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Notification of Technical Enhancement to AXI Scaling Methodology

In a June 21, 2021 letter (Burnett, 2021) to the Alternative Reference Rates Committee (ARRC) leadership, SOFR Academy committed to operationalizing Across-the-Curve Credit Spread Indices (AXI)™ in a considered and measured way that incorporates feedback and guidance from a wide range of stakeholders. Having conducted extensive consultation with market regulators and financial institutions in the United States and United Kingdom, we are pleased to provide the following technical update to the AXI scaling methodology. This technical change simplifies and strengthens the index.

### AXI construction summary

SOFR Academy supports the Secured Overnight Financing Rate (SOFR). We also support robustly defined credit spread add-ons to SOFR, such as AXI. The index is simply the weighted average of the credit spreads of unsecured bank funding transactions with maturities out to five years, with weights that reflect both transactions volumes and issuance volumes.

The design of AXI is consistent with the spirit in which the Principles for Financial Benchmarks[1] were developed by the International Organization of Securities Commissions (IOSCO). Adopting an across-the-curve construction methodology ensures that the maximum number of transactions are captured and that index alignment with the IOSCO Principles is sustained over time.

AXI is calculated as a single number that is then scaled down to standard tenors, e.g., 1-month, 3-months, 6-months etc. AXI is added to SOFR—for example, CME Term SOFR, simple daily SOFR, SOFR compounded in arrears, or other SOFR variants—to form a credit-sensitive interest rate benchmark for loans, and eventually derivatives and other products. The following diagram provide a visual representation of the construction flow.

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[1] https://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf

Exhibit 1: AXI construction summary
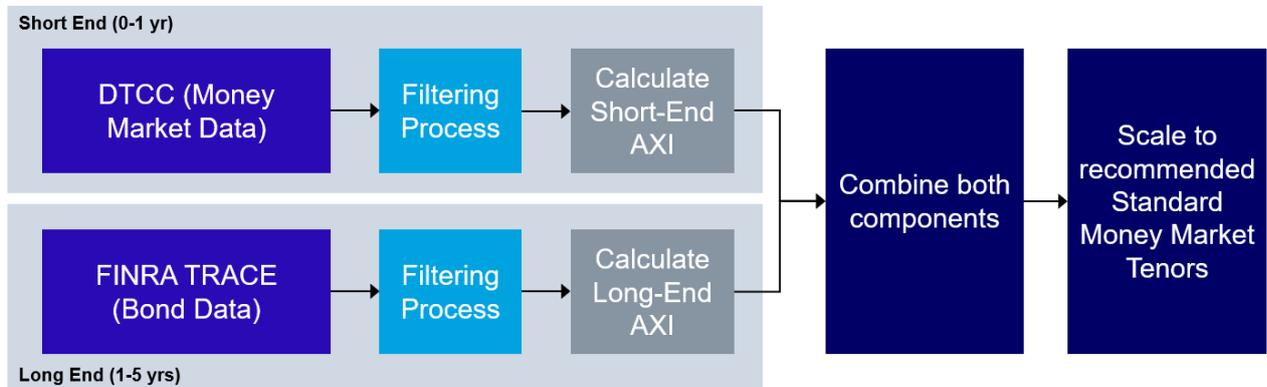
Scaling Methodology Technical Enhancement

The original academic paper in which AXI was conceived (Berndt, Duffie and Zhu, 2020). suggested a scaling factor that referenced the historical relationship between LIBOR and the risk-free rate. To avoid any references to LIBOR, which will be discontinued, the enhanced scaling factor methodology is now calculated from the 5-year historical spread between U.S. Treasury yields and the Federal Funds Rate which is set by the Federal Open Market Committee (FOMC).

For a more detailed explanation of scaled AXI, let's denote the weighted average maturity of all transactions underlying AXI by τ, where weighting is by duration (specifically, DV01[2] of the transactions.[3]) The unscaled version of AXI is simply the weighted average of the long-end AXI (derived from corporate bond transactions) and the short-end AXI (derived from CP and CD transactions), also weighted by DV01. We denote the term spread of U.S. Treasury yield of maturity x above the Fed Fund target by $UST\ Spread(x)$, calculated as a five-year historical average.[4] If x is not part of the standard Treasury maturities, linear interpolation is used. Then, the 3-month scaled AXI is calculated as:

$$\frac{AXI\ Scaled(3m)}{AXI\ Unscaled} = \frac{UST\ Spread(3m)}{UST\ Spread(\tau)}$$

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[2] Dollar duration, sometimes called money duration or DV01, is based on a linear approximation of how a bond's value will change in response to changes in interest rates.
[3] For simplicity, the duration of corporate bonds with remaining maturities between t years and $t + 1$ years is taken to be $t + 0.5$. The four maturity buckets in the AXI long-end calculation, namely 1-2 year, 2-3 year, 3-4 year, and 4-5 year, would have durations 1.5, 2.5, 3.5, and 4.5, respectively. Durations of CP and CD are taken to be their remaining time to maturity.
[4] If the Fed Fund target is a range, the value is taken to be the lower bound.

Certain global systemically important banks (GSIB) have communicated a desire to perform their own scaling. Therefore, AXI will also be published unscaled.

AXI Resources

SOFR Academy has published a range of information and education materials on AXI which will be added to over time. Materials available include but are not limited to the following:

— AXI Prototype data
— AXI Explainer Video
— AXI Technical White Paper v1.0 (October 2021)
— Term SOFR + AXI concept credit agreement (DRAFT)
— AXI Frequently Asked Questions
— Stanford Graduate School of Business Academic Paper
— AXI User-Friendly Infographic
— AXI scaling factor calculation example .xls (coming soon)
— Office of the Comptroller of the Currency (OCC) LIBOR Transition Self-Assessment Tool for Banks (coming soon)
— AXI self-paced online eLearning course (coming soon)

The materials can be accessed at the following location: https://sofracademy.com/axi/

About SOFR Academy

SOFR Academy, Inc. is a U.S. based digital education and data provider. SOFR Academy's panel of advisors includes academics from Harvard University, the MIT Sloan School of Management, the University of California Berkeley, New York University and Tsinghua University as well as experienced financial services professionals. The Firm provides services to corporations, financial institutions, governments, regulators, and individuals on important topics that impact the global economy. The Firm is also driving the operationalizing of AXI and FXI as credit spread add-ons for SOFR for use in lending and derivative markets. SOFR Academy is a member of the Loan Syndications and Trading Association (LSTA), the International Swaps and Derivatives Association (ISDA), the Asia Pacific Loan Market Association (APLMA), and the Bankers Association for Finance and Trade (BAFT) which is a wholly owned subsidiary of the American Bankers Association (ABA). SOFR Academy is backed by venture capital. For more information, please visit SOFR.org.

Contact information

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