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Financial

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LIBOR BOOTCAMP 2021

LIBOR TRANSITION BOOTCAMP ALL COURSES

Self-Paced Program

Created For

- Traders
- Investment and Portfolio Managers
- Loan and Credit Officers
- Risk Managers
- Quants and Quant Developers
- Front and Middle-Office Analysts
- Back-office and Operations Analyst
- Financial Controller and Analyst
- Legal and Compliance Officers
- Project Managers
- LIBOR Program Manager
- Model Validation Analysts
- Business Analysts and Quality Assurance
- Software Developers and Technical IT Analysts
- Management Consultants
- Business and Technical Consultants
- Students and University Faculty

ALL COURSES

CONTENTS

04/05
PROGRAM EXPERT FACULTY

06/09
COURSE STRUCTURE

10/11
LIBOR TIMELINE

12/13
MAJOR GLOBAL REPLACEMENT
RFRS – 1

14/15
MAJOR GLOBAL REPLACEMENT
RFRS – 2

16/17
MAJOR GLOBAL REPLACEMENT
RFRS – 3

18/19
LIBOR TRANSITION PROJECT
MANAGEMENT

20/21
FROM LMM TO FMM RESET IN
ARREARS AND COMPOUNDING

22/23
RATE EQUITY CORRELATION
SPREAD VS VIX

24/25
LIBOR TRANSITION IMPACT ON
SCHEDULE

26/27
ORGANIZATIONAL PLANNING

LIBOR TRANSITION BOOTCAMP 2021

Self-Paced Program

This program is designed to fill the knowledge gap for LIBOR transition and prepare participants to address the multitude of challenges they are likely to face over the next year. It covers all areas impacted by LIBOR's cessation.

- ✓ Flexible and self-paced online learning program.
- ✓ 68 sessions of 30-45 minute duration with adaptive concept checks.
- ✓ Weekly online live Q&A sessions with faculty.
- ✓ Real quantitative and operational case studies.
- ✓ Completion certificate at the end of the program.
- ✓ Continuous course updates with market and regulatory developments.

PROGRAM EXPERT FACULTY



SANJAY SHARMA, PHD
FOUNDER AND CHAIRMAN,
GREENPOINT GLOBAL

Sanjay is the Founder and Chairman of GreenPoint Global – a financial technology, risk advisory, and education services firm headquartered in New York. Founded in 2006, GreenPoint has grown to over 400 employees with a global footprint and production and management teams located here in the U.S, India and Israel.

During 2007-16 Sanjay was the Chief Risk Officer of Global Arbitrage and Trading Group and Managing Director in Fixed Income and Currencies Risk Management at RBC Capital Markets in New York. His career in the financial services industry spans over two decades during which he has held investment banking and risk management positions at Goldman Sachs, Merrill Lynch, Citigroup, Moody's and Natixis. Sanjay is the author of "Risk Transparency" (Risk Books, 2013), Data Privacy and GDPR Handbook (Wiley, 2019) and co-author of "The Fundamental Review of Trading Book (or FRTB) – Impact and Implementation" (RiskBooks, 2018).

Sanjay was the Founding Director of the RBC/Hass Fellowship Program at the University of California at Berkeley and is an Adjunct Professor at EDHEC, Nice in France and at Fordham and Columbia Universities in New York. He has served as an advisor and a member of the Board of Directors of UPS Capital (a Division of UPS) and on the Global Board of Directors for Professional Risk International Association (PRMIA). He holds a PhD in Finance and International Business from New York University and an MBA from the Wharton School of Business and has undergraduate degrees in Physics and Marine Engineering.



TIM GLAUNER
HEAD OF CAPITAL
MARKETS GLOBAL
SOLUTION CONSULTING
FOR AMERICAS, FINASTRA

Tim leads the Americas' Capital Markets practice, Global Solution Consulting at Finastra, specializing in front-office, risk and quantitative areas in capital markets for broad asset class coverage including interest rate/inflation/FX/hybrid derivatives, fixed income including corporate and ABS/MBS securities.

Over the last 25 years Tim has worked as a developer for Summit, quant developer for a Tier-1 investment bank and large hedge fund and is now actively involved in pre-sales for Finastra. His client coverage includes over 100 financial institutions including Deutsche Bank, HSBC, The Worldbank, Citibank, State Street, BB&T, Fannie Mae, and Bank of America.

He has implemented one of the earliest explanatory P&L analytics for rates along with implementing one and two-factor interest rate models using lattice and Monte-Carlo models, prepayment models, relative value analytics and firm-wide risk management analytics.

Tim holds a B.S. from the Technical University in Karlsruhe, Germany, and a dual M.S. in Computer Science and Mathematics from the Courant Institute at New York University. He is an adjunct professor at Fordham University's Gabelli School of Business and has taught courses covering capital markets and enterprise risk management.



ANN BATTLE
HEAD OF BENCHMARK
REFORM, ISDA

Ann M. Battle is Head of Benchmark Reform at ISDA where she leads ISDA's global efforts related to the transition away from LIBOR and other benchmark reform initiatives. Ann represents ISDA on the Alternative Reference Rates Committee (ARRC) and the Interest Rate Benchmark Reform Subcommittee of the CFTC Market Risk Advisory Committee. She also leads ISDA's global work with the FSB Official Sector Steering Group (OSSG) to implement more robust fallbacks for derivative contracts. At ISDA Ann also covers derivatives clearing and CCP-related issues, bank resolution, and netting and collateral opinions for cleared and uncleared derivatives.

Prior to joining ISDA, she was a counsel in the Legal Division, Complex Financial Institutions Section of the Federal Deposit Insurance Corporation (FDIC). Her work at the FDIC focused on resolution of systemically important financial institutions and, specifically, on domestic and cross-border issues related to derivatives and financial market infrastructures. Prior to joining the FDIC, Ms. Battle was an attorney with the law firm of Sutherland Asbill & Brennan LLP in Washington, DC, where her practice focused on derivatives and structured products (including regulation of such products), secured and unsecured lending, and capital markets transactions. Ms. Battle received her undergraduate B.S. Business Management from Georgia Tech and her J.D. from William & Mary Law School.



THOMAS DEAS
CHAIRMAN, NACT

Thomas C. Deas, Jr. is the Chairman of the National Association of Corporate Treasurers (www.nact.org), having also served a previous term as its Chairman from 2011 through 2013. From 2001 until his retirement in 2016, he served as Vice President and Treasurer of FMC Corporation (NYSE: FMC). Prior to joining FMC, he served as Vice President, Treasurer and CFO of Applied Tech Products Corp., of Airgas, Inc. (NYSE: ARG) and of Maritrans Inc. (NYSE: TUG). Prior to these positions, Mr. Deas was employed for 18 years at Scott Paper Company (NYSE: SPP), where he served in various capacities in finance and treasury.

Mr. Deas received a BS in Physics from the University of South Carolina. Following service as a destroyer officer in the U.S. Navy, he received an MBA from the Wharton School of the University of Pennsylvania. He is the past Chairman of the International Group of Treasury Associations and is a director of the University of South Carolina Educational Foundation and its Investment Policy Committee. He has served as a member of the Financial Stability Board's Market Participants Group and is a current representative to the Federal Reserve's Alternative Reference Rates Committee. Both these efforts focus on changes in how LIBOR and other interest rate indexes are determined. Mr. Deas is a member of the steering committee of the Coalition for Derivatives End-Users. He is a frequent speaker at investor conferences and professional forums and has testified on financial and derivatives reform before several Congressional committees.

ALL COURSES

68 SESSIONS

Optional orientation program designed for students and junior professionals.

Each session (30-45 minutes) covers basic fixed-income fundamentals and overview of LIBOR/RFR transition, quantitative, and operational challenges with concept checks.

Learning Objectives

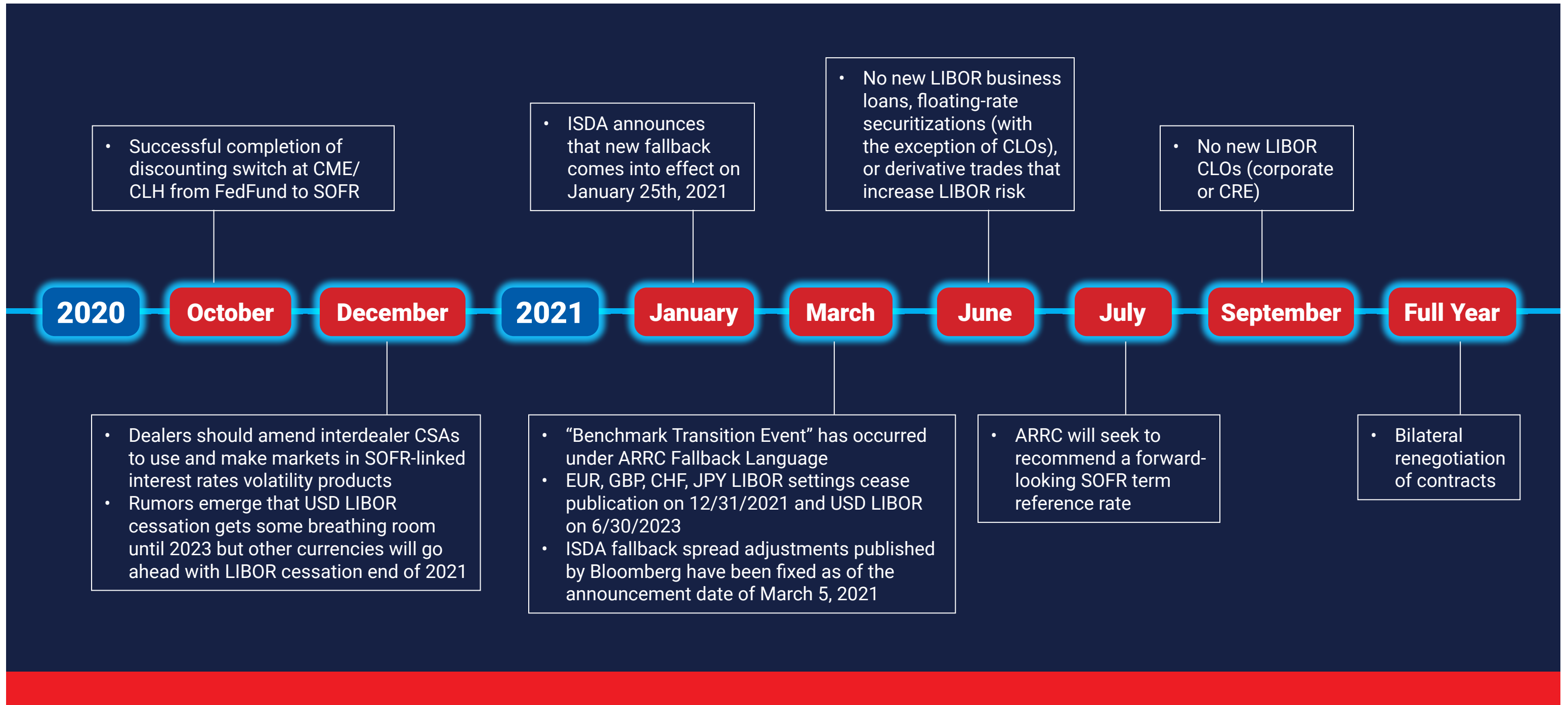
1. LIBOR components and its current usage.
2. Mechanisms of ISDA transition fallback.
3. P&L impact on fallback date and its implications on collateral, credit exposure and tax.
4. SOFR & €STR discounting and price alignment changes for cleared swaps at exchanges.
5. RFR indices across all currencies worldwide and its conventions.
6. Credit component in LIBOR and SOFR term rates.
7. Adequacy of SOFR as a replacement rate and its alternatives.
8. Current state of transition across fixed income, loans, derivatives, MBS/ABS and securitizations.
9. Redocumentation risk, broken hedges and hedge cashflow mismatches.
10. Management of legacy LIBOR swaps – renegotiations, re-bookings, compressions, fallback.
11. Curve building for existing indices and new RFR indices.
12. Impact on interest rate option products.
13. Essential components of impact on risk measures and capital, and regulatory compliance.
14. Model validation from accruals and payments to curves and option pricing models.
15. Negotiation and documentation of legacy contracts.
16. LIBOR transition project management and keys to success.

Course Structure

1. LIBOR Transition Overview and Program Introduction
2. Conceptual Knowledge Assessment
3. LIBOR Components and Current Usage
4. LIBOR Transition Timelines and Challenges
5. Interest Rate Fundamentals
6. Overview of Cash Instruments and Derivatives and the Impact of LIBOR Transition
7. Dynamics of Interest Rate Swaps
8. Market calendars and business day conventions
9. End-to-end Valuation Workflow for Interest Rate Swaps
10. Construction of Interest-rate Curves
11. Overview of LIBOR and How We Got Here
12. Choice of RFR Benchmarks
13. LIBOR Transition Timelines and Challenges
14. RFR Indices Across All Currencies Worldwide and Its Conventions
15. Mechanisms of the Transition Fallback and its ISDA Adjustment
16. Cash Instruments
17. Derivatives - New Payment and Accrual Conventions
18. LIBOR Transition Management - Structure
19. LIBOR Transition Management - Execution
20. Curve Construction of new RFR Indices
21. Quantitative and Modeling Topics
22. Risk Management

23. Model Validation
24. Regulatory and Legislative Initiatives
25. Accounting Implications of Transition of bonds and swaps
26. Overview of Cash Instruments and LIBOR transition
27. Consent Solicitation
28. Fallback Language and Waterfall
29. Syndicated, Bi-lateral Loans and Hedged Loan Approach
30. Fannie Mae and Freddie Mac LIBOR Transition Playbook
31. SOFR & ESTR Discounting and Price Alignment Changes for Cleared Swaps at Exchanges
32. RFR Payment and Accrual Conventions
33. P&L Impact on Fallback Date and Its Implications
34. Redocumentation Risk, Broken Hedges and Hedge Cashflow Mismatches
35. Impact on Interest Rate Option Products
36. LIBOR Market Model Introduction and FMM
37. Performance Considerations for Term and Overnight Rates
38. Repricing perfectly CME, LCH and Bi-lateral swaps despite basis
39. Overview of Project Management Challenges
40. Organizational and management structure
41. ARRC Practical Implementation Checklist for SOFR Adoption - I
42. ARRC Practical Implementation Checklist for SOFR Adoption - II
43. Establishing LIBOR Project Management Framework
44. Risk Management for Fixed Income Instruments
45. LIBOR Transition Impact on Financial and Non-Financial Principal Risks
46. Incorporating Replacement RFRs/Fallback Characteristics and Behavior
47. Impact on Existing Model Libraries
48. Risk management workflow and impact of LIBOR replacement
49. Regulatory Reporting and Guidance on Model Risk Management
50. Principles of Quantitative Model Validation and Model Risk Management
51. LIBOR Transition Impact on Curves, Option Models, Cashflows and Accruals
52. New Model Risk Contributing Factors
53. Model Users and their Expectations
54. Vanilla/Static, Dynamic and Credit Models
55. LIBOR Usage and Major Components of Required Model Changes
56. Dynamic Mortgage Models with Current Coupon, Prepayment and Credit
57. Hands-on New Payment and Accrual Conventions for FRN and Swaps for Reconciliations
58. Build the Short End of the RFR Curve and Cross-Currency Basis
59. Build the Long End of the RFR Curve and Cross-Currency Basis
60. Deriving Volatilities for A Proxy Index
61. Impact of small SOFR convention discrepancies to discount factors
62. Smooth Interpolation with Various Interpolation Techniques
63. Pitfalls of Flat Daily One Day Forward Rates and FOMC Meeting Dates
64. LIBOR single period in depth
65. LIBOR swap schedule
66. New accrual, reset, cashflow conventions
67. USD SOFR single period in depth
68. SOFR swap schedule

LIBOR TIMELINE



MAJOR GLOBAL REPLACEMENT RFRS – 1



Jurisdiction	Alternative RFR	Secured vs. Unsecured	Description	First publication	Working Group	Rate Administration
US	Secured Overnight Financing Rate (SOFR)	Secured	<ul style="list-style-type: none"> Fully transaction-based benchmark A robust underlying market Overnight, nearly risk-free reference rate that correlates closely with other money market rates Covers multiple repo market segments, allowing future market evolution 	3 April 2018	Alternative Reference Rates Committee	Federal Reserve Bank of New York
UK	Reformed Sterling Overnight Index Average (SONIA)	Unsecured	<ul style="list-style-type: none"> Fully transaction-based benchmark Encompasses a robust underlying market Overnight, nearly risk-free reference rate Includes an expanded scope of transactions to overnight unsecured transactions negotiated bilaterally and arranged with brokers Includes a volume-weighted trimmed mean 	23 April 2018	Working Group on Sterling Risk-Free Reference Rates	Bank of England
Europe	Euro Short-Term Rate (€STR)	Unsecured	<ul style="list-style-type: none"> Based on overnight funding transactions conducted by banks Excludes Money Market Fund (MMF) activity Will include deposits but exclude CP / CD transactions (therefore, "some" MMF activity will be captured) Calculated as a volume-weighted trimmed mean 	2 October 2019	Working Group on Risk-Free Reference Rates for the Euro Area	European Central Bank
Switzerland	Swiss Average Rate Overnight (SARON)	Secured	<ul style="list-style-type: none"> Became the reference interbank overnight repo on 25 August 2009 Secured rate that reflects interest paid interbank overnight 	Already published prior to 2018	The National Working Group on CHF Reference Rates	SIX Swiss Exchange
Japan	Tokyo Overnight Average Rate (TONAR)	Unsecured	<ul style="list-style-type: none"> Fully transaction-based benchmark for the uncollateralized overnight call rate market The Bank of Japan calculates and publishes the rate a daily basis, using information provided by money market brokers known as Tanshi As an average, weighted by the volume of transactions corresponding to the rate 	Already published prior to 2018	Study Group on Risk-Free Reference Rates	Bank of Japan

MAJOR GLOBAL REPLACEMENT RFRS – 2



Currency	IBOR	Expected discontinuation date for IBOR (if any)	Alternative reference rate	Date from which ARR will be published
BRL (Brazil)	DI rate	DI rate is expected to continue	Selic rate	Already being published
CAD (Canada)	CDOR	CDOR is expected to continue	Enhanced CORRA	Already being published. In July 2019, CARR WG recommended changes to enhance the CORRA methodology. In February 2020, the Bank of Canada published the methodology it will use to calculate enhanced CORRA. The Bank of Canada will take over the responsibility for publishing the CORRA on 15 June 2020
MXN (Mexico)	TIE	TIE is expected to continue	Overnight TIE	Already being published (publication started on 16 January 2020)
AUD (Australia)	BBSW	BBSW is expected to continue	RBA Cash Rate (also known as AONIA)	Already being published
CNY (China)	SHIBOR	SHIBOR is expected to continue	TBC	TBC
HKD (Hong Kong)	HIBOR	HIBOR is expected to continue	HONIA	Already being published. The Treasury Markets Association consulted in April 2019 on refinements to HONIA and consultation results were published in December 2019
IDR (Indonesia)	JIBOR	JIBOR is expected to continue Overnight JIBOR is being replaced by IndONIA	IndONIA	Already being published
ILS (Israel)	TELBOR	TELBOR is expected to continue	TBC	TBC
INR (India)	MIBOR	MIBOR is expected to continue	MROR	Already being published
JPY (Japan)	JPY TIBOR Euroyen TIBOR	JPY TIBOR is expected to continue Euroyen TIBOR will likely be discontinued	TONAR	Already being published
KRW	KORIBOR	KORIBOR is expected to continue	TBC	TBC

MAJOR GLOBAL REPLACEMENT RFRS – 3



Currency	IBOR	Expected discontinuation date for IBOR (if any)	Alternative reference rate	Date from which ARR will be published
NZD (New Zealand)	BKBM	BKBM is expected to continue	Not yet identified - benchmark rate for BKBM	TBD
SGD (Singapore)	SIBOR SOR	SIBOR - SIBOR is expected to be reformed and to continue SOR - SOR will be impacted by discontinuation of USD LIBOR (it is an input in SOR's methodology)	SORA	Both are already being published
TRY (Turkey)	TRLIBOR	N/A	TLREF	Already being published
TWD (Taiwan)	TAIBOR	TAIBOR is expected to continue	TAIBIR (Taiwan Bill Interest Rates)	TBD
CZK (Czech Republic)	PRIBOR	PRIBOR is expected to continue	Not yet designated, the existing overnight rate is CZEONIA	CZEONIA is currently being published
DKK (Denmark)	CIBOR	CIBOR is expected to continue	TBD	TBD
HUF (Hungary)	BUBOR	BUBOR is expected to continue	None designated, as yet the existing over-night rate is HUFONIA	HUFONIA is currently being published
NOK (Norway)	NIBOR	NIBOR is expected to continue	Reformed NOWA (Norwegian Overnight Weighted Average)	NOWA already being published. It will be reformed in 2020 and used as the ARR
PLN (Poland)	WIBOR	TBD	Not yet identified	TBD
RUB (Russia)	MosPrime Rate	TBD	RUONIA	Already being published
SEK (Sweden)	STIBOR	STIBOR is expected to continue	AGAR confirmed that the new RFR for SEK will reflect Swedish banks' overnight borrowing from financial operators. In May 2020, AGAR published proposed methodology. Work has now passed to the Swedish Riksbank	Rate expected to begin publication during 2020

LIBOR TRANSITION PROJECT MANAGEMENT



Below is a realistic illustration of a project plan that implements a new model framework, LIBOR impact study and life cycles of a derivatives portfolio

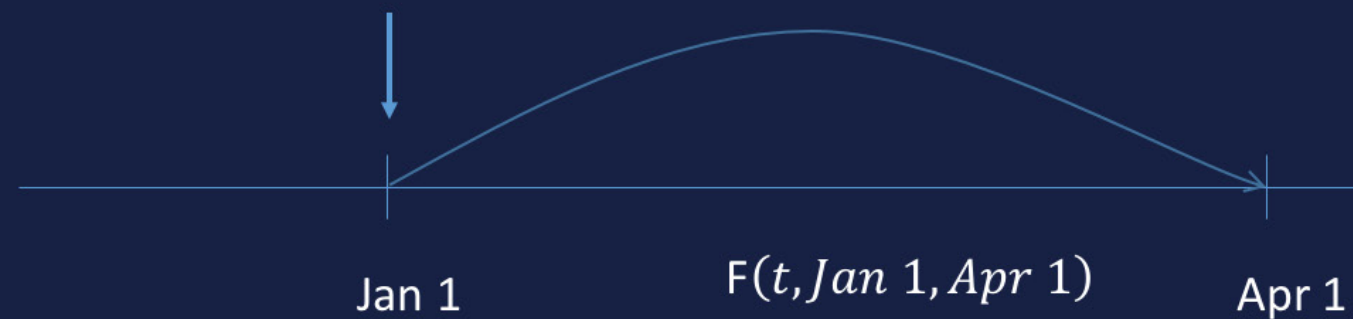
ACTUAL ILLUSTRATIVE PROJECT PLAN



FROM LMM TO FMM

RESET IN ARREARS AND COMPOUNDING

- Reset in Advance and Forward Looking

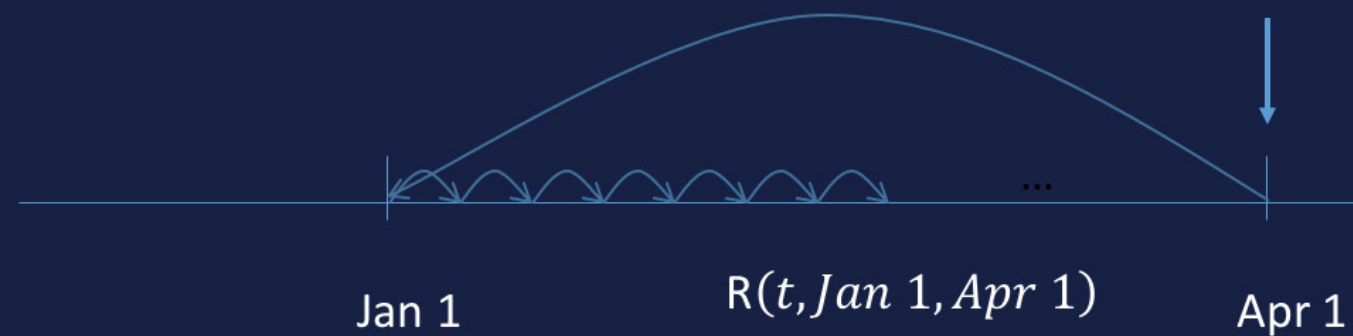


LMM setup:

$$dL_j(t) = \mu_j^Q(t)dt + \sigma_j(t)dW_j^Q(t),$$

$$Corr(dW_i^Q, dW_j^Q) = \rho_{ij}$$

- Compounding Daily and Reset in Arrears Backward Looking



FMM setup:

$$dR_j(t) = \mu_j^Q(t)dt + \sigma_j(t)g_j(t)dW_j^Q(t),$$

$$Corr(dW_i^Q, dW_j^Q) = \rho_{ij}$$

Volatility decay $g_j(t)$

RATE EQUITY CORRELATION

SPREAD VS VIX



- Basis spread was in 20-40 bps range in 2019
- Spread shot up as March 2020 approached
- Reached peak at almost 140 bps
- The correlation between SOFR LIBOR OIS spread and VIX is 0.730511
- There seem to be a lag of around half a month between VIX and the spread

LIBOR TRANSITION

IMPACT ON SCHEDULE

Single interest rate period for floating leg of a swap

No Observation Period Shift 1-month SOFR Swap

Features

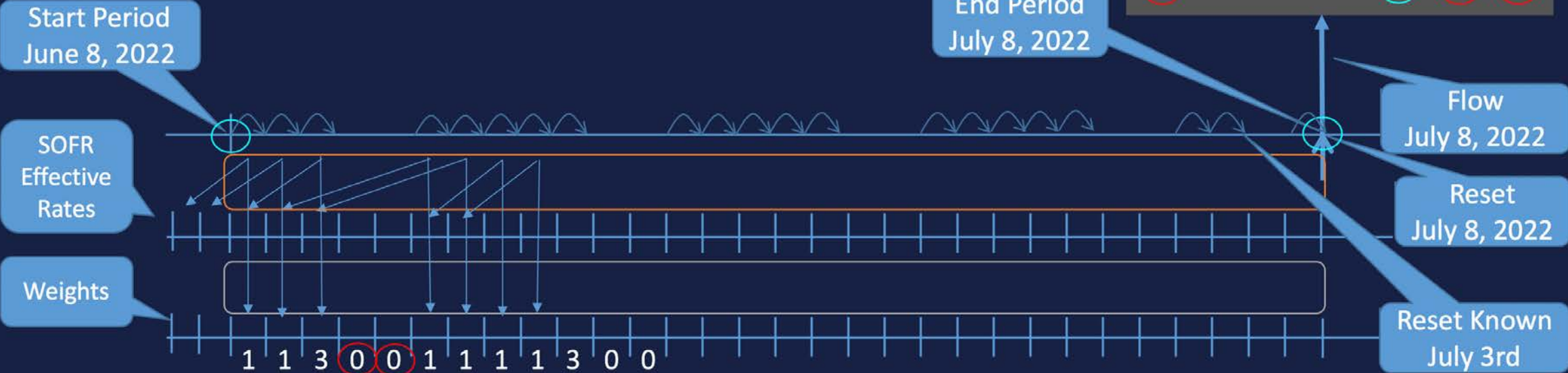
Start date of period = June 8, 2022
 Reset = Arrears = July 8, 2022
 Notional = \$100,000,000
 Lookback = 2D

End date of period = July 8, 2022
 Payment Lag = 0D = July 8, 2022
 Lockout = 0D
 Observation period shift = 0D

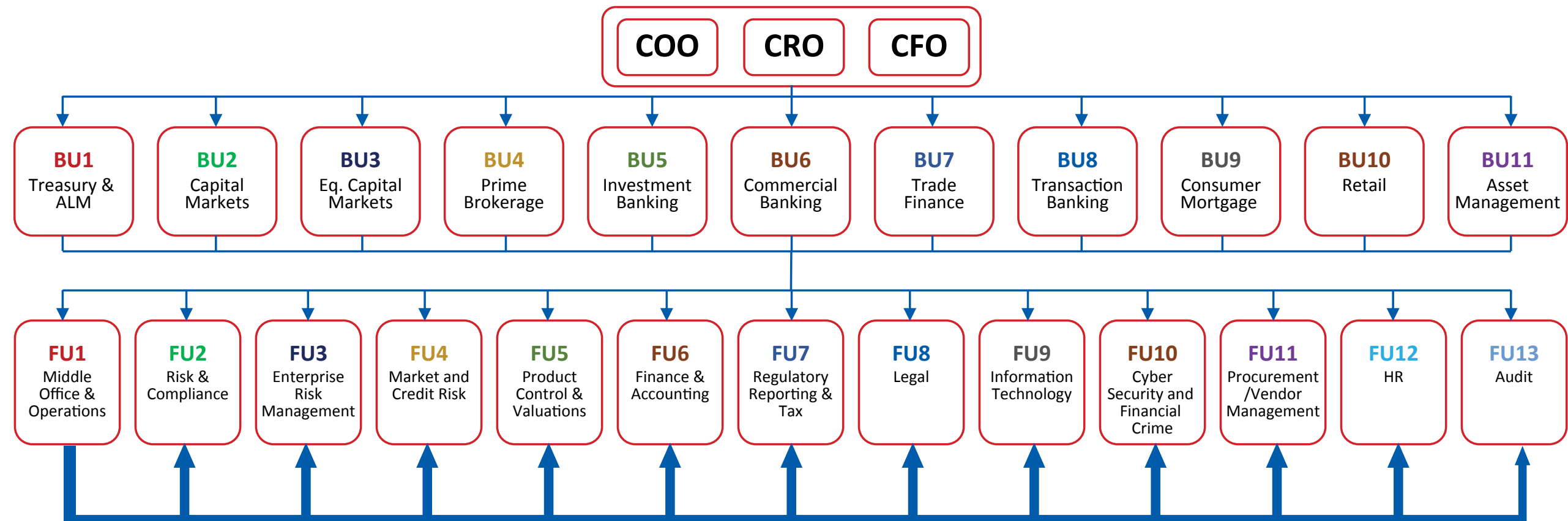
Same as
USD LIBOR

End Period
July 8, 2022

June 2022						
Mo	Tu	We	Th	Fr	Sa	Su
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3
4	5	6	7	8	9	10



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