

# U.S. High Yield Index Trading: The Kinetic Chain of High Yield Liquidity

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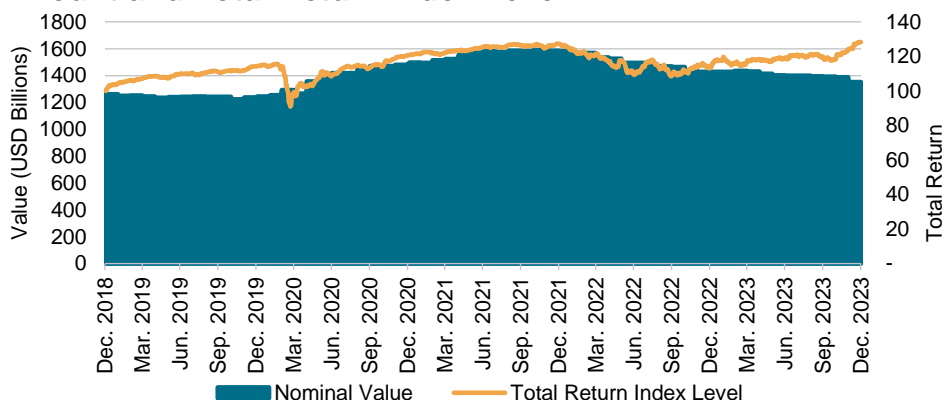
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## Executive Summary

The high yield bond market is fragmented in nature and primarily trades over the counter. Each bond carries unique credit risk, coupons, maturities, optionality and levels of liquidity. Bilateral trades introduce counterparty risk, which investors consider in addition to the credit analysis of high yield bond issuers.

High yield indices reflect the high yield market and aid investors with price discovery. For instance, as measured by the iBoxx® USD High Yield Developed Markets Index, we can understand that the notional size of the USD high yield bond market has grown by only 6.5% over the past five years, to approximately USD 1.4 trillion, while delivering an aggregate total return of 28.2% over the same five-year period.

### Exhibit 1: iBoxx USD High Yield Developed Markets Index Par Amount and Total Return Index Level

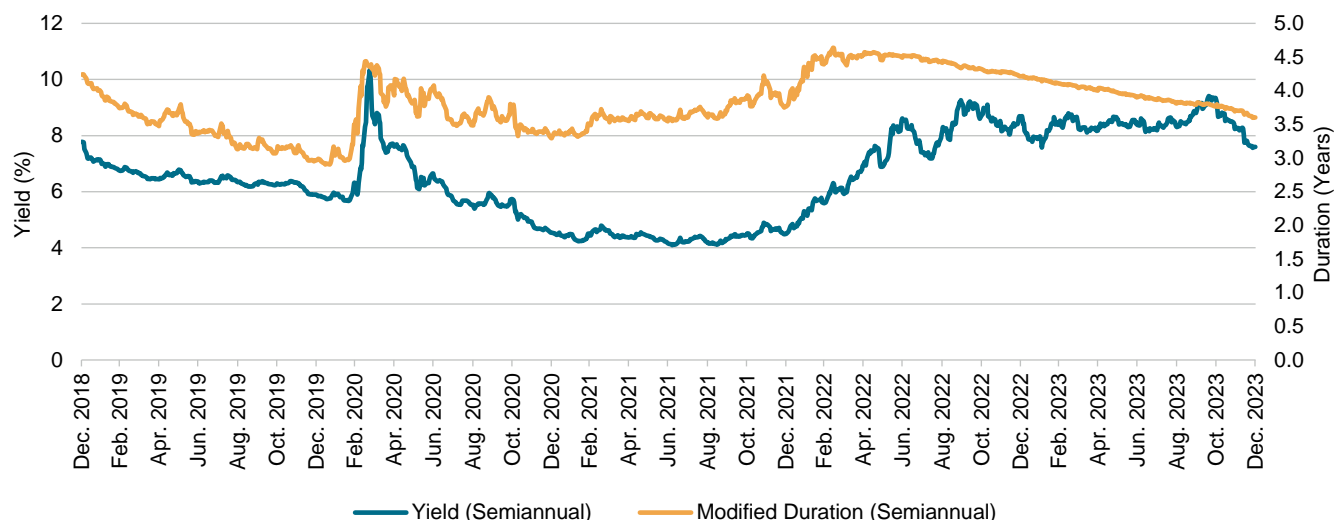


Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

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We can also understand that, with a yield of 7.6% and a duration of 3.6 years as of Dec. 31, 2023, USD high yield bond yields are approximately 100 bps higher than the prior five-year average, while index duration is 0.2 years lower than the five-year average. This detail helps summarize the overall market in single point figures, creating clarity from the noise.

## Exhibit 2: iBoxx USD High Yield Developed Markets Index Yield and Duration



Source: S&P Dow Jones Indices LLC, [iBoxx Bond & Loan Indices](#). Data as of Dec. 31, 2023. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

High yield indices help enable understanding of these and other market characteristics because they include risk/return statistics at the index level and underlying bond level published daily, along with static data such as rating, sector and maturity breakdowns. Bond prices fuel daily index calculations, so reliable pricing that powers high yield indices is paramount. The Pricing Team of the S&P Global Market Intelligence division provides component pricing for the iBoxx USD Liquid High Yield Index and CDX High Yield, including end-of-day and intraday pricing. Pricing is determined by several factors, including executed trades, dealer quotes, banks' books of record and model inputs like issuer curves and comparable assets. The pricing process is overseen by expert pricing analysts who cover specific markets and who review the algorithmic pricing process.

This pricing visibility informs index-tracking tradeable products, like ETFs, futures, total return swaps and swaps on credit default swap indices. Options markets linked to such instruments provide investors with new ways to trade high yield credit volatility. Each instrument becomes an additional source of market color for investors, which drives greater market efficiency, including for those who do not trade index-linked products.

So, high yield indices help standardize and describe the market. At the same time, high yield index-tracking tradeable products provide high yield investors with ways to trade and invest

according to these standard definitions. Tradeable high yield index products have evolved to primarily trade within a centrally cleared framework, which mitigates counterparty risk.

# Cash or Credit

The iBoxx USD Liquid High Yield Index and CDX High Yield Index have revolutionized how investors access the high yield market. Both indices are designed to be suitable reference points for tradeable products, which they do by tracking the market while prioritizing the liquidity of selections. However, they differ in their approach to market representation and weighting methodologies. The iBoxx USD Liquid High Yield Index employs a market cap-weighted approach focusing on liquid bonds. It includes a cap on issuer concentration, ensuring a broad representation of the high yield corporate bond market. In contrast, the CDX High Yield offers a unique perspective through its equal-weighted approach to credit default swaps on a fixed set of 100 North American entities, providing a distinct measure of credit risk.

## Exhibit 3: iBoxx and CDX Liquid High Yield Index Rules Comparison

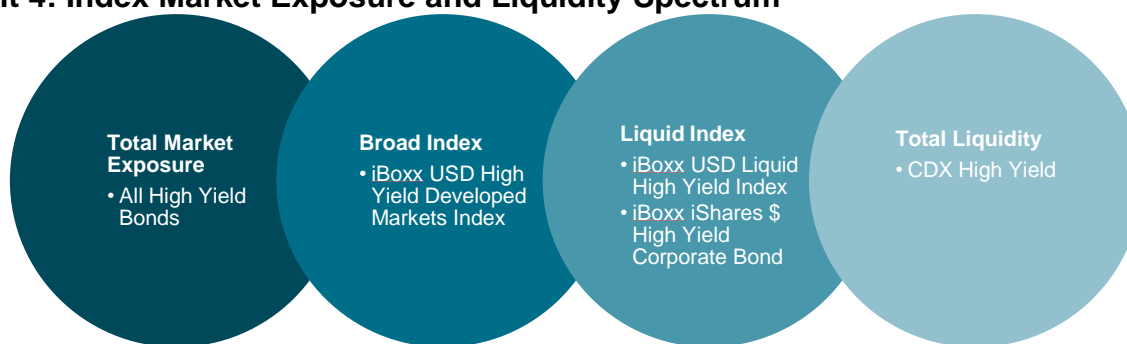
Feature	iBoxx USD Liquid High Yield Index	CDX High Yield
<b>Type</b>	Bond index	Credit default swap (CDS) index
<b>Composition</b>	High yield corporate bonds	Basket of high yield CDS on North American issuers
<b>Liquidity</b>	Focuses on liquid bonds	Most liquid CDS contracts and bond issuers
<b>Market Representation</b>	Represents the broader high yield bond market	Represents the credit risk of high yield issuers
<b>Pricing</b>	Based on bond prices	Quoted in price level (points upfront)
<b>Weighting</b>	Market cap weighted with a 3% issuer cap	100 fixed entities, each equal weighted at 1%
<b>Rebalancing Frequency</b>	Monthly	Semiannually
<b>Geographic Exposure</b>	Global, focus on U.S., developed markets	Primarily North American issuers

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2023. Table is provided for illustrative purposes.

# iBoxx USD Liquid High Yield Index Construction for Tradeable Products

Indices are created along a spectrum from total market exposure on one end, including all possible bonds in each category, to total market liquidity, where index inclusions are limited to highly liquid instruments, even if the universe is so narrow as not to reflect the investor’s investment universe. Our indices navigate this divide, seeking the ideal balance on the spectrum given the intended purpose of the index.

## Exhibit 4: Index Market Exposure and Liquidity Spectrum



Source: S&P Dow Jones Indices LLC. Chart is provided for illustrative purposes.

Active fund managers often choose broad market indices, like the iBoxx USD High Yield Developed Markets Index, because they broadly represent an opportunity set while incorporating liquidity parameters.

High yield indices intended as the basis for tradeable products tilt more toward the liquidity end of the spectrum versus broad market indices. However, to be representative of the high yield market, their risk/return characteristics must be nearly identical to broad market benchmarks. Additional liquidity characteristics tend to enable more efficient tracking, reinforcing liquidity and trade efficiency in the index-based tradeable instruments. Exhibit 5 compares key rule sets of the iBoxx USD Liquid High Yield Index to the iBoxx USD High Yield Developed Markets Index, to demonstrate criteria that distinguish an index with additional liquidity provisions from a broad high yield index.

We can see that in moving from the “broad” to the “liquid” index, the minimum amount outstanding per bond is doubled and unique issuer size criteria are introduced. Lockout and minimum run criteria are also introduced to minimize unnecessary composition changes in the index, which would trigger undo trading activity in tradeable products looking to replicate the index.

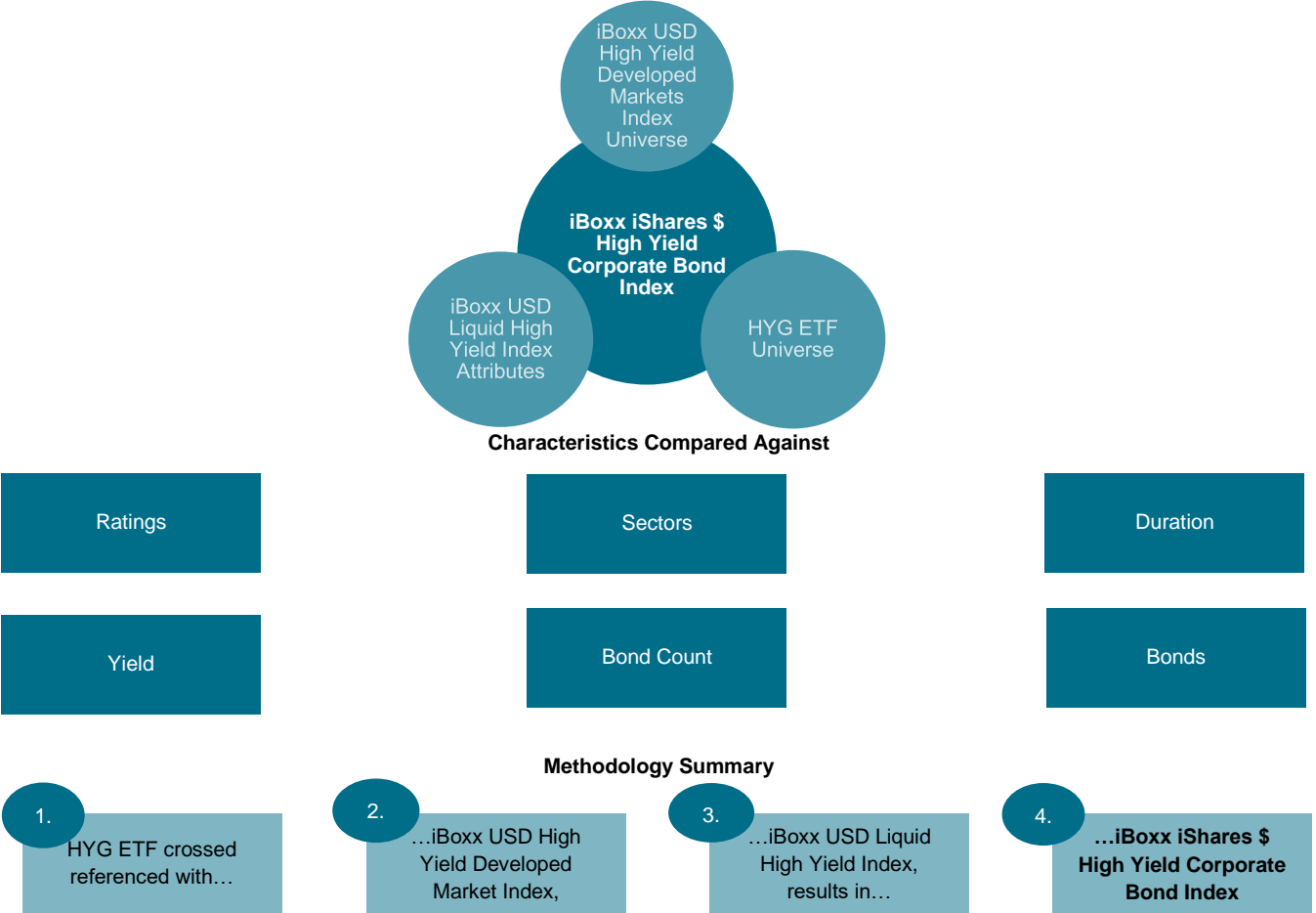
## Exhibit 5: iBoxx USD High Yield Index Rule Comparison

Rule	iBoxx USD High Yield Developed Markets (Broad)	iBoxx USD Liquid High Yield (Liquid)
<b>Amount Outstanding</b>	USD 200 million	USD 400 million
<b>Issuer Size</b>	-	USD 1 billion
<b>Issuer Cap</b>	-	3%
<b>Lockout Period</b>	-	3 months
<b>Minimum Run</b>	-	6 months
<b>Time to Maturity</b>	12 months	12 months, 18 months for new insertions

Source: S&P Dow Jones Indices LLC, [iBoxx Bond & Loan Indices](#). Data as of Dec. 31, 2023. Table is provided for illustrative purposes.

Another unique example of a “liquid” index is the iBoxx iShares \$ High Yield Corporate Bond Index, a novel index designed as a basis for listed futures products. The index is rebalanced monthly to match the holdings of an ETF based on the index (HYG ETF). Specifically, the index uses the common bonds within the iBoxx USD High Yield Developed Markets Index and the HYG ETF portfolio to form the index. This new index is then compared against the iBoxx USD Liquid High Yield Index to ensure its characteristics closely match those of the benchmark. The elements are compared across ratings, sectors, duration, yield, bond count and bonds.

**Exhibit 6: iBoxx iShares \$ High Yield Corporate Bond Index Construction**



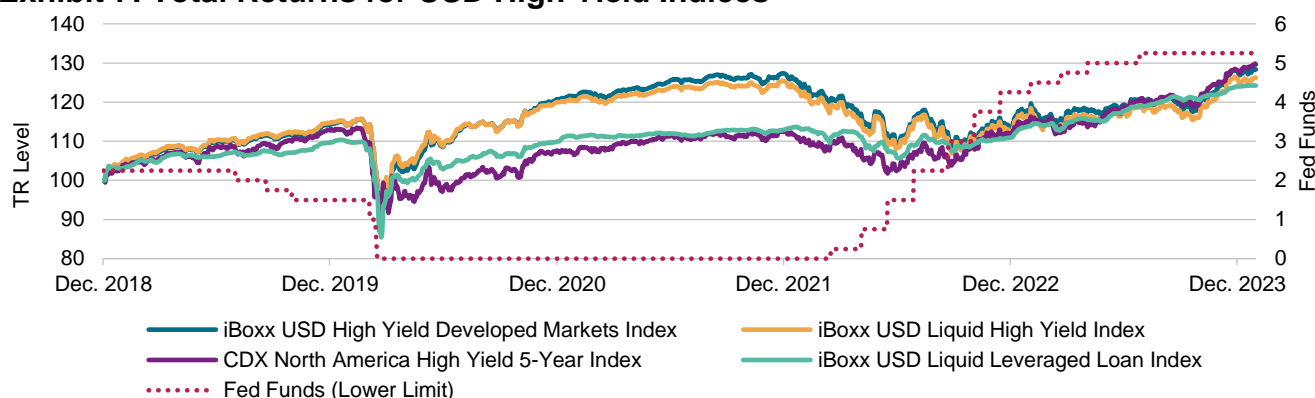
Source: S&P Dow Jones Indices LLC. Chart is provided for illustrative purposes.

The rules for the CDX High Yield go further toward the liquidity end of the spectrum, where entity changes are primarily determined based on observed trading volumes in the credit default swap and cash bond markets. The index is designed to ensure sector exposures that roughly approximate the cash market. However, liquidity is the key driver. Further, the CDX High Yield includes a fixed 100 entities, each equally weighted at 1%, to cutoff inclusions after the 100 most liquid names that meet the index criteria.

One might ask, what level of tracking error to the iBoxx USD High Yield Developed Markets Index is introduced when moving further toward the liquidity end of the spectrum? As we'll explore later in the paper, it turns out very little and potentially less than the trading costs associated with “non-liquid” bonds (that is, bonds in the “broad” index that are not in the “liquid” index). Before examining liquidity effects, let's gauge the historic performance impact from moving from broad to liquid indices.

From the start of 2019 through Jan. 31, 2024, performance was comparable across iBoxx USD High Yield Indices, while performance lagged for the CDX High Yield when rates dropped to zero with the impact of COVID-19. This makes sense, given the CDX High Yield is a pure spread product, while iBoxx Indices were positively affected by their duration exposure when rates fell. The CDX High Yield ended the period slightly outperforming the other indices, as cash bonds suffered in proportion to their duration exposure with the sharpest rate increases in decades.

### Exhibit 7: Total Returns for USD High Yield Indices



Source: S&P Dow Jones Indices LLC, [iBoxx Bond & Loan Indices](#), [iBoxx Indices Web \(ihsmarkit.com\)](#), Federal Reserve Bank of St. Louis. (n.d.) Upper Bound of the Federal Funds Target Range [DFEDTARU]. FRED, Federal Reserve Bank of St. Louis. <https://fred.stlouisfed.org/series/DFEDTARU>. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

We can see that moving from the broad iBoxx Index to the liquid iBoxx Index results in an annualized performance decrease of 0.35% and an increase of 0.69% in annualized volatility. This likely reflects the liquidity premium, given the liquid index focuses on more liquid bonds. Additionally, the broad index includes bonds that trade less frequently and, therefore, could see less frequent markings, dampening volatility.

**Exhibit 8: Risk/Return Profile of iBoxx and CDX USD High Yield Indices**

Metric	iBoxx iShares \$ High Yield Corporate Bond Index	iBoxx USD Liquid High Yield Index	iBoxx USD High Yield Developed Market Index (Broad)	CDX North America High Yield 5-Year Index
Annualized Return (%)	4.64	4.72	5.07	5.29
Volatility (%)	7.63	7.60	6.91	9.19
Sharpe (0 Rates)	0.61	0.62	0.73	0.58
Max Drawdown (%)	-21.79	-21.75	-21.40	-20.63
Max Drawdown Date	March 23, 2020	March 23, 2020	March 2, 2020	March 23, 2020

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2023. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Risk characteristics are comparable across iBoxx Indices, with the iBoxx USD Liquid High Yield Index having an 8 bps lower option-adjusted spread and 0.06 years lower effective duration than the broad iBoxx USD High Yield Index. Upon review, we see in Exhibit 9 that the iBoxx USD Liquid High Yield Index matches the return/risk metrics with nearly half the number of bonds as the broad Index.

**Exhibit 9: iBoxx USD High Yield Indices - Summary Risk Characteristics**

Risk Characteristics	iBoxx iShares \$ High Yield Corporate Bond Index	iBoxx USD Liquid High Yield Index	iBoxx USD High Yield Developed Market Index
Option-Adjusted Spread	367	374	386
Effective Duration	3.24	3.23	3.29
Number of Bonds	1,142	1,147	1,917
Yield-to-Worst (Semiannual)	7.55	7.60	7.72

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2023. Table is provided for illustrative purposes.

Daily return correlations across iBoxx USD High Yield Indices were all greater than 99.5%, demonstrating the potential ability of liquid indices to offer comparable risk/return characteristics to broad benchmark exposure while accounting for underlying bond liquidity. The CDX High Yield correlations are lower given the pure credit focus of CDX.

**Exhibit 10: Daily Return Correlations of iBoxx and CDX USD High Yield Indices**

Correlations	iBoxx \$ iShares High Yield Corporate Bond	iBoxx USD Liquid High Yield Index	iBoxx USD High Yield Developed Market	CDX North America High Yield 5-Year
iBoxx iShares \$ High Yield Corporate Bond	100.00%	-	-	-
iBoxx USD Liquid High Yield Index	99.99%	100.00%	-	-
iBoxx USD High Yield Developed Market	99.64%	99.67%	100.00%	-
CDX North America High Yield 5-Year	73.13%	73.14%	71.70%	100.00%

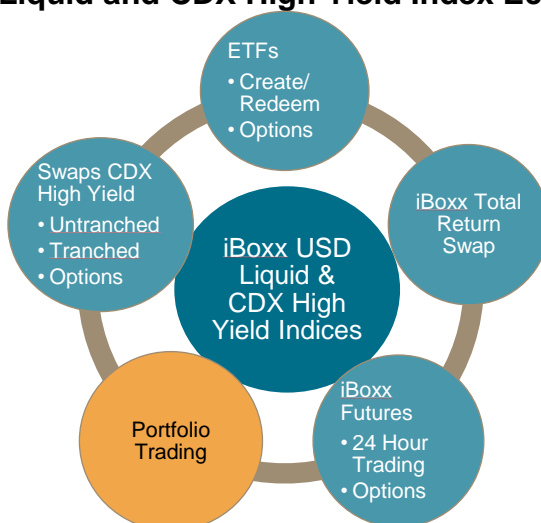
Source: S&P Dow Jones Indices LLC, [iBoxx Bond & Loan Indices](#), [iBoxx Indices Web \(ihsmarkit.com\)](#). Data as of Dec. 31, 2023. Table is provided for illustrative purposes.

Now that we've established the approximate risk/return profile equivalence of liquid to broad high yield indices, let's turn to the tradeable ecosystem that has developed around the liquid high yield indices.

## Liquid High Yield Index Ecosystem

The iBoxx USD Liquid High Yield Index and CDX High Yield are central to a diverse set of financial tools that cater to various facets of the high yield market. These tools, which include ETFs, futures, swaps and options, form an ecosystem that enables investors to access and navigate the high yield space effectively. They represent investment avenues and serve as instruments for strategies like hedging and liquidity management, making them indispensable in the high yield trading environment.

### Exhibit 11: iBoxx USD Liquid and CDX High Yield Index Ecosystem



Source: S&P Dow Jones Indices LLC. Chart is provided for illustrative purposes.

## Electronification

Index-tracking tradeable instruments, like ETFs and futures, trade via an exchange, resulting in continuous pricing and reduced counterparty risk via central clearing.

The CDX High Yield Index also trades in an exchange-like manner. Continuous pricing on the swaps that track the CDX High Yield are available via swap execution facilities. The swaps on the indices are also centrally cleared, which reduces counterparty risk. Taken together, price transparency and reduced operational risk promote market efficiency and may reduce systemic market risk.



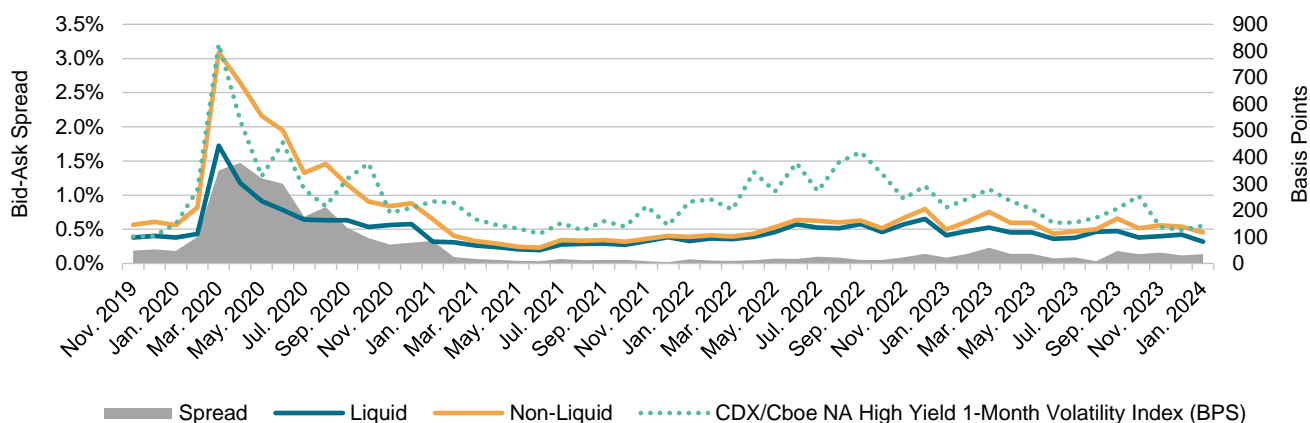
# High Yield Market Liquidity

## Liquid versus Non-Liquid iBoxx High Yield Bonds

Before examining the liquidity of tradeable index tracking products, let's first look at the liquidity of the bonds within the iBoxx USD Liquid High Yield Index versus the broad index—specifically, the bonds within the liquid Index versus those in the broader iBoxx USD High Yield Developed Markets Index that are not in the liquid Index (“non-liquid” bonds).

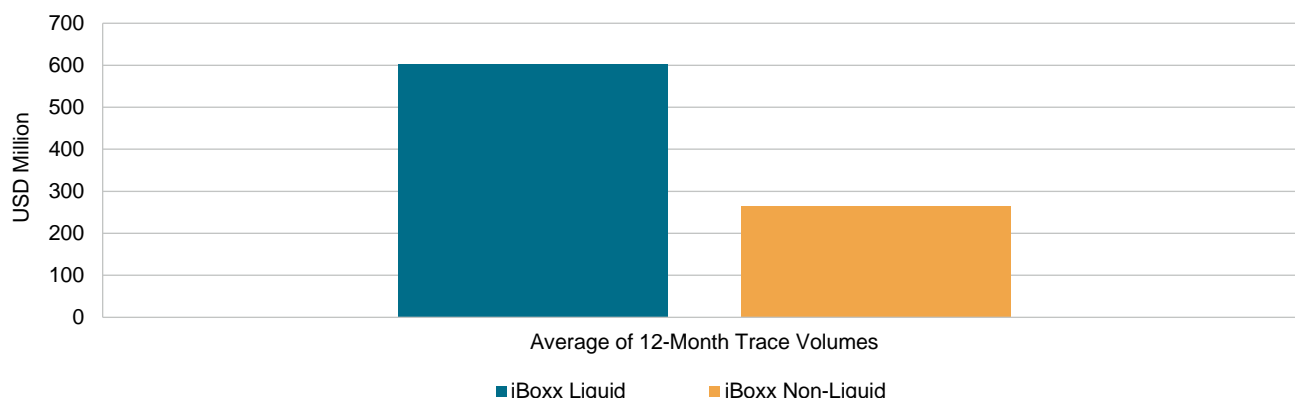
From the start of January 2020 through Jan. 31, 2024, the bid-ask spread percentage of liquid bonds versus non-liquid bonds was 0.48% vs. 0.73%, respectively, indicating an overall 0.25% lower cost for liquid bonds during the period. Further, the cost savings of liquid versus non-liquid bonds increased in periods of volatility. When the CDX/Cboe North America High Yield 1-Month Volatility Index (BP Volatility) was above average, the bid-ask spread percentage differential went to 0.46%.

### Exhibit 12: Tighter Bid-Ask Spreads in iBoxx \$ High Yield Liquid versus Non-Liquid Bonds



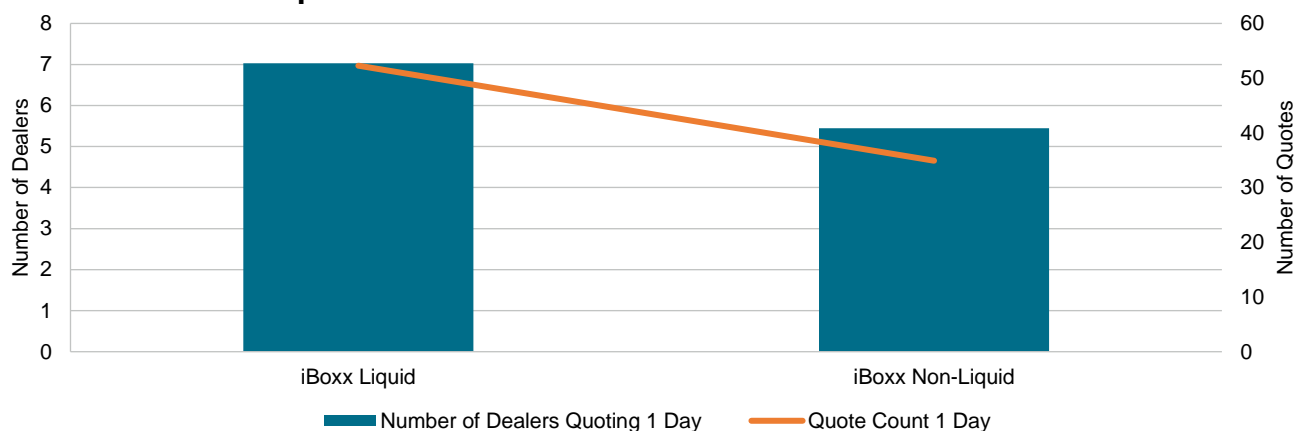
Source: S&P Dow Jones Indices LLC, [iBoxx Bond & Loan Indices](#), [Credit VIX - Indices](#) | [S&P Dow Jones Indices \(spglobal.com\)](#). Data as of Jan. 31, 2024. Chart is provided for illustrative purposes.

In addition to bid-ask spreads, trading volumes can be an essential indicator of the ability to trade in size. Looking at 2023 Trade Reporting and Compliance Engine (TRACE) volumes, individual liquid bonds traded 2.3 times more than non-liquid bonds (approximately USD 602.7 million versus USD 264.7 million, respectively).

**Exhibit 13: Average 2023 TRACE Volumes Per iBoxx High Yield Bond**

Source: S&P Dow Jones Indices LLC, [iBoxx Bond & Loan Indices](#), TRACE (Trade Reporting and Compliance Engine) service, operated by the Financial Industry Regulatory Authority (FINRA). Data as of Jan. 31, 2024. Chart is provided for illustrative purposes.

In addition to TRACE volumes, which reflect actual trading activity, liquidity is generally measured by the number of dealers quoting an instrument and the volume of quotes they provide to the market as measured by S&P Global Market Intelligence. On Dec. 29, 2023, the year's final trading day, liquid bonds received an average of 52 quotes from 7 dealers, compared to non-liquid bonds, which received an average of 35 quotes from 5.4 dealers. This difference highlights the greater market depth and liquidity for liquid bonds.

**Exhibit 14: Dealer Depth and Quote Count**

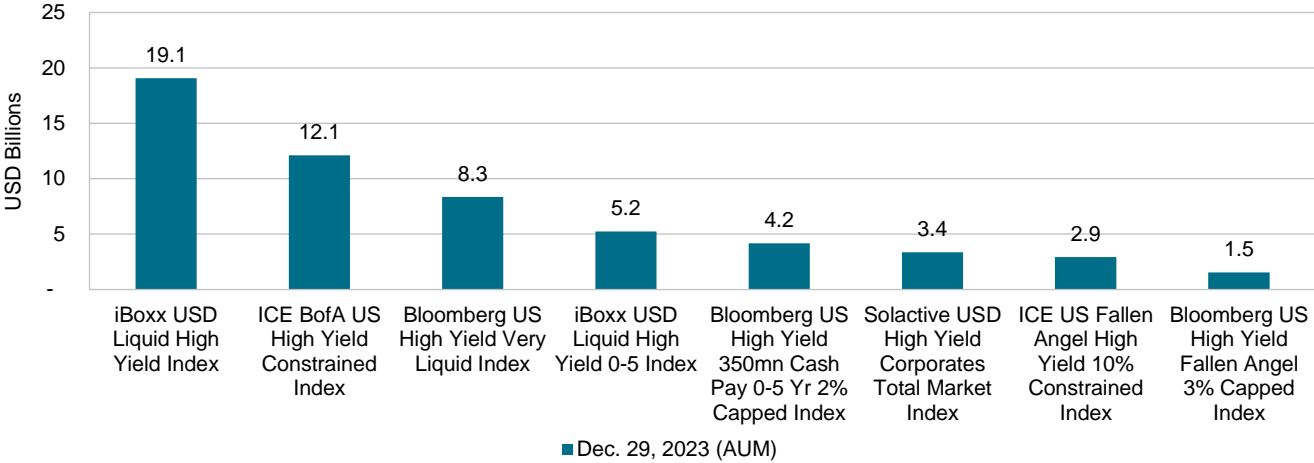
Source: S&P Dow Jones Indices LLC, S&P Global Market Intelligence Pricing Team. Data as of Dec. 29, 2023. Chart is provided for illustrative purposes.

## Optimizing Trade Efficiency in USD High Yield ETFs: An iBoxx Index Insight

We'll next delve into the liquidity metrics for U.S. high yield bond ETFs, specifically those with assets under management (AUM) above USD 1.5 billion as of the end of 2023. We will focus on ETFs corresponding to unique USD high yield indices from different index providers. When

comparable indices from the same provider are available, we will only consider the one with the higher AUM for clarity and relevance in our assessment.

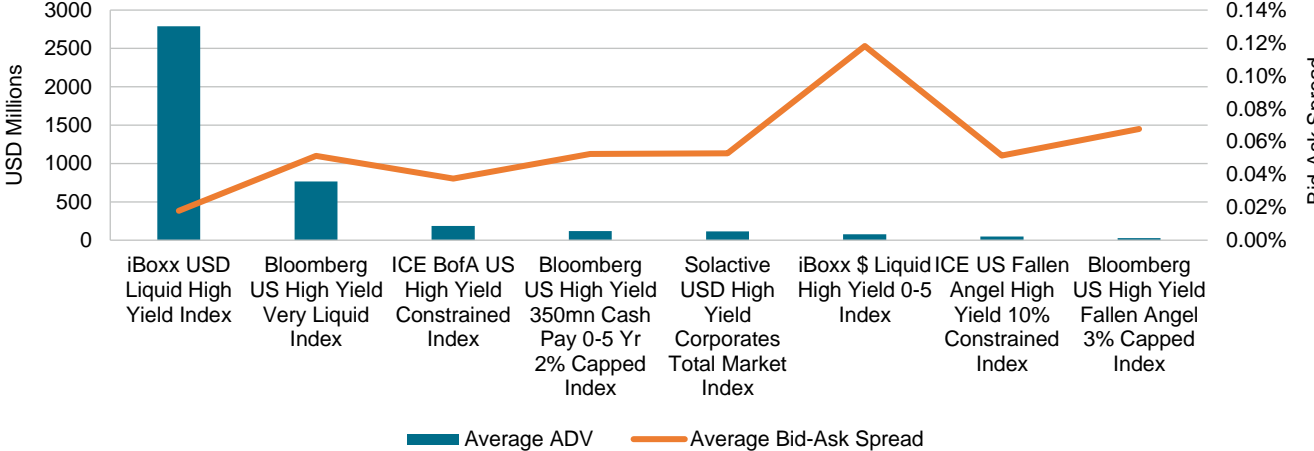
Exhibit 15: Indices Underlying the Largest USD High Yield ETFs



Source: FactSet Company/Security Analysis Tool. Data as of Dec. 29, 2023. Chart is provided for illustrative purposes.

The significance of substantial trading activity in enhancing trade efficiency is evident when examining the iBoxx USD Liquid High Yield Index. ETFs tracking this index demonstrated an average daily volume (ADV) for 2023 of USD 2.8 billion, marking the highest ADV among all ETFs in the study. This trading activity is 3.7 times greater than the second-most-traded index. Additionally, in 2023, the iBoxx USD Liquid High Yield Index exhibited the lowest bid-ask spread at 1.8 bps, which is 2.1 times lower than the ETF with the second-lowest bid-ask spread. This data underscores the superior trade efficiency of the iBoxx USD Liquid High Yield Index.

Exhibit 16: Liquidity on Indices Underlying Largest USD High Yield ETFs



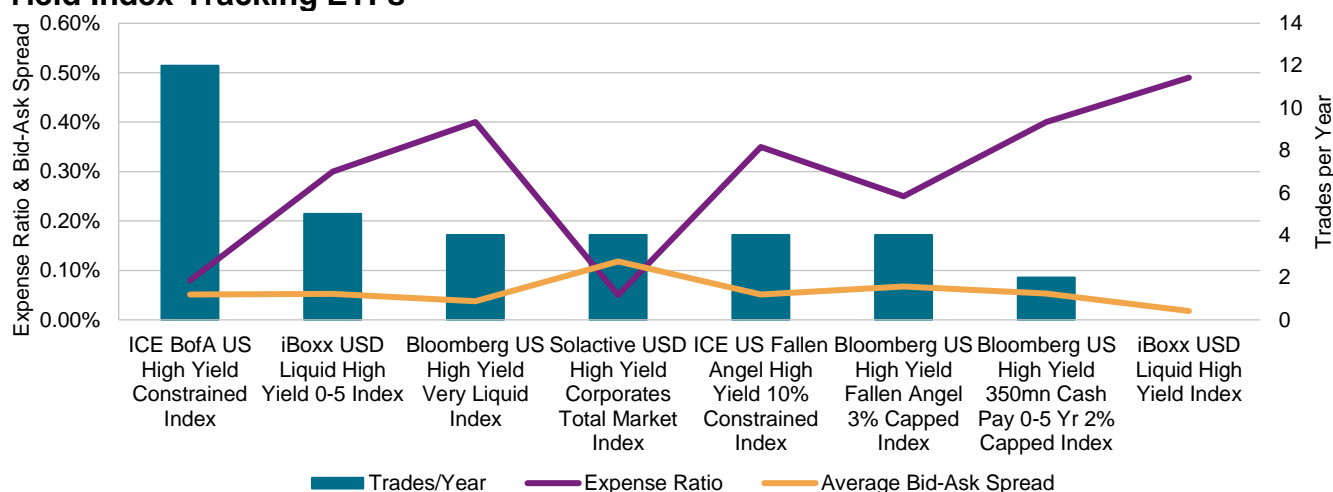
Source: S&P Dow Jones Indices LLC, FactSet Company/Security Analysis Tool. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes.

By analyzing the 2023 bid-ask spread percentages and total expense ratios for ETFs tracking U.S. high yield indices (IBOXHY), we can theorize the number of trades per year at which trading in the iBoxx USD Liquid High Yield Index becomes more cost-effective than trading in ETFs tracking other USD high yield indices. The formula can represent this:

$$N \times BA(\text{non IBOXHY Index } (i)) + TER(\text{non IBOXHY Index } (i)) \\ = N \times BA(\text{IBOXHY}) + TER(\text{IBOXHY})$$

Where N is the number of trades per year, BA is the bid-ask spread percentage, and TER is the annual total expense ratio. Our analysis indicates that beyond 12 trades per year across funds, costs to trade in ETFs linked to the iBoxx USD Liquid High Yield Index are potentially lower. It's also important to consider the ADVs per fund as the bid-ask spreads are based on realized trading activity, and significant trade sizes will impact trade efficiency.

### Exhibit 17: Index-Tracking High Yield ETF Cost Efficiency Threshold to iBoxx \$ High Yield Index-Tracking ETFs

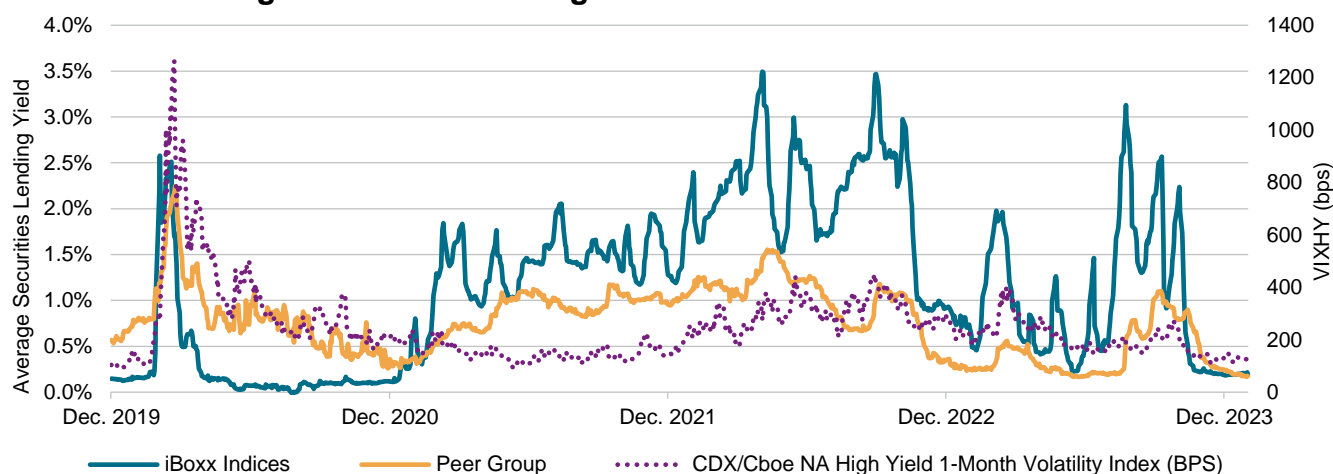


Source: S&P Dow Jones Indices LLC, FactSet Company/Security Analysis Tool. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes.

## Enhancing Yield through Securities Lending: An iBoxx Index Advantage

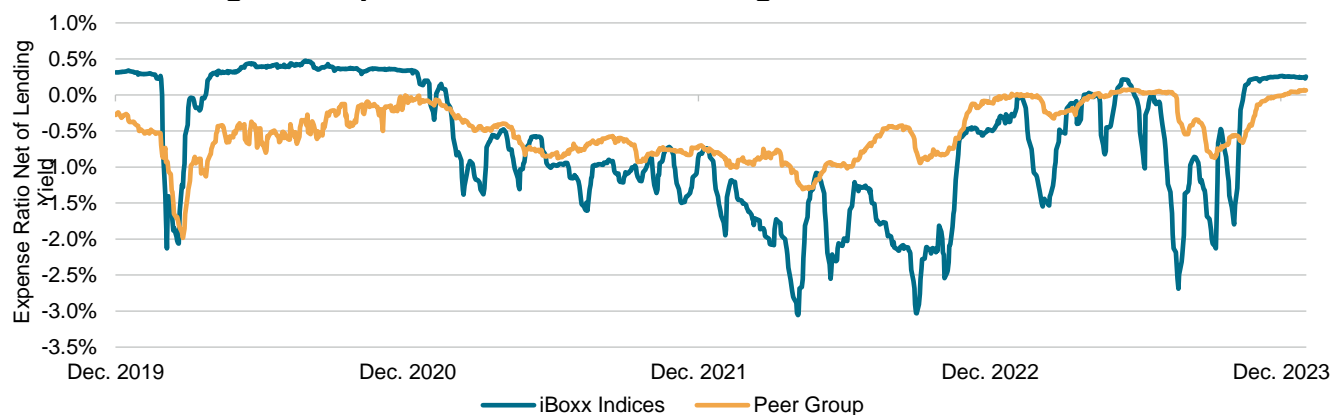
We undertook an examination of the securities lending yield institutions potentially receive from lending shares in the ETFs under study. We divided the results into two groups: those linked to iBoxx Indices and those not.

From January 2020 through Jan. 31, 2024, the average lending yield for ETFs linked to iBoxx USD Liquid Indices was 1.16%, compared to 0.76% for non-iBoxx linked ETFs.

**Exhibit 18: Average Securities Lending Yield for Institutions**

Source: S&P Dow Jones Indices LLC, FactSet Company/Security Analysis Tool, S&P Global Securities Finance. Data as of Jan. 31, 2023. Chart is provided for illustrative purposes.

Further analysis allowed us to calculate a net weighted expense ratio for each group, which considers the weighted average lending yield inflows against the weighted average total expense ratios. The iBoxx High Yield group's net weighted expense ratio, after accounting for lending yield, was -0.71% over the period, while the non-iBoxx group's was -0.51%. These results demonstrate that while securities lending can potentially enhance yield across all high yield bond ETFs, the benefit for this period was greater for those tracking iBoxx High Yield Indices.

**Exhibit 19: Weighted Expense Ratio Net of Lending Yield**

Source: S&P Dow Jones Indices LLC, FactSet Company/Security Analysis Tool, S&P Global Securities Finance. Data as of Jan. 31, 2023. Chart is provided for illustrative purposes.

**U.S. High Yield Index Tradeable Product Trading Volumes**

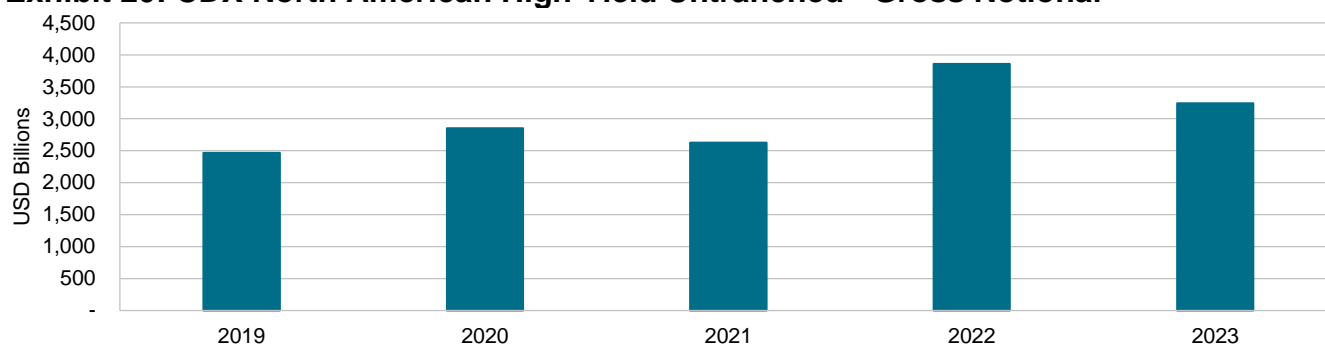
As the market has developed and new trading tools have emerged—from high yield ETFs and CDX High Yield, to standardized total return swaps, and most recently futures and the development of liquid options markets—liquidity has proved to be accretive across all products,

as measured by greater trading volumes across index-tracking tradeable instruments. Further, volumes tended to spike in most volatile periods, providing market liquidity when investors needed it most. Notably, 2020 and 2022 were exceptionally volatile years in recent history, while both years notched record high volumes across most tradeable index products.

### CDX North American High Yield Untranched - Gross Notional

Volumes in untranched swaps on CDX North American High Yield were down 16% year-over-year, to USD 3.2 trillion in 2023. However, 2022 was a record-setting year. Untranched volumes were the second highest on record and were up 23% versus 2021.

#### Exhibit 20: CDX North American High Yield Untranched - Gross Notional

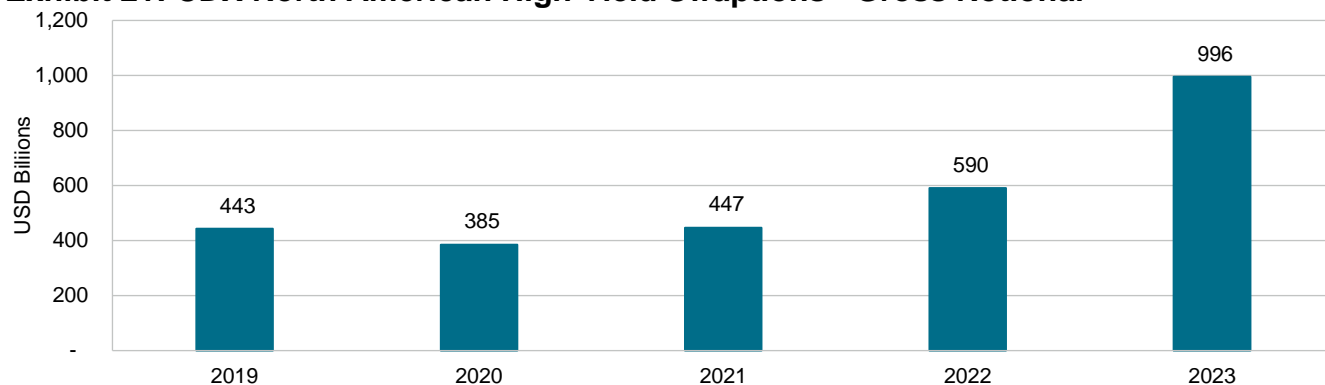


Source: DTCC. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes.

### CDX North American High Yield Swaptions - Gross Notional

Swaption trading on CDX North American High Yield grew 69% year-over-year to a record USD 996 billion in annual volume, representing 123% greater than 2021 activity.

#### Exhibit 21: CDX North American High Yield Swaptions - Gross Notional

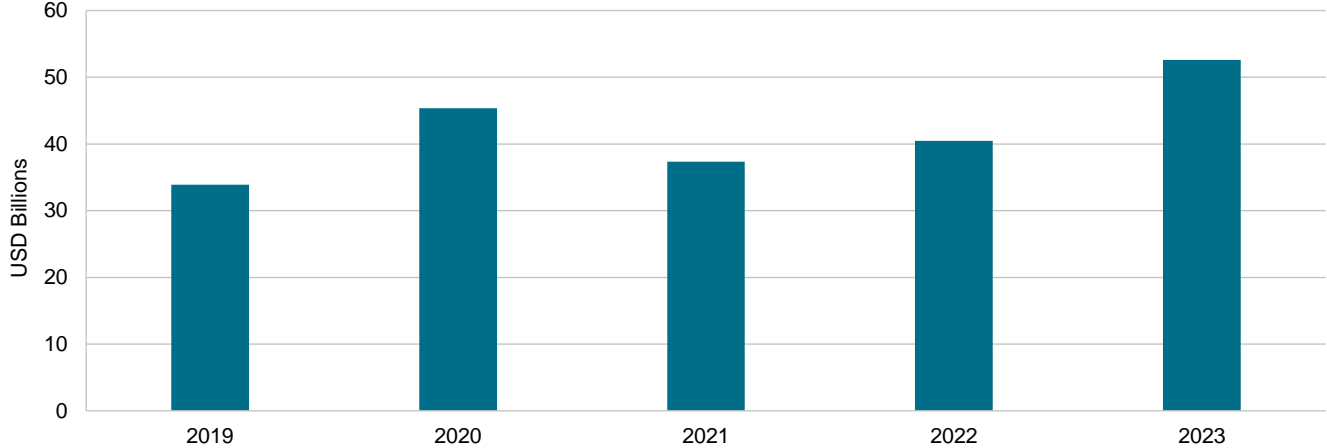


Source: OSTTRA. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes.

### CDX North American High Yield Tranchied - Gross Notional

Tranchied volumes also set new highs, growing by 30% year-over-year to USD 52.6 billion.

**Exhibit 22: CDX North American High Yield Tranchied - Gross Notional**

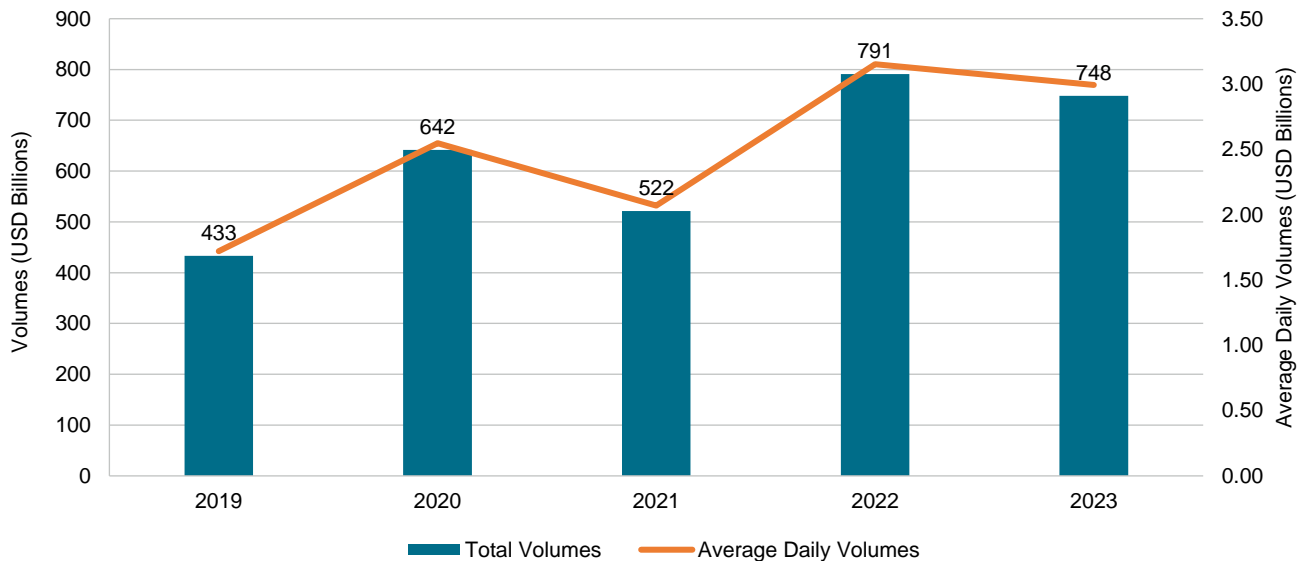


Source: DTCC. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes.

### iBoxx USD Liquid High Yield Index – ETF Volumes

Volumes in ETFs linked to the iBoxx USD Liquid High Yield Index were down 5.5% year-over-year; however, like many other tradeable index products, 2022 was a record-setting year. Looking at a longer period, volumes in 2023 were up 43.4% versus 2021 and 72.5% versus 2019.

**Exhibit 23: iBoxx USD Liquid High Yield Index - ETF Volumes**

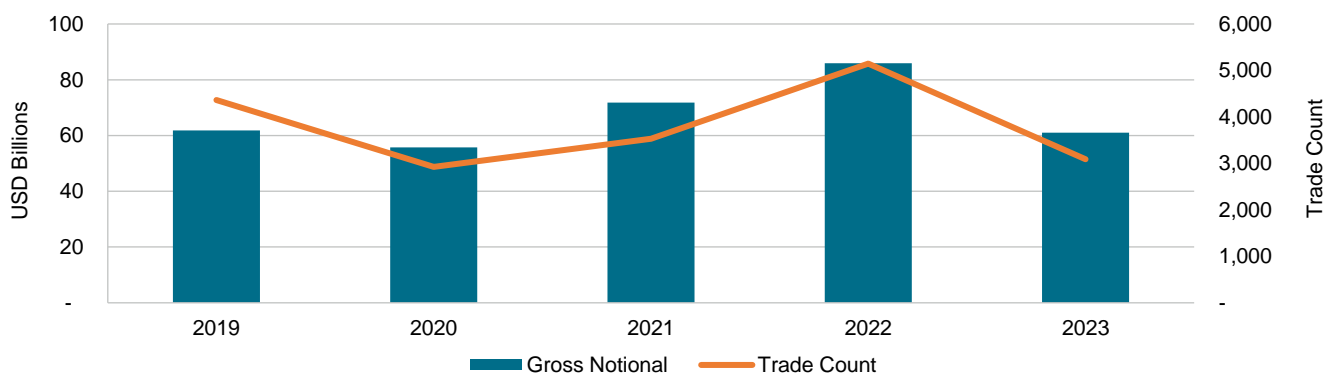


Source: BlackRock, Bloomberg. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes.

## iBoxx USD Liquid High Yield Index – Standardized iBoxx Total Return Swap Volumes

Standardized iBoxx Total Return Swaps linked to the iBoxx USD Liquid High Yield Index were down 29.1% year-over-year to USD 61 billion and were essentially flat over the past five years.

### Exhibit 24: iBoxx USD Liquid High Yield Index – Standardized iBoxx Total Return Swap Volumes



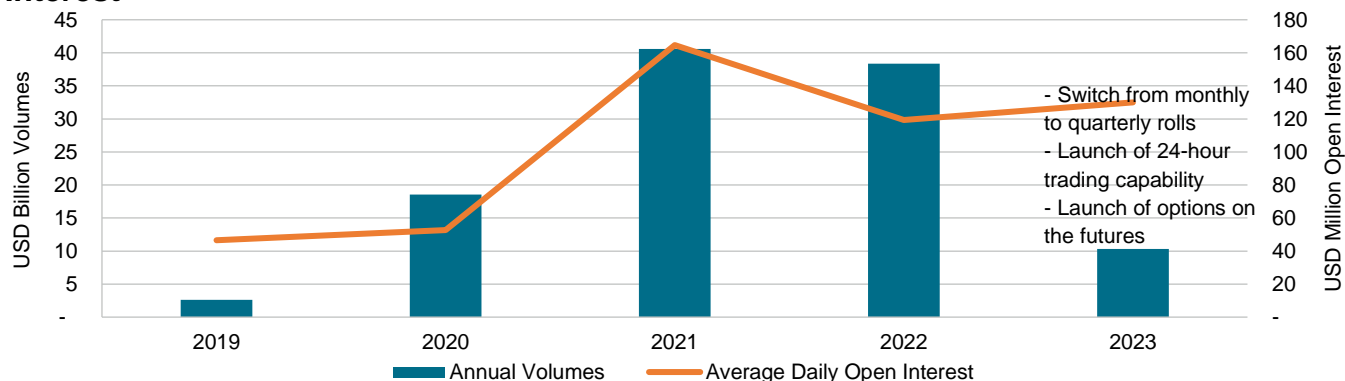
Source: DTCC. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes.

## iBoxx iShares \$ High Yield Corporate Bond Index

### Futures Volumes and Open Interest

Futures volumes linked to the iBoxx iShares \$ High Yield Corporate Bond Index fell to USD 10.3 billion in 2023. However, this 73.1% decline was partly driven by the switch in settlement frequency from monthly to quarterly to be more in line with the most active derivatives traded on other credit indices. This is evidenced by the 8.9% year-over-year average daily open interest increase to USD 130 million. Other market changes in 2023 included listing options on futures tracking the iBoxx Index and an expanded 24-hour trading window.

### Exhibit 25: iBoxx iShares \$ High Yield Corporate Index - Futures Volumes and Open Interest



Source: Cboe Global Markets. Data as of Dec. 31, 2023. Chart is provided for illustrative purposes.



## Bid-Ask Spread Percentage

The Bid-Ask Spread percentage reflects realized trading costs and is, therefore, a key measure of trade efficiency. When we look at the bid-ask spreads of tradeable products linked to USD high yield indices versus individual liquid high yield bonds, we observe that tradeable index products exhibit considerably lower bid-ask spreads.

### Exhibit 26: Cross Product Bid-Ask Spreads

Instruments	Underlying Index	2023 Average Bid-Ask Spread <sup>1</sup>
<b>Index Constituent Bonds</b>	iBoxx USD Liquid High Yield Index	38.2 bps
<b>ETFs</b>	iBoxx USD Liquid High Yield Index	1.8 bps
<b>Swaps on iTraxx/CDX Indices</b>	CDX North American High Yield	3.3 bps
<b>iBoxx Total Return Swaps</b>	iBoxx USD Liquid High Yield Index	30 bps
<b>iBoxx Futures</b>	iBoxx iShares \$ Investment Grade Corporate Bond Index	6.8 bps

Source: S&P Dow Jones Indices LLC, S&P Global Market Intelligence Pricing Team, FactSet Company/Security Analysis Tool. Data as of Dec. 31, 2023. Table is provided for illustrative purposes.

## Concluding Perspectives on High Yield Index Trading

The advent of index-tracking tradeable products has unlocked novel tools for high yield investors. Swaps on the CDX High Yield offer a solution for trading pure credit exposure, and they can be used by investors with a view on credit who do not have a view on interest rates. Options on high yield bond ETFs and CDX High Yield swaptions provide new ways to potentially manage or trade high yield credit volatility. These tools are further complemented by innovative measures such as the CDX/Cboe NA High Yield 1-Month Volatility Index, which distills expected credit volatility into a single figure.

The plethora of index-tracking tradeable tools has led to robust relative value trading activity, which sharpens price efficiency as investors capitalize on arbitrage opportunities to correct market inefficiencies.

From a risk management standpoint, liquidity, idiosyncratic and default risks are perennial concerns. As we've explored in the paper, index-based tradeable products stand out for their liquidity and trade efficiency, with index tools offering a means of mitigating liquidity risks.

<sup>1</sup> For the CDX High Yield, the table reflects the bid-ask spreads for the five-year tenor of the on-the-run series of the index. For iBoxx Total Return Swaps, the table reflects the bid-ask spreads for iBoxx Total Return Swap contracts maturing within the next three months.

Finally, trading via index-based tradeable instruments offer operational efficiency. Instead of the daunting task of individually trading over 1,000 high yield bonds, investors can achieve diversified market exposure through a single transaction. This efficiency preserves value and underscores the importance of index design as a balance between liquidity and comprehensive market coverage.

In conclusion, the USD high yield market has evolved significantly, with index-tracking tradeable instruments playing a pivotal role. Tradeable indices, at the forefront of this evolution, have expanded market access, enabled new investment strategies and helped redefine the risk management landscape.

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