

Integrating AXI & FXI in Asset Management: A Practical Guide

IOSCO-aligned credit spread reference benchmarks for SOFR



Contents

[Executive Summary](#)

[Compliance with IOSCO Principles for Financial Benchmarks](#)

[Reviewing the Suitability of the CDS Market for this Use Case](#)

[Overview of Use Cases for AXI and FXI:](#)

1. [Enhancing Credit Spread Sensitivity in Fixed Income Portfolios](#)
2. [Credit Spread Hedging and Risk Management](#)
3. [Supporting SOFR-Based Floating Rate Products](#)
4. [Benchmarking and Performance Evaluation](#)
5. [Credit Market Stress and Scenario Analysis](#)
6. [Informing Asset Allocation Decisions and Economic Market Stress Indicators](#)
7. [Enhancing Credit Sensitivity in Exchange-Traded Funds](#)

[Historical Performance of the Benchmarks](#)

[Brief analysis of Benchmark Performance by Alex Roever](#)

[Conclusion](#)

[Our People](#)

[Resources](#)

[References](#)

[About Sofr.org](#)

[Disclaimer](#)

Executive summary

This document provides a guide for asset managers on how to utilize the IOSCO-aligned credit-spread reference benchmarks, AXI® (U.S. Bank Across-the-Curve Credit Spread Index) and FXI® (Financial Conditions Credit Spread Index), particularly in the context of the post-LIBOR financial environment. These indices, first conceived by Berndt, Duffie & Zhu (2023), provide real-time, transaction-based credit spread measures, offering asset managers enhanced transparency, stability, and efficiency in managing credit risk across various sectors.

These two indices offer a reliable forward-looking measure of credit spreads based on actual market transactions in both short-term and long-term debt instruments. Independent research by Cooperman, Duffie, Luck, Wang and Yang (2024) shows that usage of a credit sensitive reference element such as AXI or FXI enhances the efficiency, transparency and stability of U.S. financial markets.

AXI and FXI are calculated and published each business day at approximately 9AM ET, using the prior day's transaction data. The indices are accessible via Bloomberg (tickers: AXIUNS & FXIUNS) and LSEG Data & Analytics (RICs: .IIAXI & .IIFXI).







On January 30, 2025, [H. Rodgin Cohen](#) (Senior Chair of Sullivan & Cromwell LLP) hosted an industry discussion regarding the implementation of AXI & FXI which was attended by certain large asset managers underscoring the need for further discussion regarding the application of these reference credit spreads for non-bank financial institutions which in part prompted the development of this document.

This document, which should be read in combination with the [User's Guide to AXI & FXI](#), outlines several key use cases where AXI and FXI can be integrated into asset management strategies. These indices can enhance portfolio management, risk assessment, and investment decision-making processes, particularly for leading asset managers. We invite market participants to share any additional use cases or applications for AXI and FXI that may not be covered in this document.

In connection with the role of a credit-sensitive supplement for SOFR, a [letter](#) from U.S. financial regulators encouraged market participants to engage with the producers of alternative reference rates, reinforcing the importance of this dialogue. We welcome your insights – share your feedback at axi@sofr.org to contribute to this ongoing discussion.

Compliance with IOSCO Principles for Financial Benchmarks

It is important to note that an independent review by [IBM Promontory](#) concluded that both AXI and FXI are compliant with relevant IOSCO Principles for Financial Benchmarks, which ensures that they are robust, transparent, and resistant to market manipulation. This compliance reinforces the reliability of these indices as benchmarks for assessing credit conditions in the current financial landscape. With this in mind, they are ideal tools for asset managers seeking to integrate comprehensive, credit-sensitive measures into their investment and risk management strategies.

IOSCO Principle	AXI Determination	FXI Determination
Benchmark Design	Fully Implemented 	Fully Implemented 
Data Sufficiency	Fully Implemented 	Fully Implemented 
Transparency of Benchmark Determinations	Fully Implemented 	Fully Implemented 

Source: IBM Promontory (2024)

Reviewing the suitability of the CDS market in this case

The Credit Default Swap (CDS) market, while a useful tool for credit risk management in many contexts, cannot be directly used in the case of AXI and FXI for several reasons. Berndt, Duffie & Zhu (2023) state that current CDS trade volumes would not allow for the creation of a sufficiently robust index that is suitable for heavy derivatives applications. AXI and FXI are based on a wide range of actual market transactions, including corporate bonds (FXI) and other unsecured debt, offering a comprehensive, market-based measure of credit spreads that reflect general credit market conditions, not just default risk.

Additionally, the CDS market can be less liquid and more sensitive to issuer-specific events, making it less reliable as a broad-based benchmark compared to the robust, transaction-based approach used by AXI and FXI. The AXI/FXI indices are also designed to be resistant to manipulation and always reflect the evolving funding costs of banks (AXI) and broader market participants (FXI) in a way that is not captured by the CDS market. Therefore, AXI and FXI provide a more accurate and applicable measure for bank lenders, portfolio managers and risk professionals seeking a comprehensive view of credit conditions across various maturities.

Furthermore, the design of AXI and FXI swaps align closely with SOFR swaps in terms of reset dates, notional amounts, and other characteristics, providing a more accurate and seamless match for banks and market participants. In contrast, using CDS would likely lead to less precision and a less efficient way to manage exposure to credit spreads. Finally, the group of U.S. Regional banks who [requested](#) the development of credit spread supplement for SOFR for usage in revolving credit facilities may not have the desire to reference a CDS index. In connection with the NY Fed's Credit Sensitivity Group Workshops, one private sector firm developed and launched a credit spread index based on CDS data which was subsequently withdrawn.

Overview of Use Cases for AXI and FXI

AXI and FXI offer asset managers the tools they need to better understand and navigate the complexities of credit markets, particularly in times of financial stress, enhancing portfolio performance and risk management strategies. The indices are sufficiently robust for usage in a wide variety of applications, including heavy derivatives usage, without the risk of statistical corruption or manipulability.



Use Case 1: Enhancing Credit Spread Sensitivity in Fixed Income Portfolios

Objective: To manage credit risk and optimize yield in portfolios with exposure to corporate and bank debt.

- **AXI (U.S. Bank Across-the-Curve Credit Spread Index):** AXI measures the average credit spread for U.S. banks, which is particularly valuable for fixed-income portfolios holding bank debt. It provides a real-time, transaction-based measure of U.S. bank funding costs, which are crucial for understanding the broader credit risk in portfolios.
 - **Use Case:** Asset managers with holdings in bank debt or financial sector debt can use AXI to track the credit spread movement in real-time, adjusting their portfolio to mitigate potential widening of spreads or increasing exposure to bank debt if credit conditions are favorable.
 - **Implementation:** AXI can serve as a benchmark for assessing the performance of a portfolio relative to broader credit market movements, allowing asset managers to adjust duration, credit quality, and sectoral exposures based on changing credit conditions.

- **FXI (Financial Conditions Credit Spread Index):** FXI expands the scope to include non-bank financial intermediaries (NBFIs) and corporate debt. This is useful for portfolios with more diversified credit exposures across various sectors.
 - **Use Case:** For diversified fixed-income portfolios (e.g., those containing both bank and corporate bonds), FXI provides a more comprehensive measure of credit conditions. Asset managers can use FXI to assess the broader financial market conditions and adjust portfolio allocations across sectors as credit spreads widen or tighten.
 - **Implementation:** FXI's broader exposure makes it a useful indicator for asset managers looking to hedge against systemic credit risk, as it can provide early signals of financial stress across the corporate sector and the NBFI space.

Use Case 2: Credit Spread Hedging and Risk Management

Objective: To hedge credit spread risk and manage exposure to credit market volatility.

- **AXI and FXI as Hedging Tools:** Both AXI and FXI can be used to hedge credit spread risk. Asset managers can use these indices in conjunction with derivatives like credit default swaps (CDS), interest rate swaps, or credit-linked notes to hedge against widening credit spreads that could affect the value of their portfolios.
 - **Use Case:** If a portfolio holds a significant amount of bank debt or other credit-sensitive instruments, and an asset manager expects widening credit spreads (for example, due to economic stress or regulatory changes), AXI can be used to hedge that risk. Similarly, FXI can be used to hedge broader corporate credit exposure, particularly when the risk is related to non-bank financial institutions or a diverse mix of sectors.
 - **Implementation:** Asset managers can enter into derivative contracts that reference AXI or FXI, aligning their hedging strategy with the anticipated movements in credit spreads. This can help reduce volatility in portfolios during periods of market uncertainty.

Use Case 3: Supporting SOFR-Based Floating Rate Products

Objective: To incorporate AXI and FXI with SOFR in floating rate debt and structured products.

Asset managers typically do not issue floating rate notes (FRNs) directly. Instead, they primarily act as investors in floating rate debt issued by corporations, banks, or governments. However, asset managers may create and manage funds or portfolios that invest in FRNs, such as floating rate bond funds or money market funds. These funds are designed to provide exposure to floating rate debt instruments, which adjust their interest payments based on prevailing market interest rates, often tied to a benchmark like SOFR.

- **SOFR + AXI or FXI for Floating Rate Notes:** As asset managers look to incorporate SOFR into floating-rate debt products, they can enhance these products by adding a credit spread component based on AXI or FXI. This is particularly useful in environments where credit spreads are a significant contributor to total returns.
 - **Use Case:** Asset managers can invest in or offer floating-rate notes (FRNs) or structured products that reference both SOFR and AXI/FXI. By adding AXI or FXI to the base SOFR rate, the product reflects the cost of credit, providing a more comprehensive view of the cost of borrowing in credit markets.
 - **Implementation:** These products would reference SOFR (for the interest rate) plus either AXI or FXI (for the credit spread). This can be done using either an “in-advance” structure (averaging the rate prior to the interest period) or an “in-arrears” structure (averaging over the current interest period). The addition of a credit spread allows asset managers to offer products that are more reflective of the true market conditions.

Use Case 4: Benchmarking and Performance Evaluation

Objective: To improve benchmarking against credit-sensitive performance indicators.

- **AXI as a Benchmark for Bank Debt:** AXI provides a benchmark for evaluating the performance of portfolios with exposure to U.S. bank debt. Asset managers can use AXI as a performance reference to determine whether their portfolios are outperforming or underperforming relative to the broader market's credit risk.
 - **Use Case:** For portfolios that invest in U.S. bank debt, AXI serves as a valuable tool for benchmarking returns against the credit spread changes of U.S. banks.
 - **Implementation:** Asset managers can use AXI to evaluate how well their portfolio managers are handling the credit risk associated with bank debt. It also helps assess whether credit spread movements are contributing to returns or causing negative performance.

- **FXI as a Benchmark for Broader Corporate Credit Exposure:** FXI, which includes corporate debt and NBFIs funding transactions, can be used to benchmark a portfolio with significant exposure to these sectors.
 - **Use Case:** If a portfolio has a mix of corporate bonds, asset-backed securities, and NBFIs debt, FXI can act as a performance benchmark to compare the portfolio's relative performance based on the movement of corporate credit spreads.
 - **Implementation:** Using FXI as a benchmark allows asset managers to monitor whether their credit strategies are appropriately aligned with broader market trends and can serve as an indicator of the risk profile of a portfolio relative to the market.

Use Case 5: Credit Market Stress and Scenario Analysis

Objective: To assess potential outcomes under different credit market stress scenarios.

- **Scenario Analysis with AXI and FXI:** AXI and FXI can be used in scenario analysis to assess how portfolios may perform under various market stress scenarios, such as economic downturns, financial crises, or regulatory changes. The movement of these indices during periods of market distress can provide valuable insight into the likely behavior of credit-sensitive instruments in a portfolio.
 - **Use Case:** Asset managers can model the impact of credit spread widening on their portfolios using AXI and FXI to assess risk exposure during adverse credit market conditions. For example, if the AXI spread widens significantly, this could indicate an increase in bank credit risk, which could affect portfolios with bank debt exposure.
 - **Implementation:** Asset managers can conduct stress tests or sensitivity analysis by applying different credit spread scenarios derived from AXI and FXI to assess the potential impact on portfolio performance, providing a clear view of credit risk and allowing for adjustments in strategy.

Use Case 6: Informing Asset Allocation Decisions and Economic Market Stress Indicators

Objective: To use AXI and FXI to guide strategic asset allocation, identify early market stress signals, and make informed investment decisions.

- **AXI and FXI as Economic and Market Stress Indicators:**

AXI and FXI are excellent tools for monitoring economic and financial market stress, as both indices reflect the cost of funding and credit conditions in real-time. These indices can be especially valuable in signaling shifts in market risk sentiment, providing asset managers with early warning signs of systemic stress that could affect asset allocation decisions.

- **Use Case:** If AXI and FXI show signs of rapid widening, it could indicate deteriorating market confidence or financial distress, prompting asset managers to reduce risk exposures (e.g., shifting out of riskier bank or corporate bonds into safer assets like government bonds).
- Conversely, a narrowing of AXI and FXI spreads could signal improving credit conditions, which might prompt an asset manager to increase exposure to credit-sensitive assets, such as corporate bonds or bank debt, to take advantage of potentially improving yields

Use Case 6: Informing Asset Allocation Decisions and Economic Market Stress Indicators (continued)

— Implementation:

- **Strategic Asset Allocation:** AXI and FXI can inform decisions regarding shifts between asset classes. For example, if credit spreads are widening significantly (signaling market stress), an asset manager may choose to reduce exposure to credit-sensitive assets and increase allocations to safer, lower-risk assets (e.g., U.S. Treasuries or cash-equivalents).
- **Tactical Asset Allocation:** On a shorter time horizon, these indices can be used to fine-tune asset allocations, moving assets in and out of sectors or instruments that are more sensitive to credit conditions. For example, a large spread widening might prompt a shift away from financials and into sectors with less exposure to credit risk.
- **Guiding Tactical and Dynamic Shifts in Allocations:**
 - By using AXI and FXI to monitor credit market conditions, asset managers can implement dynamic strategies to adjust their portfolios in response to evolving economic signals. For instance, during periods of heightened market stress or financial volatility, managers can reduce allocations to high-yield or bank debt and increase holdings in safer, more liquid assets. Similarly, during more stable times, they may increase exposure to credit sectors, taking advantage of narrower credit spreads.

Use Case 7: Enhancing Credit Sensitivity in Exchange-Traded Funds

AXI and FXI can be integrated into the construction of credit-sensitive Exchange-Traded Funds (ETFs), particularly those that track corporate bonds, bank debt, or broader fixed income markets. These indices provide a transparent and robust measure of credit spreads, reflecting the cost of funding in both the short-term and long-term unsecured debt markets. Asset managers running fixed income ETFs can use AXI and FXI to better capture the credit risk exposure of the underlying assets. By incorporating these credit-sensitive indices, managers can offer more tailored ETFs that respond to changes in credit market conditions, improving the risk-return profile for investors.

Objective: To manage credit risk exposure and optimize performance in ETFs focused on corporate bonds, bank debt, or diversified fixed-income assets.

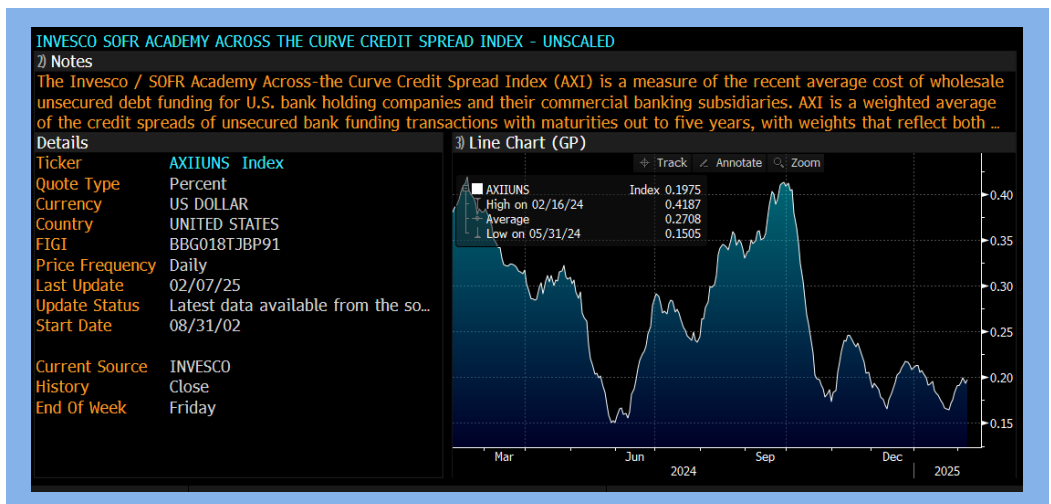
- **AXI:** AXI measures the credit spreads for U.S. banks, offering a detailed view of the marginal cost of funding in the banking sector. This is especially useful for ETFs that track bank debt or the financial sector.
 - **Use Case:** For ETFs focused on financial sector debt, AXI can help asset managers track credit spread movements in real-time. Managers can use this data to adjust portfolio allocations, increasing exposure to bank debt if spreads are narrowing or reducing exposure if spreads are widening, indicating higher credit risk.
 - **Implementation:** AXI can serve as a benchmark for ETFs tracking bank debt, enabling asset managers to adjust sectoral and duration exposures in response to credit conditions in the banking sector.

Use Case 7: Enhancing Credit Sensitivity in ETFs (continued)

- **FXI:** FXI expands its scope to include non-bank financial intermediaries (NBFIs) and corporate debt. This is ideal for ETFs with diversified credit exposure, as it reflects broader credit conditions across financial sectors.
 - **Use Case:** For diversified fixed-income ETFs, such as those with both bank and corporate bonds, FXI provides a broader gauge of credit market conditions. Asset managers can use FXI to monitor the credit environment and adjust allocations across various sectors—such as corporate or NBFI debt—based on changes in credit spreads.
 - **Implementation:** FXI can inform active and tactical ETF strategies, helping asset managers to hedge systemic credit risks and respond proactively to financial market stress by rebalancing sector weights or adjusting maturity profiles.

AXI historical performance

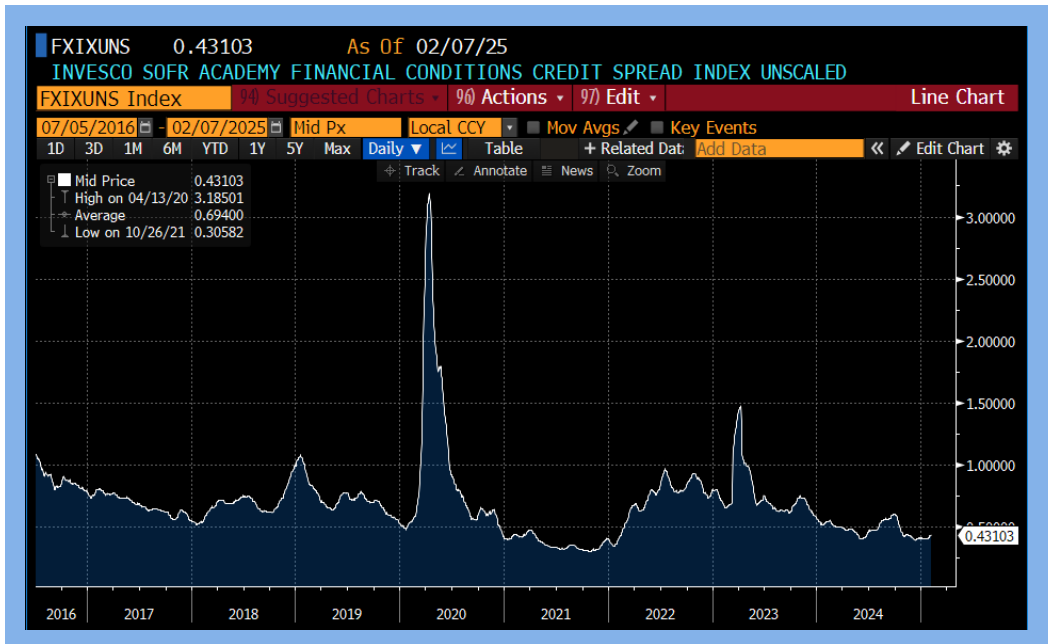
USD Across-the Curve Credit Spread Index (AXI). AXI is, by definition, highly correlated with banks' contemporaneous marginal costs of funds.



Source: Invesco Indexing via Bloomberg

FXI historical performance

USD Financial Conditions Credit Spread Index (FXI). FXI follows the same methodology as AXI, but the underlying transactions are expanded beyond banks to include all financial institutions as well as corporate funding transactions



Source: Invesco Indexing via Bloomberg

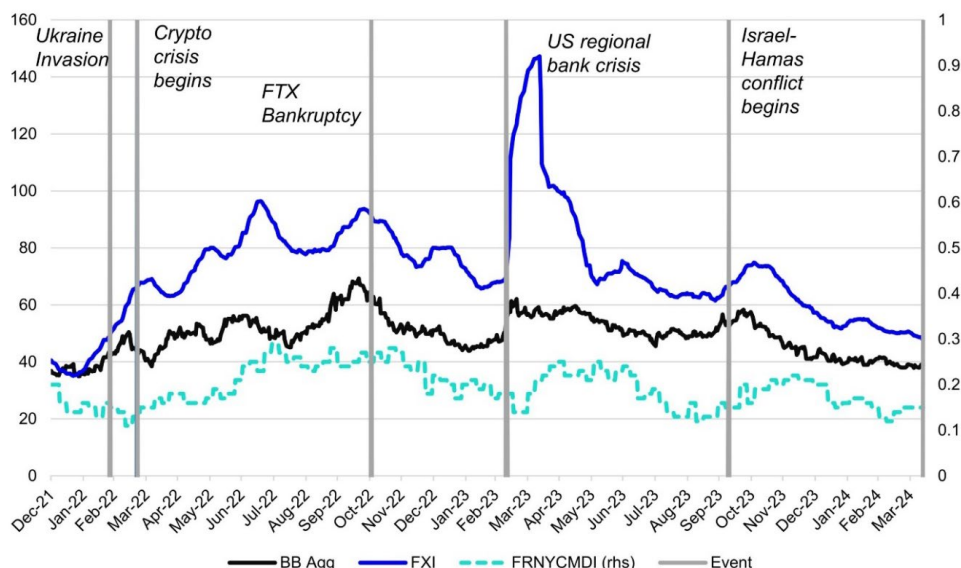
Brief analysis of Benchmark Performance by Alex Roever

In a 2024 market [insight](#), ‘How do AXI and FXI reflect market and geopolitical risks?’ former JP Morgan Head of U.S. Rates Strategy, Alex Roever, notes that AXI and FXI tend to be more responsive to changes in actual market conditions than mark-to-model alternatives. The chart below recaps the performance of several credit market indicators. The data shown demonstrate similar, but not identical responses across these metrics. The difference between the Bloomberg Aggregate and FXI is notable because of FXI’s greater sensitivity to events. This behavior makes sense given that the Aggregate index includes non-credit asset classes including US Treasuries and Agency MBS which tend to attract assets during times of credit stress. Because FXI is based exclusively on investment grade credit it is a cleaner measure of credit stress.

Another aspect of FXI that adds to its value as a market metric is that its levels are determined by actual trades of its underlying securities and not by mark to model levels of the entire portfolio. As a result, FXI tends to be more responsive to changes in actual market conditions than mark-to-model alternatives. This is most evident during the US regional bank crisis in 2023 where changes in funding conditions were quickly reflected.

The performance of several credit market indicators demonstrate similar, but not identical responses across metrics.

Bloomberg US Aggregate Index, FRBNY Financial Conditions Index, Invesco SOFR Academy Financial Conditions Credit Spread Index (Bloomberg ticker FXIXUNS Index)



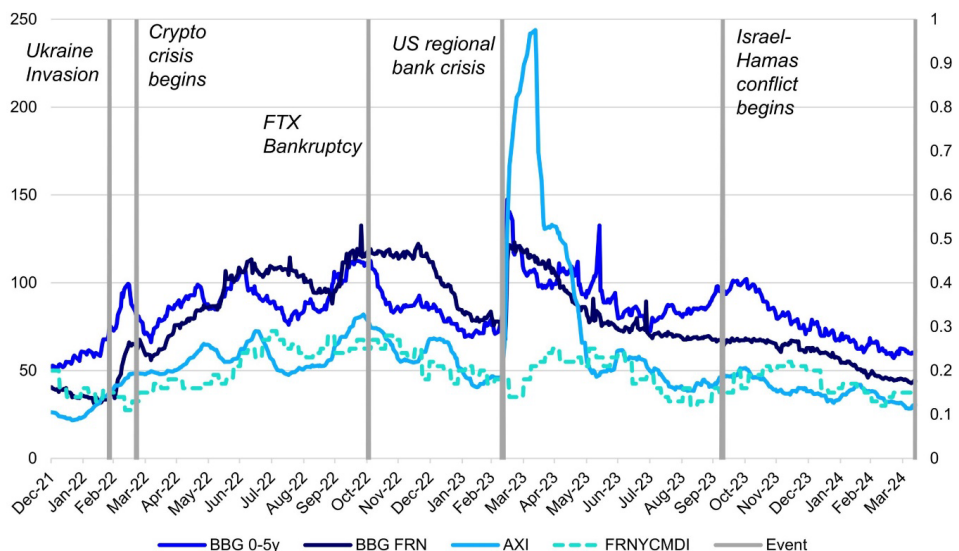
Brief analysis of Benchmark Performance (continued)

The chart below provides a similar analysis during the same period with a somewhat different set of data that includes: The Bloomberg 0-5y US Corporate Index (Bloomberg ticker I31658US Index), a total return benchmark index, The Bloomberg US Floating Rate Note Index (another total return benchmark index, which is mainly composed of floating rate debt of financial institutions; Bloomberg ticker BFRNTRUU Index). The FRBNY financial conditions index (to benchmark broader impact of the events)

AXI is a broad-based corporate credit index constructed from actual trades on US-dollar denominated banks and financial institution bonds with maturities from overnight to five years. For reference purposes, major geopolitical and financial market events are noted on the charts. As the data illustrate, in the post pandemic period US credit markets have shown a tendency to react more strongly and persistently to financial market issues of various forms, while upticks in geopolitical risks have resulted in less impact. One possible explanation for this is the prominence of bank and financial debt in the US bond markets. Moreover, market participants have become accustomed to bank and financial crises of various forms, and many have developed something akin to a “gag reflex” that pushes them to reduce risk as headlines drop

In the post pandemic period US credit markets have shown a tendency to react more strongly to financial market issues.

Bloomberg 0-5y US Corporate Index, Bloomberg US Floating Rate Note Index, FRBNY Financial Conditions Index, the Invesco SOFR Academy Across-The-Curve Credit Spread Index (Bloomberg ticker AXIUNS Index)



Conclusion

AXI and FXI are versatile tools that can significantly enhance asset management practices, especially as the industry adjusts to a post-LIBOR world. From improving risk management through credit spread hedging to enhancing the benchmarking and performance evaluation process, these indices offer real-time, transaction-based data that can provide more accurate insights into credit conditions across different sectors. By incorporating AXI and FXI into investment strategies, asset managers can make more informed decisions, better manage risk, and enhance the performance of credit-sensitive portfolios. We encourage market participants to provide feedback on the integration of AXI and FXI into asset management operations and to share insights on additional use cases that could further enhance their applicability in the evolving financial environment.



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Resources

The development of AXI and FXI commenced in 2021, following a request from ten U.S. Regional banks for a credit sensitive supplement to SOFR. SOFR Academy and the Benchmark Administrator have made available a wide range of information and education materials regarding AXI and FXI, including but limited to the following:

- A [User's Guide](#) to AXI & FXI - This paper provides an overview of the need for these credit spread reference benchmarks in commercial lending markets, their unique construction design, their potential application in cash products and derivatives markets.
- Methodology documentation – Detailed methodology documentation for both [AXI](#) and [FXI](#), which includes a set of rules and criteria that govern the index's creation, calculation, and maintenance.
- IBM Promontory's IOSCO [Review](#) - Promontory Financial Group, a business unit of IBM Consulting completed a limited assurance review of AXI and FXI's degree of implementation of relevant IOSCO Principles for Financial Benchmarks. IBM have also released a [case study](#).
- Frequently Asked [Questions](#) (FAQs) - These FAQs were prepared for use by market participants and are current as of the version date noted above. This list will evolve as new developments and questions arise.
- AXI & FXI [Brochure](#) – This document generally describes key features of AXI & FXI as well as financial stability considerations
- SOFR Academy [Insights](#) - Global markets require robust benchmarks. SOFR and other risk-free rates are now the foundation for fixed income markets, and markets are safer. But credit markets need more, they need robust metrics that communicate ever changing credit conditions AND work with risk-free rates, and that's where we can help.

For additional resources and further information please visit SOFR.org and questions can be submitted via the [Contact Form](#).

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About Sofr.org

SOFR Academy is a U.S.-based economic education and market information provider. The Firm's mission is to enhance the efficiency, transparency, and stability of financial markets. The Firm is operationalizing first of their kind across-the-curve credit spread indices in certain major currency jurisdictions which work in conjunction with respective (near) risk-free rates. The Firm's panel of advisors includes former U.S. Treasury Secretary Lawrence H. Summers and academics from Harvard University, Tsinghua University, the University of California Berkeley, New York University, the University of Oxford and London Business School, as well as experienced financial services professionals. SOFR Academy is a member of the Asia Pacific Loan Market Association (APLMA), American Economic Association (AEA), the Loan Syndications and Trading Association (LSTA), the International Swaps and Derivatives Association (ISDA), the Bankers Association for Finance and Trade (BAFT) which is a wholly owned subsidiary of the American Bankers Association (ABA), the U.S. Chamber of Commerce (USCC) and the Bretton Woods Committee (BWC). SOFR Academy's backers include Joe Lonsdale's [8VC](#), and former Goldman Sachs partner Robert Litterman who developed the Black-Litterman model together with Fischer Black in 1990. For more information, please visit www.sofr.org.



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