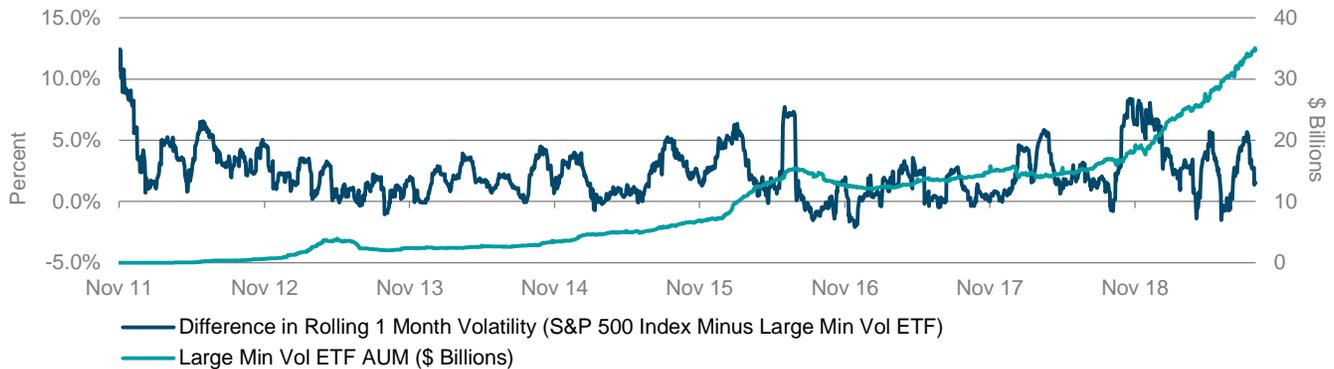
Anyone can buy a stock, capital markets do not require justification. But, the real questions are: have ETFs enabled additional speculation and overtrading? Can overtrading even be evidenced? If so, does trading activity need to be normalized by number of listings, or market cap?

If ETFs have enabled speculation, they have also given investors significant advantages, such as accessing an entire market in one trade. In the following exercise we aim to get a sense for how a particular segment of the market behaved when large inflows into a popular ETF that tracks that segment of the market occurred. Figure 8 shows the dollar inflow into a large minimum-volatility ETF that, in our opinion, serves as a good proxy for the minimum-volatility segment of the U.S. stock market.

**FIGURE 7: S&P 500 PRICE TO FREE CASH FLOW**



Source: Bloomberg as of 9/30/19. Subject to change and may not be indicative of future results.

**FIGURE 8: DIFFERENCE IN ROLLING ONE-MONTH VOLATILITY (S&P 500 index minus large min vol ETF) VS. AUM OF LARGE MIN VOL ETF**

Source: Bloomberg as of 8/31/19. Subject to change and may not be indicative of future results.

As you can see, there appears to be no immediately noticeable trend that links large inflows into the minimum volatility segment of the market with the observed volatility difference between the broad U.S. stock market (represented by the S&P 500) and the minimum volatility segment of the U.S. stock market (represented by the large min vol ETF). In fact, the relationship seems to be relatively stable across the minimum volatility segment of the market, as the approximately nine-year period charted shows that the volatility difference between the S&P 500 and min vol hovered between 0.0% and 6.0% most of the time. This is not definitive proof, but provides evidence in support of the fact that as ETF AUM rises, it does not necessarily change the volatility profile of the segment of the market that underlies that particular ETF, relative to the broad stock market.

### The micro scope

**Myth 4: ETFs will break when markets go south** – If the market is in turmoil; how confident can an investor be that: market makers will continue to make orderly markets (tight bid offer, significant depth), ETF authorized participants (APs) will continue operating, the creation and redemption process for ETFs will operate as normal, and the premium and discount of price to intraday NAV will not deviate too far?

Before getting into the specifics of the ETF ecosystem, it's important to pull back the lens on how large the ETF market is relative to the broad market, both in terms of total AUM and

trading volumes. Take, for example, the high yield bond market. The high yield cash bond market reported about \$11bn USD in trading volume per day in 2018 as compared to \$2.5bn in ETF secondary trading and \$400mm in ETF primary trading within high yield. On average, ETF primary activity represents just around 3.5% of the trading volume in the high yield cash market. (Source: Bloomberg, DWS Calculations as of 9/26/19).

The reliability of market makers and APs to continue to carry out ETF trading activity is essential to sustaining investor confidence in the ETF market, especially during periodic market stress. In practice, APs can create or redeem new ETF shares with the issuer at a fair value in the primary market. This allows APs to act as arbitrageurs when ETF prices deviate from their fair market value. For this arbitrage mechanism to make economic sense, the premium or discount present in the ETF secondary market has to exceed the creation or redemption costs (i.e. custody costs, financial transaction taxes of underlying securities, commissions, etc.). One concern that arises among ETF investors is, since APs are not required to step into the market, how can we have confidence that they will serve their important role at all times? The answer is the role that lead market makers play in the ETF ecosystem. U.S.- listed ETFs have one lead market maker (European ETFs have two) with clearly defined quoting obligations to make a continuous 2 sided market during regular trading hours<sup>1</sup>.

<sup>1</sup>Quotations requirements include:

- \_ LMMs must maintain continuous, two-sided quotes for each security in which the firm is registered as lead
- \_ LMMs must meet minimum performance requirements which include a Best Bid Best Offer requirement, minimum displayed size, minimum quoted spread and participation requirements for opening and closing auctions.

In return for meeting these obligations, LMMs will receive a superior fee structure for their LMM allocations.

For each ETF, there is a large number of independent profit-seeking APs whose profit incentives directly align with goals of ETF investors, which are to access the underlying markets of ETFs at a fair price and with the assurance of liquidity. For example, Xtrackers currently maintains relationships with 28 different APs. In the past, when APs or market makers have withdrawn from the ETF market, there was very little impact on the resilience of the ETF ecosystem and its ability to provide liquidity to investors. In addition to APs, which are only the subset of brokers that create and redeem shares directly with ETF issuers, DWS Xtrackers as an example, also maintains a broad relationship with over 100 brokers who serve as an additional liquidity valve to ETF investors.

The reliability of liquidity providers to effectively keep prices in line with NAVs relies on their ability to access financial instruments that allow for the seamless arbitrage of ETFs to their underlying baskets. In periods of financial stress, concerns will sometimes arise as to the capacity or willingness of APs to operate in this manner on a continuous basis. When underlying liquidity is insufficient to allow for immediate arbitrage of NAV/price disparities, liquidity providers are still able to leverage a much broader toolkit of investment vehicles in order to generate profits. This includes the utilization of quantitative models to replicate market risks using other instruments (e.g. hedging high yield risk with S&P futures) as well as having the flexibility to take on, or warehouse, market risk.

Ultimately, ETF prices are a reflection of current market liquidity conditions through the behaviors of APs as well as other brokers. And given improvements in underlying market

liquidity across equities and fixed income through the advent of numerous electronic trading platforms, the ease by which ETF markets operate is, if anything, improving significantly, in our view.

**Myth 5: The ETF tail is wagging the asset dog** – What is the difference between, and importance of, primary and secondary liquidity in both highly liquid, and relatively illiquid markets? How is it possible to have often vast amounts of secondary market trading of an asset (class) that is itself potentially not being traded (or at least traded far less). Are ETFs simply derivatives?

It is important to remember that ETFs are one of many tools investors can use to implement their market views. Ultimately, prices of underlying securities are freely formed by market dynamics of supply and demand, and the price of an ETF simply reflects these underlying market dynamics as well. The mechanism of creating and redeeming ETFs by APs effectively transfers the true cost of transacting in the market onto ETF investors. Because this is true, generally speaking, ETFs can provide investors liquidity commensurate with the underlying risk markets even if the ETFs themselves do not frequently trade. In fact, ETFs can go one step further and provide liquidity even when the underlying market fails. An example of this occurred from 6/26/15 to 7/31/15 (indicated by the grey shaded area in the chart below). At this time, the Greek stock market closed but the largest, most-liquid, Greece ETF continued trading in the United States, which provided investors with the ability to access the Greek market even when the underlying securities were not trading.

**FIGURE 9: LARGEST GREECE ETF AVERAGE 30 DAY TRADING VOLUME VS. GREEK ATHEX**



Source: Bloomberg as of 10/11/19. Subject to change and may not be indicative of future results.

As you can see, trading volume in the Greece ETF spiked even when the Greek market was closed, which speaks to the flexibility and additional liquidity that ETFs provide market participants. A similar example occurred in Egypt from January 27, 2011 to March 23, 2011, when the Egyptian market was closed due to the Arab Spring.

Unlike an individual stock, the liquidity of an ETF is not limited to the number of existing shares available in an ETF's secondary market. Instead, the liquidity is determined by how easy it is to create or redeem the underlying basket in the open cash market. This is commonly measured by market participants in the form of "implied liquidity" (for more, see the below box). In all cases, regardless of size, the secondary market of an ETF adds additional layers of liquidity. In general, the liquidity buffer provided by ETFs and ETPs can be observed by measuring secondary market turnover relative to primary market turnover. Across the U.S. ETF market, for example, the secondary to primary market ratio is was 7.7x on average over the past 5 years, which highlights the additional liquidity buffer ETFs add that can help reduce the impact on underlying securities.

#### Capitals Markets

- \_ Implied liquidity refers to the number of shares that can be created/redeemed before materially moving the price of a security. This is typically measured by 25% of the 30-day average volume of the least liquid security in the basket. In the case that the required execution volume exceeds the implied liquidity figure, clients can work with the Capital Markets team to ensure best or more efficient execution
- \_ Using limit orders rather than market orders can mitigate execution risk during periods of market stress
- \_ Large trades in international ETFs are typically better suited for times when the underlying markets are also open (e.g. MSCI World has over 60% US Exposure; thus, waiting for the US market to open would likely resulted in better execution)
- \_ Time of day matters for market impact—the most liquid part of the day (as defined by the largest number of trades taking place) typically occurs going into the market close

As the secondary market for the ETF grows, its liquidity improves, allowing investors to rely more on the availability of existing ETF shares rather than having to tap the primary cash markets via the creation and redemption process. In fact, ETFs with large secondary markets frequently have lower trading costs than their underlying basket, particularly when the underlying basket rarely trades. The development of these secondary markets provides an additional layer of liquidity on top of the underlying cash market, which allows the

ETF to potentially trade without having a major impact on its underlying basket. For this reason, ETFs with large secondary markets are often used as a primary trading vehicle, particularly when the underlying cash market is relatively illiquid.

In relatively illiquid markets, this transfer of the fluidity of trading from the underlying market should also be reflected in the way ETFs will price relative to their underlying baskets. As mentioned earlier in the paper, APs are often able to utilize a wide variety of financial instruments (e.g. futures, swaps, underlying basket, other ETFs, options) in order to hedge their risks, thus supplying additional levers for more efficient ETF market pricing.

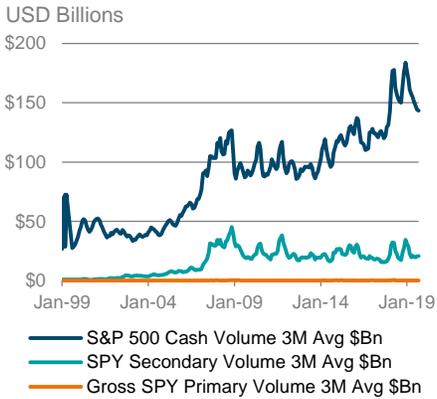
The following exhibits explore the relationship between ETF secondary trading activity, primary market trading activity (i.e. creates and redemptions), and underlying market trading activity across three markets, and the results are telling.

The exhibits show that ETF primary volume makes up only a tiny percentage of cash trading volume across a variety of markets, namely the S&P 500, the US High Yield Corporate Bond market, and emerging market equities over time, and secondary volumes are still small (and even potentially declining) as a percentage of overall cash volumes. Looking at the middle row of exhibits, one can see that for the S&P 500 and also for emerging markets, combined primary and secondary ETF activity appears to be on the decline as a percentage of total cash volume. Shown differently, in the first row of exhibits, one can see that both in EM and in the S&P 500, cash volumes have been rising at a faster pace than ETF primary and secondary activity. For high yield bonds, primary and secondary ETF activity is drifting higher, but this is only a slight trend, and primary plus secondary ETF activity still represents a small fraction of cash market volume. Across all three markets it appears that ETF primary market activity is extremely small on a percentage basis, relative to ETF secondary market activity (as seen in the third row of exhibits). This speaks to the minimal impact that ETFs can be expected to have on the underlying cash market.

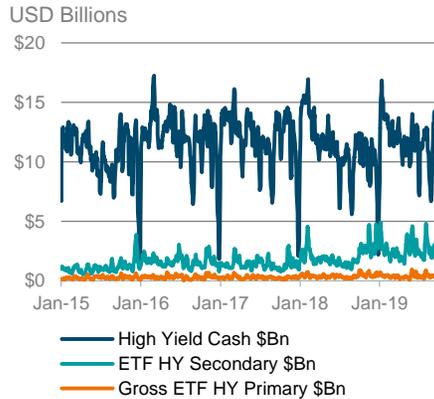
Visually, based on the third row of exhibits, one can see how small of a percentage ETF primary activity represents, relative to ETF secondary activity. This could imply that even if total ETF AUM were to double or triple from today's levels, the impact that ETFs have on underlying markets would still likely be minimal, as nearly all of their trading activity occurs on a secondary level without buying or selling underlying securities.

**FIGURE 10: ETF TRADING VOLUMES ACROSS S&P 500, HIGH YIELD AND MSCI EM**

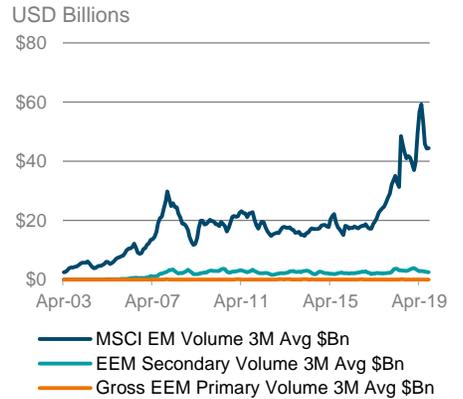
**S&P 500 cash volume vs. SPY secondary trading vs. SPY primary trading**



**High yield cash volume vs. HY ETF secondary trading vs. HY ETF primary trading**



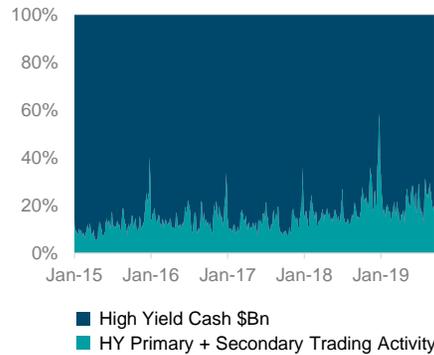
**MSCI EM cash volume vs. EEM secondary trading vs. EEM primary trading**



**S&P 500 cash volume vs. Combined SPY primary plus SPY secondary trading activity %**



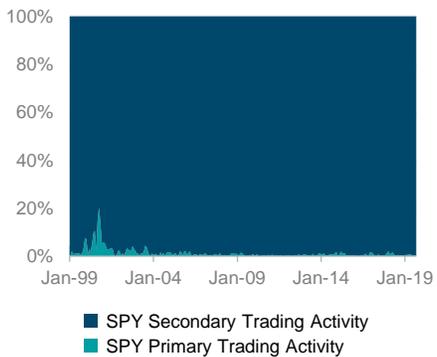
**High yield cash volume vs. Combined HY ETF primary plus HY ETF secondary trading activity %**



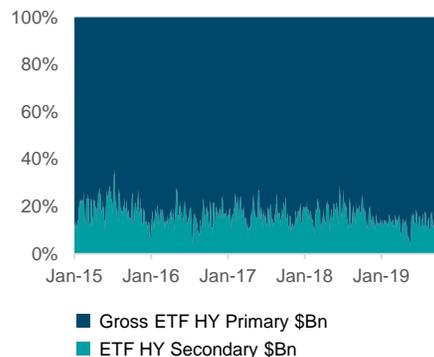
**MSCI EM cash volume vs. Combined EEM primary plus EEM secondary trading activity %**



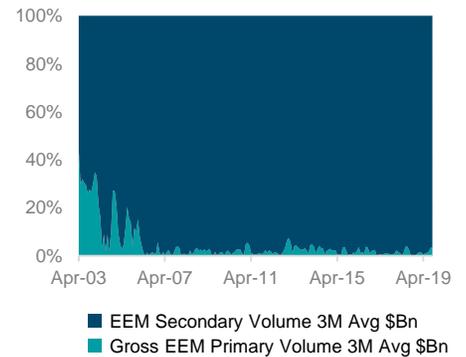
**SPY ETF primary vs. secondary activity**



**HY ETF primary vs. secondary activity**



**EEM ETF primary vs. secondary activity**



Source: Bloomberg as of 9/30/19

\*Note that cash volume data may be skewed downwards in earlier years for both EM and S&P 500 as Bloomberg does not have average 3 month volume data for many tickers historically (data is missing for more tickers in the earliest years, and this trend declines as the data becomes more recent)

## Conclusion

ETFs were created out of the perceived necessity for a secondary channel for market liquidity to help markets trade more fluidly, especially in periods of market stress. The liquidity provision and cost competitiveness during a period in which alpha generation across the active asset management industry has been difficult, has led to significant asset migration into ETFs and other passive strategies. Ironically, investors have increasingly voiced concerns about the unforeseen consequences of this market shift in two main areas: First, the continued ability of markets to accurately reflect fundamental information, and second, the orderliness of ETF capital markets in the event of a market shock.

The impact of passive investing on market efficiency is a complicated problem. We can observe empirically any changes to certain market dynamics that have or have not arisen in tandem with passive AUM growth. We make a few key high-level conclusions:

1. Increased passive AUM has not coincided with increased market volatility or inter-stock correlations in U.S. markets. Of course, it's always the case with these types of empirical observations that, as researchers, we don't have the "counter-factual," that is we can't say how volatility or correlation would have looked absent passive flows that did in reality occur. That said, we do stand behind the analysis as at least putting the burden of proof back onto those who argue that volatility and correlations have gone up.
2. There is a lack of material evidence of deterioration in price discovery of individual stocks. Idiosyncratic, or company specific, stock risk has remained stable over time. We claim to have found a fairly powerful argument to question the often quoted assertion that passive flows have worsened price discovery (by reducing the amount of active analysis occurring in the market). We looked at the two main components of stock risk under the CAPM framework – market risk, and stock-specific risk – and observed after roughly the last 20 years, the influence of both has remained relatively stable. If it were true that stocks were being increasingly driven by market risk (or, equivalently, that stock-specific risk was less important because of passive flows), then we would expect to observe that trend. We did not see any evidence of such a move.
3. There has not been an obvious increase in volatility among specific market segments that have experienced significant inflows.
4. ETF trading, especially primary activity, still represents a relatively small proportion of the broader market. This fact, combined with a robust market structure, has typically helped provide liquidity to the market in periods of stress. Indeed, what we increasingly see with ETFs is that they become the "vehicle of choice" during volatile periods when market participants are looking for ways to quickly express a view. Furthermore, there are numerous examples of ETFs becoming price discovery vehicles when their underlying markets are closed for trading due to underlying economic difficulties (i.e. Greece and Egypt), or mismatching holidays (i.e. China A shares being available to trade in the U.S. throughout Golden Week, and fixed income ETFs trading on Columbus Day when bond markets are closed).
5. The mechanics of ETF trading are designed to reflect true market liquidity. Authorized Participants and non-AP brokers acting in their own economic interests provide a transfer of underlying market dynamics onto ETF investors.

While it is difficult to draw definitive conclusions about the future broader impact of ETFs and passive investing, empirical evidence and a thorough understanding of the way ETFs are traded should make investors more comfortable that ETFs complement cash markets in providing liquid access to a broad range of financial markets.

In times of market stress investors should recognize that ETFs will simply provide liquidity commensurate with underlying market dynamics. In addition, the combination of ETF secondary market trading and improvements in the ease of trading underlying cash markets has continued to enhance liquidity conditions across markets.

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### DWS ETFs

With \$111 billion in passively managed AUM globally, DWS takes pride in being the second largest provider of ETFs in Europe<sup>1</sup> and fifteenth largest provider of ETFs in the U.S.<sup>2</sup> One of our firm's strengths includes a long history (since 1999) of physical replication of equity and fixed income benchmarks. This is complimented by DWS's ability to offer a wide range of vehicles by which clients can access passive exposures. Such vehicles include physical and synthetic ETFs, ETCs, segregated accounts, and other pooled investment vehicles. Another one of

DWS's strengths is customization. DWS provides clients with the flexibility to adjust passive portfolios to meet highly specific client requirements and guidelines. One such example includes the firm's ability build and manage complex investment strategies such as Smart Beta Fixed Income solutions. Furthermore, leveraging DWS's long history and strong commitment to ESG, the firm provides clients with a strong capability to integrate ESG, an ever more popular theme, into their passive portfolios.

<sup>1</sup> Source: ETF Stream.com [https://www.etfstream.com/feature/7709\\_morningstar-european-etf-assets-to-hit-e2trn-by-2024/](https://www.etfstream.com/feature/7709_morningstar-european-etf-assets-to-hit-e2trn-by-2024/)

<sup>2</sup> Source: ETF.com <https://www.etf.com/sections/etf-league-tables/etf-league-table-2019-07-31>

## Definitions

Alpha generation refers to the financial models or trading strategies used to generate excess returns.

Arbitrage 1) Technically, this refers to buying a security in one market and simultaneously selling it or its equivalent in the same market or other markets, for the differential or spread prevailing at least temporarily because of conditions peculiar to each market. 2) Commonly refers to a swap done between two similar issues based upon an anticipated change in price spreads.

Authorized participants (APs) are one of the major parties at the center of the ETF creation/redemption mechanism, and as such, they play a critical role in ETF liquidity. In essence, APs are ETF liquidity providers that have the exclusive right to change the supply of ETF shares on the market.

BATS is a U.S. equity and exchange-traded fund exchange.

Bid-offer refers to a two-way price quotation that indicates the best potential price at which a security can be sold and bought at a given point in time.

Capital asset pricing model (CAPM) describes the relationship between risk and expected return and is used in the pricing of risky securities.

Correlation refers to the way securities perform in relation to one another. A correlation of 1.0 indicates that two securities move in exactly the same direction, while a correlation of -1.0 indicates movements in exactly opposite directions. A zero correlation implies no relation in the movements of securities.

Credit Market refers to the market through which companies and governments issue debt to investors, such as investment-grade bonds, junk bonds, and short-term commercial paper.

Dark pools are a type of alternative trading system that give investors the opportunity to place orders and make trades without publicly revealing their intentions during the search for a buyer or seller.

Dispersion is the extent to which a distribution is stretched or squeezed.

An electronic crossing network (ECN) is an alternative trading system (ATS) that matches buy and sell orders electronically for execution without first routing the order to an exchange or other displayed market, such as an electronic communication network (ECN), which displays a public quote.

Exchange traded funds (ETFs) are a sort of exchange traded product (ETP) that can hold a variety of underlying assets and that can be traded on a stock market.

ETC stands for exchange traded commodity. Like other types of exchange traded products, ETC trade on exchanges. They seek to track the price movement of a commodity or group of commodities.

They may consist of either the underlying securities they are tracking or a swap agreement which may or may not be secured by collateral.

Environmental, social and governance (ESG) issues refer to non-financial issues that may affect the sustainability of an investment.

Fixed Income is a term used to describe a variety of investments that pay a fixed amount of interest until they mature, including CDs, bonds, and Treasury securities.

A futures contract (futures) is a legal agreement to buy or sell something at a predetermined price at a specified time in the future, between parties not known to each other.

Golden Week in the People's Republic of China is the name given to a semi-annual 7 or 8 day national holiday, implemented in 2000. The Chinese Lunar New Year Golden Week (Chinese New Year) begins in January or February. The National Day Golden Week begins around October 1.

High-yield (HY) bonds are high-paying bonds with a lower credit rating than investment-grade corporate bonds, Treasury bonds and municipal bonds.

Intrinsic value is the perceived or calculated value of an asset, an investment, or a company.

MarketAxess is fixed income electronic trading platform for institutional investors and dealers.

Market capitalization, in the context of an individual firm, is the number of shares issued multiplied by the value of the shares.

A market maker is a broker-dealer firm that is able to make either one- or two-sided markets in a particular security in order to facilitate the trading of that security during regular market hours.

Multilateral Trading Facility is a European regulatory term for a self-regulated financial trading venue. These are alternatives to the traditional stock exchanges where a market is made in securities, typically using electronic systems.

MIFIID II is a legislative framework instituted by the European Union (EU) to regulate financial markets in the bloc and improve protections for investors. Its aim is to standardize practices across the EU and restore confidence in the industry, especially after the 2008 financial crisis.

NASDAQ is an electronic exchange where stocks are traded through an automated network of computers instead of a trading floor. It stands for National Association of Securities Dealers Automated Quotations System and is the world's second-largest stock exchange based on market capitalization.

Net Asset Value (NAV) is usually determined at 4:00 pm Eastern Time on each day that a fund's exchange is open for trading. It is calculated by dividing a fund's total net assets less total liabilities by the number of shares outstanding.

Net New Asset (NNA) is the net change in new client assets under management.

New York Stock Exchange (NYSE) is a stock exchange located in New York city that is considered to be the largest equities-based exchanges in the world based on total market capitalization of its listed securities.

Securities and Exchange Commission (SEC) is an independent federal government agency in the U.S. responsible for protecting investors, maintaining fair and orderly functioning of the securities markets and facilitating capital formation.

A swap is a derivative contract in which one party exchanges or swaps the values or cash flows of one asset for another.

The S&P 500 Index includes 500 leading U.S. companies capturing approximately 80% coverage of available U.S. market capitalization.

Smart Beta is an index-based strategy that eschews the typical market capitalization weighted approach in favor of other fundamental, economic or statistical measures such as gross domestic product (GDP), earnings or volatility.

Stock market crash of 1987 was a rapid and severe downturn in stock prices that occurred over several days in late October 1987, affecting stock markets around the globe. In the run-up to the 1987 crash, the Dow Jones Industrial Average (DJIA) more than tripled in the prior 5 years.

Transparency rules sets out the rules for ongoing disclosure which cover periodic financial reporting and notification of interests in shares. In the UK VIX is the ticker symbol for the Chicago Board Options Exchange (CBOE) Volatility Index, which shows the market's expectation of 30-day volatility. It is constructed using the implied volatilities of a wide range of S&P 500 index options. It is not possible to invest directly in an index.

The opinions and forecasts expressed herein are as of November 7, 2019, are subject to change and may not come to pass.

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