Fixed Income ETF Liquidity Primer

October 2023

Introduction
Over the past ten years, fixed-income exchange-traded funds (ETFs) have become an increasingly popular option for investors seeking transparency¹ and market liquidity. Fixed income ETF assets reached $1 trillion (19% of industry assets under management or AUM) at the end of August 2019² and as they become a larger part of the ETF ecosystem, many questions have surfaced regarding the mechanics and liquidity of these products. The following discussion will shed light on these questions and provide a deeper understanding of ETFs and their markets.

Key focus areas
The cost and potential benefits of fixed income ETFs
Trading efficiency over underlying markets has been one of the key growth drivers in the fixed income ETF space. With bond dealer inventories reduced as a result of the financial crisis, fewer than 35% of corporate bonds receive price quotes on any given day³ leading to less transparent pricing. This section focuses on the potential benefits of fixed income ETFs for price discovery and as an efficient vehicle for both retail and institutional investors to gain exposure to various types of fixed income securities.

Understanding the mechanics of fixed income ETFs
With their open-ended structure, ETFs have the ability to expand or contract shares outstanding on a daily basis. When ETF demand is skewed to the buy or sell side, liquidity providers can use the creation or redemption process to facilitate liquidity. Fixed income ETFs exhibit some key differences in this process when compared to equity ETFs. We will also give an overview of the two ways ETF shares can be created and redeemed through in-kind creations and redemptions, or cash creation and redemptions.

Fixed income ETFs during market distress
After examining the mechanics of fixed income ETFs, we look at a common investor concern regarding this space. Is there an issue wrapping a potentially illiquid basket of over the counter (OTC) securities in a liquid wrapper that trades on exchange?

Figure 1: Fixed Income AUM growth chart
After registering an annual growth rate of 23% over the last five years, fixed income strategies now account for 19% of the total ETF industry

![Fixed Income AUM growth chart](image)

Legend:
- Total Assets of FI ETFs - US
- Total Assets of FI ETFs - Europe
- Count of FI ETFs - US
- Count of FI ETFs - Europe

Source: Morningstar, monthly data from August 2009 to August 2019

¹ ETFs disclose their full portfolio holdings daily
² Data from ETFGI Global ETF and ETP industry insights, August 2019
³ Source: SEC & FINRA as of March 31, 2019
The costs and potential benefits of fixed income ETFs
A key driver of growth in the fixed income ETF space has been the trading efficiency that these products provide over their underlying markets. Tradability has been a longstanding challenge in fixed income markets with bonds trading OTC. Much of new corporate bond issuance is purchased in the primary market by insurance companies, large corporations and institutional investors who commonly hold to maturity. As such, these issues, rarely trade in the secondary market. Since the financial crisis, the balance sheets of big banks and fixed income dealers have been constrained by regulators, leading to a considerable decline in corporate bond inventory. As a result, FINRA and SEC findings show that individual bond liquidity conditions have worsened, with only 35% of US corporate bonds getting price quoted on any given day. In many cases, it can be difficult to get an accurate look at the right bonds for the portfolio, let alone purchase them. These liquidity challenges in fixed income markets have led investors to gravitate towards alternative wrappers such as ETFs for their fixed income investment exposure.

Figure 2: Bond dealer inventories
Regulation implemented following the financial crisis has led to a significant reduction in bond dealer inventories in corporates and mortgage backed securities (MBS)

Figure 3: Bid/ask spread availability in TRACE eligible corporate bonds
As a result of limited bond dealer inventories, 65% of corporate bonds do not receive two-way quotes daily.

4 The Trade Reporting and Compliance Engine (TRACE) is the FINRA-developed vehicle that facilitates the mandatory reporting of over-the-counter secondary market transactions in eligible fixed income securities. All broker dealers who are FINRA member firms have an obligation to report transactions in corporate bonds to TRACE under an SEC-approved set of rules.
A fundamental advantage ETFs have over their underlying bond markets is superior liquidity. Most ETFs are actively traded on exchange each day, (often with multiple dealers quoting prices) versus a single corporate bond that trades OTC and may lack adequate liquidity for days at a time. ETFs are required to have a lead market maker (LMM) who is responsible for quoting bids and offers on the exchange throughout the trading day. Therefore, in contrast to the underlying bond market, a fixed income ETF will typically have more actionable quotes throughout the trading day. As a result, the ETF structure has the potential to bring vastly improved liquidity conditions over the individual bond market.

Figure 4: Average odd lot mark-ups of U.S. corporate bonds
Retail investors typically see significantly larger spreads on odd lot bond trades.

<table>
<thead>
<tr>
<th></th>
<th>Institutional ($1mm notional trades)</th>
<th>Retail (&lt;$100K notional trades)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Grade</td>
<td>0.08%</td>
<td>1.06%</td>
</tr>
<tr>
<td>High Yield</td>
<td>0.25%</td>
<td>2.11%</td>
</tr>
</tbody>
</table>

Source: SEC & FINRA as of March 31, 2019

The liquidity advantage for fixed income ETFs is overwhelmingly apparent when looking at sized transactions. It is difficult enough to find round lot inventory in the corporate bond market at a fair price. In the case of smaller retail size or “odd lot” trades, it’s common for a dealer to build in a significant price mark-up which causes considerable yield drag and impacts total return for the investment. In contrast, fixed income ETF investors can get efficient execution in minimum size lots of as little as one share ($20 to $100), a significant improvement in tradability versus the underlying market. For this reason, it is typically easier for an investor to achieve their yield targets using ETFs rather than individual bonds.

This enhanced tradability has been the primary driver of fixed income ETF adoption by retail clients. However, institutional investors are finding that these products can provide more cost-efficient exposure to the underlying market as well. Typically, when secondary market activity in fixed income ETFs increases, investors can execute well inside the bid-offer spreads offered in primary market. This allows investors to get exposure to the underlying market with better pricing than if they were to buy the underlying basket of securities themselves.
Spreads, however, only explain half the story. In fact, premium and discounts also need to be taken into consideration. The ETF is going to trade 12bps wide, but its price will fluctuate between a premium and discount to NAV based on market sentiment. This premium/discount in the ETF reflects the cost for liquidity providers to buy/ sell the underlying securities in the primary market, a concept discussed later.

After factoring in the premium/discount cost and the ETF’s bid/ask spread, in many cases there is still a vast reduction in transaction costs for investors to trade the ETF versus buying the underlying basket of securities.

Although fixed income ETFs have brought enhanced tradability and price improvement to their underlying market, there are still costs to consider when investing in a fixed income ETF. The first is the management fee – according to Bloomberg, average management fees are about 17 bps lower for fixed income ETFs (average 26 bps) than equity ETFs (average 43 bps). However, due to the added difficulty in index tracking and the portfolio management processes, tracking error is an important factor that investor should consider, when comparing Fixed Income ETFs, due to the fact that most fixed income ETFs are managed to the index via a sampling process. Even the largest of fixed income ETFs rarely hold every bond in the index for the same reasons mentioned earlier (there is a limited inventory of bonds being quoted every day, thus the portfolio manager may never have the opportunity to buy each bond in the index).

Lastly, another potential benefit of fixed income ETF ownership is the excess revenue that institutions can potentially earn by lending out the ETF shares they hold. Individual bonds are typically more expensive to short than individual stocks, and as a result many investors turn to fixed income ETFs to gain short exposure or to hedge certain risks in their fixed income portfolios. This additional short demand creates an opportunity for the long fixed income ETF investor, as these lending rates are typically higher than equity ETFs.

**Figure 5: ETF vs. underlying market average bid/offer spreads**

<table>
<thead>
<tr>
<th></th>
<th>ETF spread</th>
<th>Basket spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro Floating Rate Note</td>
<td>12 bps</td>
<td>35 bps</td>
</tr>
<tr>
<td>AT1/CoCos</td>
<td>12 bps</td>
<td>55 bps</td>
</tr>
<tr>
<td>$ High Yield</td>
<td>40 bps</td>
<td>85 bps</td>
</tr>
</tbody>
</table>

For illustrative purpose only. Any calculations and charts set out herein are indicative only, make certain assumptions and no guarantee is given that future performance or results will reflect the information herein.

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In-kind creations and redemptions

To create and redeem shares using an in-kind process, liquidity providers work directly with ETF portfolio management teams to deliver (create) or receive (redeem) the bonds necessary for the ETF to best mirror its underlying index. Because odd lot bond trades can be difficult and expensive, bonds typically trade in round lots of $1 million increments or higher, and as a result liquidity providers seldom deliver an entire basket of bonds as they typically do with equity ETFs. Instead, the ETF portfolio management team will often negotiate a smaller basket of bonds (aka a custom in-kind basket) with the liquidity provider that best sample the portfolio/index. These custom baskets can be as small as a few bonds or as large as several hundred bonds.

Cash creations and redemptions

Fixed income ETF issuers may also create or redeem ETFs in cash. Cash redemptions are rare given that with a cash redemption the portfolio manager would need to sell securities to raise cash, potentially triggering a taxable event. In a cash creation, the liquidity provider exchanges cash for a creation unit of ETF shares. The portfolio manager then puts this cash to work, purchasing securities in the open market while passing back transaction costs to the liquidity provider.

Cash or in-kind, the primary market provides a critical outlet for fixed-income ETF liquidity, allowing liquidity providers to tap the deep pocket of issuance and liquidity in the underlying market. This allows liquidity providers the outlet necessary to facilitate sizable ETF trades that require creations or redemptions depending upon the size of the creation/redemption and the right mix of bonds for the portfolio to track its index on any given day.
When creating custom baskets, portfolio managers look to take in bonds that the portfolio is underweight vs the index (creation) and deliver out bonds that the portfolio is overweight (redemption) in an effort to minimize expected tracking error in the portfolio. In a sense, each custom creation/redemption is an opportunity for the portfolio manager to rebalance the portfolio to the index without having to incur transaction costs inside the portfolio. Moreover, it is important to note that the negotiated bonds included in the custom basket are booked at the index closing value, which is the NAV valuation point, and therefore there is no cost charged to the fund as a result of an in-kind trade.

**Secondary market liquidity**

An additive layer of liquidity that the fixed income ETF provides over its underlying market liquidity is the secondary market. This is the volume that is traded on and off the exchange. As natural buyers and sellers match off, liquidity providers become less reliant on the primary market (creation / redemption) to hedge their ETF trades with clients. With less reliance on the primary market the need to transact in the underlying bonds is diminished, reducing transaction costs for the end client.

As shown in the chart above, based on the trading data from Bloomberg over the past three years, the ratio of weekly secondary market activity (exchange volume) to primary market activity (absolute value of creation/redemption activity) in an illustrative Emerging Markets ETF has averaged over 5:1. This means that for every $40 Million of the ETF traded on exchange, on average $32 Million is netted between buyers and sellers in the secondary market, and only $8 Million of high yield corporate bonds needed to be traded on a typical day via the primary market creation/redemption process. This reduces costs of transacting in the underlying market (paying underlying bid/ask spreads) and these cost savings are passed on to the ETF investor via price improvement (tighter bid/ask spreads) versus the underlying market.

Figure 8 highlights this price improvement in an intra-day snapshot over a 3-day period on a different illustrative High Yield ETF. The HY ETF trades with an average bid/ask spread of 4bps, while its underlying basket of high yield bonds trades ~70bps wide. The ETF price fluctuates between the underlying portfolio bid/ask spread based on the imbalance of buyers and sellers in the ETF on any given day. As buyers outstrip sellers, liquidity providers need to create shares of the ETF and in doing so will need to buy bonds in the underlying market at their offer prices. Hence as buyers outstrip sellers and the chance of a creation increases, the ETF price floats to a premium towards the offer prices on its underlying bonds.
Understanding fixed income ETF premiums and discounts

The intra-day snapshot of the above example also helps to explain premiums and discounts in fixed income ETFs. When assessing the premium/discount for an ETF, we compare the ETF's price to its net asset value (NAV). The NAV of an ETF represents the value of each share's portion of the fund's underlying assets and cash at the end of the trading day. The key to an accurate assessment of an ETF's premium/discount is the pricing methodology for its NAV.

The first point to consider is if the ETF's end-of-day NAV is priced from the bid, mid, or offer prices on its underlying portfolio. Typically, fixed income ETFs price their NAVs to the mid or bid, but this must be known to appropriately compare two different ETFs apples to apples.

Referencing the example in Figure 8, we can see that the ETF's intra-day NAV (mid prices) would be halfway between the portfolio bid/offer. On the first day, the ETF started the session trading at a premium, as sellers began outweighing buyers, liquidity providers began pricing in the cost of redeeming the ETF shares and the ETF closed at a discount on the day. That said, if the ETF had marked its NAV to the bid prices on its underlying bonds the product would have appeared to trade at a premium throughout the entire session.

On any given day, one could expect a mid-marked fixed income ETF to trade within a premium/discount band of ½ the underlying market bid/ask spread.

However, on some occasions fixed income ETF premiums/discounts may stray outside of this expected range. One could see this as a potential arbitrage opportunity, however, competition in the ETF market making community has accelerated in the last five years and these opportunities are typically exploited within seconds of observation. Digging further in to the NAV pricing methodology, we can see why fixed income premium/discounts may fall outside the expected range.

The reverse is true as sellers outstrip buyers and liquidity providers price in the cost of redeeming ETF shares and selling the underlying bonds at their bid prices. As long as the ETF is trading inside the underlying portfolio's bid/ask, the investor is better off buying the ETF rather than the underlying securities in the portfolio. This price improvement has been a key driver for institutional adoption of fixed income ETFs.
During periods of reduced fixed income market liquidity, ETFs may act as a price discovery vehicle.

![Figure 9: Daily trades of U.S. corporate bonds](image)

*Source: SEC bond market liquidity study 2018*

Given the OTC nature of bond markets, it is unlikely there will be a traded price for each bond in the ETF’s underlying portfolio every day. In fact, according to a SEC bond market liquidity study in 2018, only 20% of corporate bonds trade on any given day. In many cases this leads to stale bond prices being used when calculating an ETF’s end of day NAV. Pricing agents attempt to assess fair value prices for these underlying bonds to more accurately reflect the ETF’s NAV.

Although there has been vast improvement in the technology and methodology for fair-valuing bonds, these fair valued prices tend to be conservative and lag market moves. As a result, the fair-valued fixed income ETF NAV tends to be stale and lag the actionable ETF price as seen with the ETF in the example of Figure 10. In these instances, many fixed income ETFs become the price discovery vehicle for their underlying markets.
Fixed income ETFs during periods of market stress

Now that we have examined the mechanics of fixed income ETFs, it is time to look at a common question that surrounds fixed income ETF space. Is there an issue wrapping a potentially illiquid basket of OTC securities in a liquid wrapper that trades intraday on exchange?

This concern by the ETF investor is logical and mainly derives from the liquidity mismatch between the underlying bonds and the open ended nature of ETFs. In literature, “liquidity mismatch” occurs when a product offer more liquidity and tighter bid-offer spread than the underlying assets that are usually difficult to trade. For fixed income ETFs, the existence of liquidity mismatch is partly explained by the difference in market structure between ETFs and Cash Bonds. While ETFs quote and trade continuously like an equity in a transparent and efficient way, bonds trading is less transparent, less efficient and less accessible. As we have seen in the previous sections, bonds quotes are not firm and trades are infrequent and often not disclosed publicly.

Normal behaviour of ETF markets reflects a balance of buyers and sellers transacting shares of the fund on an exchange. In the extreme scenario where all volume of the ETF is either made up of buyers or sellers then creations or redemptions would be the sole outlet for liquidity. This would create heavy reliance on the liquidity in the underlying bond market. Thus, at a minimum, the fixed income ETF is only as liquid as its underlying bonds and investors should set their worst-case liquidity expectations from this lens. That said, the scenario described above is uncommon.

Although this worst-case scenario is possible, historically we have not seen secondary market volumes skew 100% to the buy or sell side even in times of significant market stress. For example, over the past five years an average of 83% of the volume traded in high yield ETFs was natural buyers and sellers matching off on exchange without causing a high yield bond to be traded⁵.

In times of market distress like we saw in Q4 of 2018, when high yield markets fell nearly 4.5%, high yield ETF trading can become more one directional. Trading activity significantly skewed to the sell side and only 43% of the volume traded in U.S. was natural buyers and sellers matching off. Thus, although fixed income ETF investors should frame their liquidity expectations in line with the underlying market, historically the secondary market still provides an incremental layer of liquidity in times of stress.

This is also confirmed by the ETFs and Bond Funds subcommittee of the SEC’s Fixed Income Market Structure Advisory Committee. In their report on the Design of Exchange-Traded Funds and Bond Funds, they indicate that “there is no evidence that fixed income funds have had liquidity problems in a limited number of scenarios including the collapse of Third Avenue Fund (2015), the Taper Tantrum (2013) and the Flash Crash (2010)⁶”. The report confirm indeed that ETFs have generally served as vehicles of price discovery and the ratio of secondary to primary volume rises in stress times as buyers and sellers interact on organized exchanges.

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¹ Source: Bloomberg L.P., from April 1, 2014 to March 31, 2019.
² See Section 3.2 of the “Report on the Design of Exchange-Traded Funds and Bond Funds”.

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This is confirmed when looking at the high yield market in 2018 when we observed considerable volatility in high yield ETFs with negative returns and large outflows relative to assets under management. According to the commission, funds in stressed periods experienced elevated secondary exchange volumes, elevated listed options activity, and premiums/discounts in line with price discovery and bid-ask spreads of underlying bonds.

**Figure 12: High Yield ETFs trading volume during market sell-offs**

This stems from the diversity of the investor base transacting in these ETFs. For example, retail investors may see the market decline as a risk off signal and sell high yield ETFs for investment grade or treasury exposure. At the same time, hedge funds may see a buy the dip opportunity, insurance companies may have duration matched a liability with the high yield ETF and have no consideration for the short-term volatility.

This diversification creates competing opinions and reduces the likelihood of one directional secondary market volume in the fixed income ETF. This diversity of client base has become more prevalent in the last 5 years as institutional ownership of fixed income ETFs has grown by 23% annually since 2014.

As a first layer of defence, we have discussed how even in times of stress there is typically volume trading on the exchange in the ETF that is balanced between buyers and sellers. This incremental layer of liquidity has helped diffuse pressure in sell-offs.
The second layer of defence is redemption optionality (even when secondary market liquidity vanishes and 100% of the fixed income ETF volume traded is selling). The ability to facilitate in-kind redemption for ETFs can help diffuse the pressure in sell-offs as the ETF portfolio manager do not have to liquidate the underlying bonds and return cash to the investors. Rather, he/she will deliver a basket of bonds to the authorized participant in exchange of ETF shares. In these high stress cases, liquidity providers (when presented with a basket of high yield bonds to sell) have the choice to sell those bonds or hold them on their books and hedge the risk with a credit derivative (CDX). The liquidity provider can then wait for the market to stabilize before offloading the bonds. This optionality for liquidity providers offers a secondary mechanism for diffusing pressure in times of market stress that we do not observe in other investment structures outside of ETFs.

In sum, investors should frame their liquidity expectations for a fixed income ETF in line with the liquidity of its underlying securities. Secondary market liquidity is fluid, not static, and exchange volume can be heavily skewed to the sell side in times of stress, increasing reliance on the liquidity of the underlying bonds. Historically, the secondary market has still provided an incremental layer of liquidity over the underlying market even in times of fixed income market stress. Under a challenged liquidity scenario where secondary market liquidity is reduced, the optionality that the in-kind redemption process offers to fixed income ETF liquidity providers helps improve liquidity over other investment vehicles in the space.

Key takeaways
- Consider the liquidity of an ETF’s underlying securities
- Secondary market trading has traditionally provided an incremental layer of liquidity
- Periods of market stress can skew volume to the sell side of both the ETF and underlying securities
- The ETF in-kind redemption process helps to improve fixed income liquidity during periods of market stress

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