
Fixed Income ETFs: Fact vs. Fiction

Answers on
Fund Structure,
Liquidity, Trading
and Performance

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1 Has the Increasing Size of the Fixed Income ETF Market Distorted the Bond Market?

Despite their rapid growth, fixed income ETFs still only represent 1.5% of the total investable fixed income universe and 3.3% of the US high yield market.

However, in some fixed income sectors, ETFs are rapidly becoming an important source of additive liquidity.

The fixed income ETF market is still relatively young – the first fixed income ETF launched in 2002. Only 10 years ago, assets under management in fixed income ETFs represented \$48 billion and circa 1.9% of the global fixed income fund industry, according to Morningstar. Meanwhile, ETFs accounted for a mere 0.2% of the investable global fixed income universe as measured by the Bloomberg Barclays Multiverse Index, which includes investment-grade and high yield bonds issued in developed and emerging market currencies.

As of March 31, 2019, fixed income ETFs represented 12.2% of the global fund market, with nearly \$1 trillion in assets. While the growth of these instruments has been robust, they still “only” account for 1.5% of the total investable fixed income universe. Flows have been strong, but they have not occurred solely at the expense of other types of existing investment vehicles. They have grown the overall market.

When it comes to their impact on market prices, these instruments still represent a relatively small portion of sub-asset classes within the fixed income market. Figure 1 highlights some examples of the difference between how much ETFs represent of the actual investment universe, and Figure 2 shows how much they account for in terms of trading activity.

Figure 1

**Relative Sizes of ETF AUM
Versus Total Market AUM
(\$m)**

	US High Yield Corporate Bonds	US Investment Grade Corporate Bonds	US Investment Grade Floating Rate Notes	US Senior Loans	US Municipal Bonds	EM Bonds	US Government Bonds	US MBS
Market Size (M)	\$1,201,857	\$7,875,503	\$500,355	\$1,147,019	\$3,830,433	\$1,950,469	\$15,267,707	\$5,895,102
ETFs AUM (M)	\$36,352	\$113,468	\$16,241	\$9,786	\$36,604	\$25,513	\$114,659	\$22,702
ETF Market Share (%)	3.0	1.4	3.2	0.9	1.0	1.3	0.8	0.4

Market Size Data: SIFMA (as of Q4 2018; US IG Corporate Bonds, US Government Bonds, US Municipal Bonds), Bloomberg (as of December 31, 2018; US High Yield Corporate Bonds, US IG FRNs, EM Bonds, US MBS), The Loan Syndications & Trading Association (as of December 31, 2018; US Senior Loans), ETF AUM: Bloomberg Finance, L.P., (as of 12/31/2018). Average Daily Volume (3M ADV) Bond Trading: Bloomberg Finance, L.P. (as of December 2018), EMTA (as of Q1 2018; EM Bonds), SIFMA (as of December 2018; US Government Bonds, US Municipal Bonds, US MBS); BondCliq (US IG FRNs, as of December 2018). Average Daily Volume (3M ADV) ETF Trading: Bloomberg Finance, L.P. (as of December 2018).

Trading Volumes

ETFs generally account for <5% of assets in almost all segments of the broad USD fixed income universe; in many cases, however, these instruments represent a higher proportion of the traded volume.

Thus, the FI ETF can be a source of additive liquidity to those markets. The stock exchange becomes the venue where a variety of investor types congregate to position their portfolios and express a fixed income beta exposure in either direction.

This two-way flow in shares of the ETF typically results in muted impact on the underlying market. (For example, an ETF consisting of senior loans or high yield bonds may see only \$1 of net share creation or redemption for every \$6-8 of secondary trading value).

In high yield, ETF trading may have begun to supplant volumes in synthetic products, such as total return swaps and credit derivative swap indices (CDX); investors often prefer the funded exposure due to its performance profile, which better matches the cash bond market and avoids the multiple basis risks that exist with a synthetic exposure.

Figure 2
**3-Month Average
 Daily Volumes**
 Bond Trading vs. ETF Trading

	US High Yield Corporate Bonds	US Investment Grade Corporate Bonds	US Investment Grade Floating Rate Notes	US Senior Loans
3M ADV: ETF Trading (M)	\$2,990	\$1,634	\$209	\$306
3M ADV: Bond Trading (M)	\$12,849	\$21,645	\$1209	\$3,649
ETF Trading Volume (%)	23%	8%	17%	8%

Market Size Data: SIFMA (as of Q3 2018; US IG Corporate Bonds), Bloomberg (as of December 31, 2018; US High Yield Corporate Bonds, US IG FRNs), The Loan Syndications & Trading Association (as of December 31, 2018; US Senior Loans), ETF AUM: Bloomberg Finance, L.P., (as of 12/31/2018). Average Daily Volume (3M ADV) Bond Trading: Bloomberg Finance, L.P. (as of December 2018), Average Daily Volume (3M ADV) ETF Trading: Bloomberg Finance, L.P. (as of December 2018).

Are Fixed Income ETFs Sufficiently Liquid?

A fixed income ETF's liquidity is at least as liquid as the underlying market that it tracks.

The ability to invest in an ETF via the primary and/or the secondary market can provide greater liquidity compared with alternative approaches to bond investing, such as index and actively managed mutual funds.

The unique structure of a fixed income ETF – which packages a diversified portfolio of bonds into a single, tradable equity – provides two sources of liquidity for investors. These two sources — “primary,” which can be accessed via an authorized participant, and “secondary,” which can be accessed directly — define a fund's overall liquidity profile.

Primary market An ETF is a portfolio of individual securities – i.e., equities or bonds – that form a single fund. The shares of this fund are publicly listed and trade on an exchange (the secondary market). Normally, investors buy or sell ETF shares via the secondary market. However, if their buy or sell order is too large to trade on the exchange, an alternative approach could be for the investor to approach a market maker, who in turn, could trade via the primary market.

The size of the investor's order and trading volumes of the ETF will determine whether the secondary market can accommodate the trade. If the investor could only trade via the secondary market, a large order may take time to execute, meaning they would be exposed to market risk for an extended period.

To counter this potential problem, ETF issuers partner with a pool of authorized participants (“APs”), who, through managing the primary market, ensure that investors can buy or sell shares in the ETF in various market environments. These APs are also known as “market makers”: their role is typically carried out by investment banks or specialist trading firms. APs are able to create new shares for the ETF in the case of a large buy order (“creation”) and redeem existing shares in the case of a large sell order (“redemption”). This intraday mechanism is called creation/redemption and means that ETFs are able to accommodate large buy or sell orders beyond the liquidity provided by the secondary market.

This creation/redemption mechanism facilitates instantaneous an order executed in size and at a price level that the underlying bond market supports. For example, if an AP has the ability to buy and sell \$1 billion worth of US Treasuries, that AP should be willing to make an equivalently sized market in a US Treasury ETF – even if the fund has a low average daily trading volume and small AUM. The liquidity of a fixed income ETF is therefore at least equal to the liquidity of the underlying bond market.

Secondary market The secondary market is simply the exchange where ETFs are listed and trade. An ETF's secondary market liquidity can be assessed by looking at its average daily trading volume and spread (i.e., the difference between the offer price and bid price, which are the prices at which investors can buy or sell the fund), as well as premiums and discounts to net asset value. As outlined above, the full scale of an ETF's liquidity can only be accurately measured when the primary market's liquidity is also included.

Case Study: US High Yield Liquidity

US High Yield liquidity is occasionally highlighted as a potential area of concern, particularly for ETFs in times of market stress. However, analysis of the market's trading volume reveals that ETFs actually complement the broader market's liquidity profile.

Figure 3 shows historical high yield market trading volumes and illustrates how both types of ETF liquidity – primary and secondary market volumes – are dwarfed in comparison with the broader HY cash market.

It demonstrates how, in periods of market stress, ETF secondary trade volume tends to spike, but the primary market volume remains relatively subdued in comparison. This suggests that even in times of market stress, there is sufficient secondary market ETF liquidity for investors to trade without accessing the primary market and, subsequently, the broader market. It also highlights that, if large numbers of investors tried to redeem at the same time, the primary ETF market could be used as a liquidity source, especially given the scale of trading volume in the US HY cash market.

Even in times of severe market volatility, there was sufficient liquidity in the secondary market to allow investors to buy and sell their positions without relying on the primary market.

As shown in Figure 4, fixed income ETFs are the only investment vehicle that provides two layers of liquidity and offers transparent, diversified access with intraday pricing.

Figure 3
High Yield Volume vs. High Yield ETF Primary Market Activity

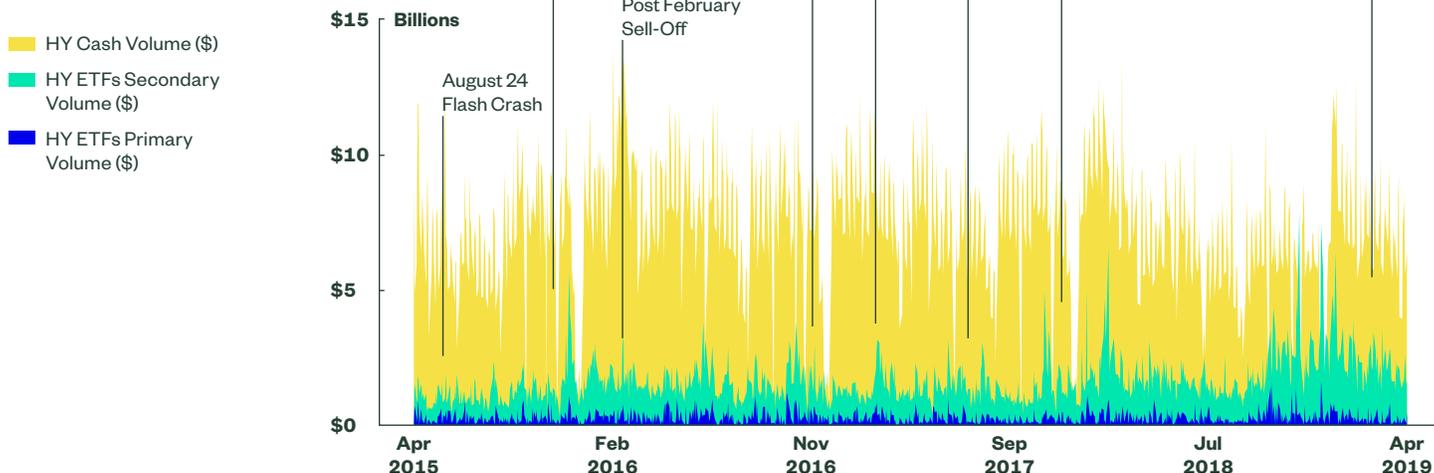


Figure 4
Trading Comparison Across Investment Types

	Exchange Traded Fund	Index Fund	Actively Managed Fund	Single Fund
Trading venue	On Exchange (secondary) Primary Market	Via fund provider, requiring written application	Via fund provider, requiring written application	Over the counter, voice or electronically enabled
How frequently can investors gain access?	Intraday	Typically close of business on trade date	Typically close of business on trade date	Intraday
Trade notification period	None	Typically 1 to 3 days	Typically 1 to 3 days	None
Minimum investment size	1 share	Fund's Minimum Investment Size	Fund's Minimum Investment Size	Bond's Minimum Price/Minimum Increment
Can investors see intraday pricing?	Yes	No	No	Yes
How concentrated is the portfolio?	Diversified	Diversified	Greater concentration	Single security

3

Do Fixed Income ETFs Overweight the Riskiest Companies?

An ETF's index construction inherently provides diversification benefits and often employs constituent capping to mitigate concentration risks.

In addition to the broad diversification afforded by indices, large issuers of debt are also companies with substantial asset bases and revenue profiles. This provides the ability, or the capacity, to pay and service the debt on the firm's balance sheet. Focusing only on the amount of debt an issuer has in an index overlooks a few key variables.

Indices are rules based, focusing on diversification and liquidity for ensuring investability. As a result, not all of an issuer's debt is included in an index, which paints an incomplete picture of the firm's overall indebtedness. For instance, an issuer can have short-term liabilities that do not qualify it for inclusion in an index, or debt financing secured in subordinated form, or financing denominated in a different currency.

As shown in Figure 5, based on the amount of debt included in the Bloomberg Barclays US Corporate Bond Index, the rankings of the most indebted firms are very different from the rankings of their total short and long debt overall.

A high level of debt for an issuer has little to do with a company's creditworthiness or capacity to pay.

Firms with larger debt loads do not pose greater risks for investors than firms with smaller debt loads. If it were the case that large debt loads equated to greater credit risk, the corporate bond market would exhibit a linear relationship between credit ratings and debt outstanding. However, credit rating agencies consider numerous factors besides amount of debt, including capacity to service debt.

Figure 5
**Top 10 Holdings in the
 Bloomberg Barclays US
 Corporate Bond Index**

	Weight in Index (%)	Rank by Debt Included in Index	Rank by Short-Term and Long-Term Debt	Market Cap (\$M)	Sales (Last 12M) (\$M)
Bank of America	2.3	1	5	\$287,718	\$112,267
JP Morgan Chase	2.3	2	2	\$374,024	\$135,686
AT&T	1.9	3	25	\$224,675	\$177,545
Citigroup	1.8	4	3	\$161,780	\$98,981
Goldman Sachs	1.7	5	6	\$78,077	\$52,322
Wells Fargo & Co	1.7	6	13	\$217,609	\$102,318
Morgan Stanley	1.5	7	12	\$80,203	\$50,793
Verizon	1.4	8	35	\$233,767	\$131,219
Apple Inc	1.3	9	34	\$968,618	\$258,490
Microsoft Corp	1.2	10	45	\$979,921	\$122,211

As of 04/30/2019.

4 Do Fixed Income ETFs Underperform Active Managers in Volatile Markets?

Index-based fixed income exposures would have outperformed 77% of active managers, on average, during five systemically important volatile markets over the past 25 years.

SPDR ETFs analyzed five significant market events representing periods of volatility in the bond markets over the past 25 years: the Aggressive Fed Hike, the Tech Bubble, the Global Financial Crisis, the Taper Tantrum and the 2016 plunge in oil prices.

The analysis focused on the performance of active managers within the Morningstar Intermediate-Term Bond Universe and found that fixed income index-based exposures outperform active strategies.

As shown in Figure 6, the Agg outperformed the median manager in each of the events. In fact, during three of the volatile events, the index ranked in the top quartile. The belief that index-based exposures cannot withstand market volatility is clearly a misconception – the Agg outperformed more active managers than it underperformed.

Why have index-based strategies proven so resilient? During a downturn, spreads widen and default rates increase, while the flight to safety means that Treasuries are in demand. Unfortunately, any active manager with an overweight to credit and, therefore, a higher credit beta, may be negatively impacted as default rates spike. Managers who outperform the benchmark during an upmarket tend to be unable to market time a downturn and reduce risk as all investors are leaving the party. These active managers' credit exposure hurts performance during risk-off environments. Active strategies also tend to be more concentrated, whereas indexing provides a broader exposure, which potentially lowers idiosyncratic risk during market volatility through diversification.

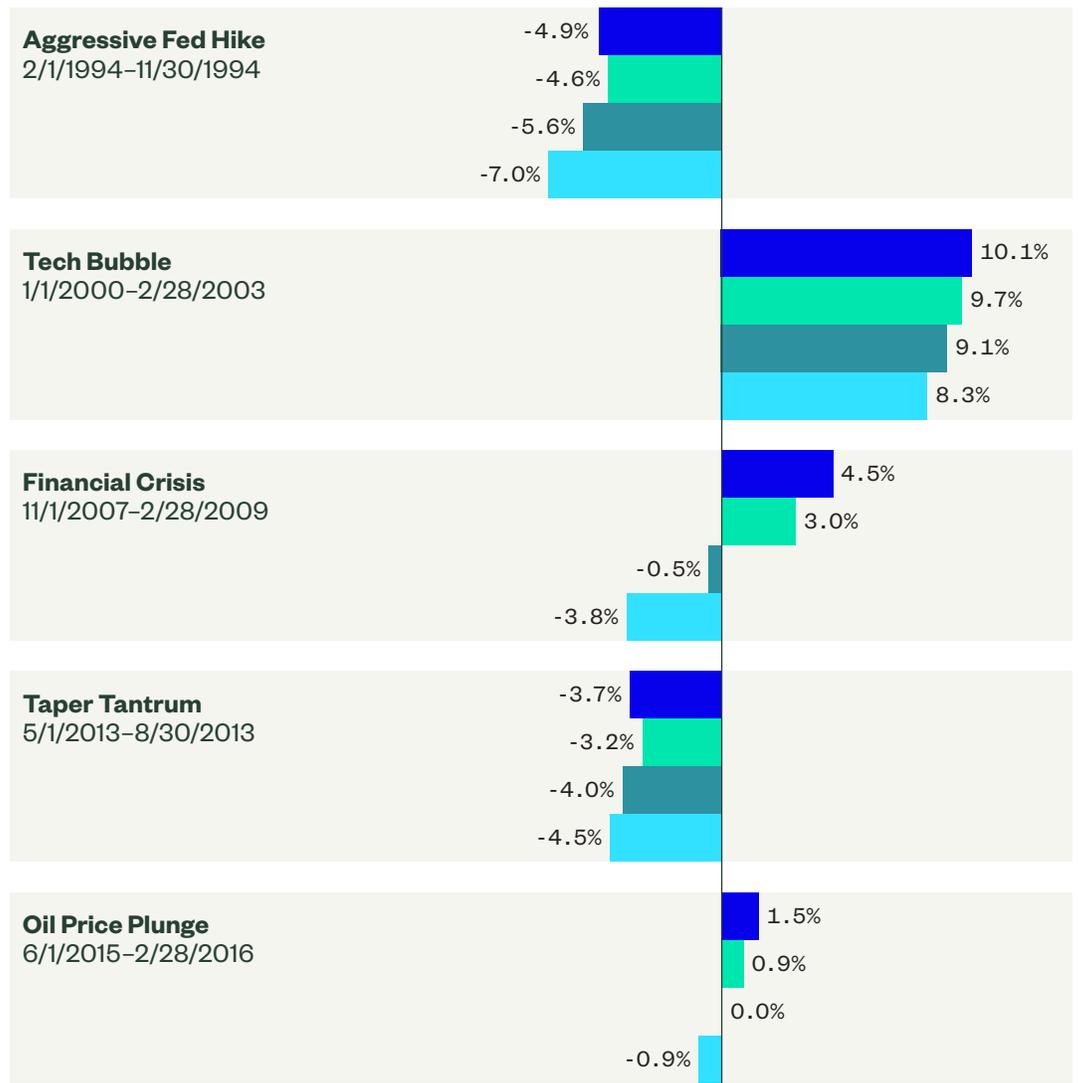
This analysis does not preclude the implementation of both active and index exposures for efficient portfolio construction. Over the long term, there is clearly a place for both; index-based exposures can augment active exposures, thus benefiting long-term performance while lowering fees.

Figure 6
**Performance During
 Market Turbulence**
 Index vs. Active Managers

■ Bloomberg Barclays US
 Aggregate Bond

Manager Universe, Morningstar
 Intermediate-Term Bond:

■ Top Quartile
 ■ Median
 ■ Bottom Quartile



Source: Morningstar as of 04/30/2019. The information contained above is for illustrative purposes only. Weights are as of the date indicated, are subject to change, and should not be relied upon as current thereafter. Diversification does not ensure a profit or guarantee against loss.

5 Are There Too Many Bonds to Make Fixed Income Index Investing Efficient?

An index investment manager's objective is to seek to track an index's return with minimal tracking error. The objective is not to hold every bond in the index.

Generally, it is not possible to hold every bond in an index, given the sheer number of bonds. As an example, the Bloomberg Barclays US Aggregate Index contains 10,374 different bonds.* That total includes:

- US Treasury bonds
- Bonds from government-related agencies, such as the Tennessee Valley Authority
- Bonds from US corporate issuers
- Securitized bonds
- USD-denominated bonds from foreign issuers

Given the diverse holdings, portfolio managers attempt to replicate the risk characteristics of the index through sampling, rather than by holding every security. This means replicating the duration, curve, and issuer credit exposure of the index. Sampling can be the most efficient technique for constructing portfolios, as many broad fixed income indices include a large number of securities, but not all of those securities can be purchased. Coupled with potentially high transaction costs to access illiquid bonds, full replication isn't always possible or practical. With a sampling approach, a PM can seek to build a portfolio with the same characteristics as the index.

At a high level, PMs usually take one of two approaches to ensure that tracking error remains tight and performance deviations are minimal as a result of exposure differences: top-down or bottom-up.

Top-Down Approach

This approach seeks to align the common factors of the ETF to the index, as these are the key variables that drive market beta. These factors include:

Duration Considering how to match on key rate duration exposures.

Credit Spread Examining differences between option-adjusted spread, as well as other metrics, such as option-adjusted spread duration.

Sector Exposures Looking at the sector and industry compositions to manage macro impacts.

Ratings Allocating at the credit rating level.

Bottom-Up Approach

The bottom-up approach is often used in markets such as high yield or convertible bonds, where PMs typically find more price volatility.

In a bottom-up approach, a PM tries to identify large or outsized idiosyncratic risks and mitigate them. An example of this is making the decision to purchase one bond instead of another from a company based on its position in the credit curve, a factor that can impact single bond volatility.

As an illustration, we can consider the characteristics of a representative SPDR ETF tracking the Bloomberg Barclays US Aggregate Bond Index. As shown below, while the fund may only hold 1,514 out of nearly 5,000 securities in the index, the underlying portfolio matches on other characteristics, such as yield, coupon, maturity, option-adjusted spread, spread duration, key rate durations and average credit rating.

Figure 7

Characteristics of a Representative SPDR ETF Tracking the US Aggregate Bond Index

	SPAB Portfolio	The Agg	+/-
Coupon (%)	3.3	3.3	0.1
Local Yield to Worst (%)	3.0	3.0	0.0
Option Adjusted Spread (Basis Points)	43.9	43.7	0.3
Option Adjusted Duration (Yrs)	5.9	5.9	0.0
Option Adjusted Spread Duration (Yrs)	6.0	5.9	0.0
Avg Maturity (Yrs)	8.1	8.2	0.0
Avg Credit Rating	AA	AA	–
Key Rate Duration 6M	0.0	0.0	0.0
Key Rate Duration 2Y	0.1	0.1	0.0
Key Rate Duration 3Y	0.5	0.5	0.0
Key Rate Duration 5Y	0.8	0.8	0.0
Key Rate Duration 7Y	0.8	0.8	0.0
Key Rate Duration 10Y	0.9	0.9	0.0
Key Rate Duration 20Y	1.3	1.3	0.0
Key Rate Duration 30Y	1.2	1.2	0.0

Source: State Street Global Advisors, Bloomberg Finance L.P., as of January 31, 2019. The above example is for illustrative purposes only.

Are Fixed Income ETFs Difficult to Trade?

Complexity varies depending on the needs of the investor, but there are a few straightforward ways to trade fixed income ETFs.

Investors seeking to trade fixed income ETFs have two primary avenues:

Exchange Liquidity Requires access to a front-end trading platform and brokerage or custodial account. The investor would also need a Depository Trust Company (DTC) number if self-clearing.

Off-Exchange/Over-the-Counter (OTC) Liquidity Requires establishing trading relationships with a broker dealer and/or market maker and account settlement instructions to be able to book and settle individual trades.

When considering whether to trade on exchange or OTC, it's important to consider trade size. As you would expect, similar to single stock equities, larger trades that exceed average daily volume should be handled with greater care by working with a broker dealer or market maker OTC.

Generally, if the trade size is typical in the underlying market, it should be acceptable in the ETF. Capital markets teams can serve as a valuable resource for guidance on liquidity. These professionals are in tune with the markets and have robust relationships with liquidity providers. Capital markets teams can opine on optimal trading strategies depending on the ETF, the underlying market, the trade's size and, most important, the priorities of the executing trader.

Some investors may wish to understand the components that are used to price an ETF, such as principal, interest, cash, and accrued interest/undistributed income. This information is used in NAV construction and is factored into the costs that a broker must bear creating/redeeming ETF shares, which, in turn, are embedded into the prices at which they are willing to buy and sell ETF shares.

ETF issuers publish daily reports that include all of these components, such that any investor is able to price the ETF. Nonetheless, pricing remains dynamic, as it is dependent on factors like time of trade (it is generally better to trade when the underlying market is liquid and the creation/redemption window is open); hedging costs; and dealer balance sheet charges. And of course, pricing is dynamic because bid/offer can vary with trade size.

A Leader in Fixed Income Investing

The Scale to Specialize:

- State Street Global Advisors' global scale enables our portfolio managers, traders and investment strategists to be sector specialists and based in their geographic markets
- Our dedicated capital markets teams provide 24-hour coverage across global markets, offering enhanced liquidity and cost-efficient trading strategies
- Entrusted with \$430 billion in fixed income assets, managing 30+ currencies across 40 different countries*

Proven Track Record:

- 23 years of bond investing — our first fixed income index fund launched in 1996
- Manage more than 100 fixed income strategies, providing choice for investors
- More than 100 fixed income professionals dedicated to conducting research, managing risks and costs, and supporting our clients

Innovative Solutions for Bond Investors:

- Comprehensive range of cost-effective ETFs
- Leveraging strategic partnerships to complement beta range, enabling investors to enhance their portfolios

* Source: State Street Global Advisors, as of March 31, 2019.

ssga.com

spdrs.com

Glossary

Basis Point (bps) A unit of measure for interest rates, investment performance, pricing of investment services and other percentages in finance. One basis point is equal to one-hundredth of 1 percent, or 0.01%.

Bloomberg Barclays U.S. Aggregate Bond Index (the Agg) A benchmark that provides a measure of the performance of the US dollar denominated investment grade bond market, which includes investment grade government bonds, investment grade corporate bonds, mortgage pass through securities, commercial mortgage backed securities and asset backed securities that are publicly for sale in the US.

Bloomberg Barclays U.S. 1-3 Year Corporate Bond Index A benchmark designed to measure the performance of the short-term U.S. corporate bond market. It includes publicly issued US dollar-denominated and investment-grade corporate issues that have a remaining maturity of greater than or equal to one year and less than three years.

Convertible A convertible security is a security which may be exchanged for another asset, generally a fixed number of shares of common stock.

Credit Derivative Swap Contract between two counterparties where the buyer makes periodic payments to the seller, and in return receives a payoff if an underlying financial instrument defaults or experiences a similar credit event.

Depository Trust Company (DTC) One of the world's largest securities depositories. It also acts as a clearinghouse to process and settle trades in corporate and municipal securities.

Diversification A strategy of combining a broad mix of investments and asset class to potentially limit risk, although diversification

does not guarantee protecting against a loss in falling markets.

Duration A commonly used measure, expressed in years, that measures the sensitivity of the price of a bond or a fixed-income portfolio to changes in interest rates or interest-rate expectations. The greater the duration, the greater the sensitivity to interest rates changes, and vice versa.

Liquidity The degree to which an asset or security can be bought or sold in the market without affecting the asset's price. Liquidity is characterized by a high level of trading activity.

Net Asset Value (NAV) The calculated assets minus liabilities divided by shares outstanding. NAV is the straightforward account of the actual assets in the fund.

Over-The-Counter, or OTC A term in financial markets used to describe transactions that occur away from any listed exchanges between individuals or involving dealer networks, whether in stock, bond, currency or derivatives markets.

Premium and Discount If an ETF is trading above its NAV, the ETF is said to be trading at a premium. If the price of the ETF is trading below its NAV, the ETF is said to be trading at a discount.

Senior Loans Floating-rate debt issued by corporations and backed by collateral such as real estate or other assets.

Total Return Swap An agreement where one party makes payments based on a set rate, while the other party makes payments based on the return of an underlying asset. In total return swaps, the underlying asset is usually an equity index, loans, or bond.

Tracking Error A measure of how consistent a portfolio's return is with that of its benchmark. In reality, no indexing strategy can perfectly match the performance of the index or benchmark, and the tracking error quantifies the degree to which the strategy differed from the index or benchmark, by measuring

the standard deviation between the two values, annualized.

Volatility The tendency of a market index or security to jump around in price. In modern portfolio theory, securities with higher volatility are generally seen as riskier due to higher potential losses.

Yield The income produced by an investment, typically calculated as the interest received annually divided by the investment's price.

Important Information Risk Disclosures

Investing involves risk including the risk of loss of principal.

Bonds generally present less short-term risk and volatility than stocks, but contain interest rate risk (as interest rates rise, bond prices usually fall); issuer default risk; issuer credit risk; liquidity risk; and inflation risk. These effects are usually pronounced for longer-term securities. Any fixed income security sold or redeemed prior to maturity may be subject to a substantial gain or loss.

ETFs trade like stocks, are subject to investment risk and will fluctuate in market value. The investment return and principal value of an investment will fluctuate in value, so that when shares are sold or redeemed, they may be worth more or less than when they were purchased. Although shares may be bought or sold on an exchange through any brokerage account, shares are not individually redeemable from the fund. Investors may acquire shares and tender them for redemption through the fund in large aggregations known as "creation units." Brokerage commissions and ETF expenses will reduce returns.

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