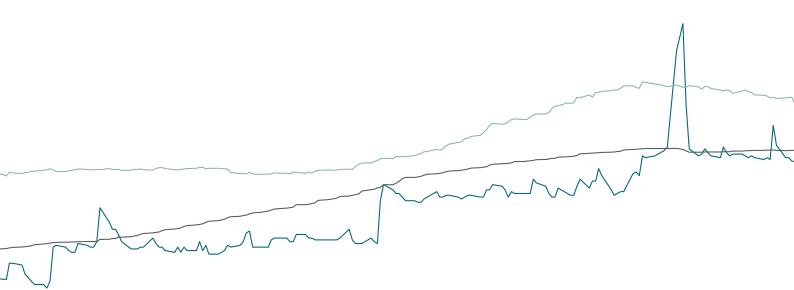


AERIAL VIEW

ACCESS A BROADER MARKET PERSPECTIVE



THE CHALLENGES OF LOSING LIBOR

BY OLIVER BADER

APR 18

JUN 18

AUG 18

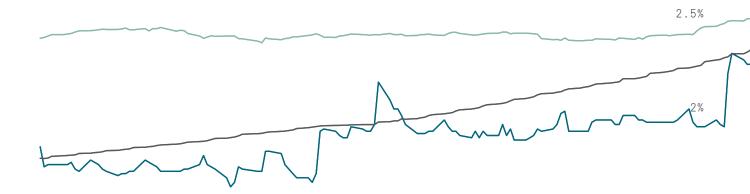
AUG 18

APR 18

AUG 18

3.5%

3%



1.5%

1%

SOFR AND LIBOR RATES

0.5%

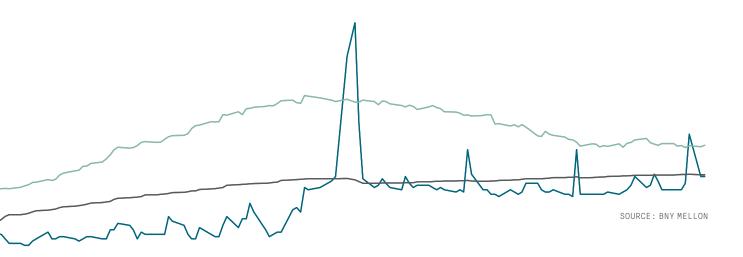
---- SPOT 3M LIBOR

--- SPOT O/N SOFR

COMPOUNDED O/N SOFR SET-TING IN ARREARS (W/DATES MATCHING THE 3ML PERIOD)

0%





ithin three years' time, an interest-rate benchmark that became infamous in the aftermath of the global financial crisis could disappear from the markets for good.

Replacing the London Interbank Offered Rate or "LIBOR" has become a Wall Street priority and global regulators are keen to consign it to the dustbin of history, after a host of banks were accused of manipulating the rate.

But moving over won't be easy, even with what appears to be a lengthy runway. LIBOR is the basis for pricing hundreds of trillions of dollars of financial instruments, including everything from complex derivatives and commercial loans to home mortgages. As such, it is about as intrinsic to financial

markets as train tracks are to railway transportation.

Industry working groups in conjunction with regulators at the Bank of England and the Federal Reserve have been busy determining some alternatives. These vary by structure and region, bringing nuances to the transition. Further complicating the matter is the fact that it appears the switch will happen at different times for different financial instruments in different ways.

The suggested US dollar replacement, called the Secured Overnight Financing Rate or "SOFR," was recommended in 2017 by the Fed-sponsored Alternative Reference Rates Committee (ARRC) and introduced in April 2018. Unlike LIBOR, which has a 'term' component for setting interest rates one, three, six or 12 months out, the new

SOFR rate is an overnight rate.

Historically, USD LIBOR has been based on uncollateralized transactions and taken from a diminishing number of observable transactions. By contrast, SOFR is expected to behave differently because it is based on a larger volume of underlying, secured trades.

Regulators are now pushing the industry to move away from LIBOR, feeling it lacks robustness because expert judgement is too often required in the absence of underlying transactions. There is a risk it becomes unstable if it lingers on after the alternatives are in place and some believe banks may decide to stop quoting LIBOR, once they are no longer required to help set the benchmark after 2021 by the UK's Financial Conduct Authority.

Trading and issuance are "already

SOFR FLOATERS

CUMULATIVE ISSUANCE

MONTHLY ISSUANCE

happening and building momentum, and given the regulatory stance, we think those things will come together," says Adam Gilbert, regulatory leader at PwC financial services advisory. "Will there be vestiges of LIBOR that stick around? That's quite possible but we think it's the exception."

ACT NOW

While SOFR is based on more than \$800 billion of underlying short-term loans every day, trading volumes in products like derivatives, loans and securities indexed to the new SOFR rate are still in their relative infancy. Conversely, LIBOR is the other way around. It's based on only about \$500 million of daily trades but there are an estimated \$350 trillion in loans and derivatives linked to it--\$150 trillion in Europe and Japan and \$200 trillion in the US.

Industry experts say that, with the clock ticking and the transition likely to accelerate soon, market participants with exposure to LIBOR need to get ready. In the US, the Fedsponsored ARRC group set out a "paced transition plan" to sequence the adoption of SOFR. This contemplates derivatives -- both on and off exchange -- and the creation of a forward-looking rate for loans, bonds and mortgages.

The Securities and Exchange Commission said in a July 11 statement that it would monitor which risks and exposures companies might need to disclose in relation to the transition and "whether the adoption of a variety of replacement rates for USD LIBOR instead of a dominant successor could limit the effectiveness of all replacement benchmarks."

In the near term, a key focus will be analyzing areas of exposure to LIBOR not just across trading, but across risk, finance, operations, legal and technology groups. That review involves not just collecting all the physical documentation supporting financial contracts, but also looking across the different types of clients using them.

"Will there be vestiges of LIBOR that stick around? That's quite possible but we think it's the exception."

ADAM GILBERT, PWC

Depending on the institution and the resources available, this is where the pinch points will likely occur.

"This is likely to be a series of massive corporate actions," says John Nixon, director of derivatives operations at BNY Mellon. "You have to be able to support it on billions of dollars of varying types of instruments and evidence that transition internally and to clients or counterparties."

Like every other bank, BNY Mellon set up a program to analyze the potential impact, appointing an enterprise-wide LIBOR "czar" overseeing a taskforce to identify every affected legal contract. The bank has already executed SOFR swaps and futures as well as both underwritten and made markets in SOFR floating-rate notes for clients.

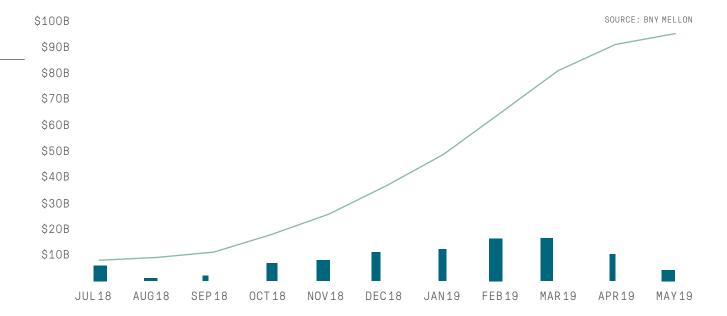
"The change will be seismic but the good news is we have already quantified our market exposure and we're ready to trade," says Robert Lynch, head of interest rates trading at BNY Mellon Capital Markets, LLC.

The biggest burden will inevitably fall on the smallest accounts and thousands of wealth managers and asset managers that do not have the bandwidth or quants available to help them make the switch to the new overnight rates, say industry experts.

The changes could ripple far and wide, and not only in bond and derivatives contracts. The mortgage market, with millions of commercial borrowers whose interest rates set off LIBOR, will suddenly find itself operating under a new paradigm.

FALLBACK LANGUAGE

In case LIBOR stops being quoted and falls away, regulators have been helping to coordinate the construction of recommended new legal language, known as 'fallback' provisions," as a sort of insurance policy to be written into future and legacy products.



Current fallbacks govern what might happen if there were a temporary cessation in existing benchmarks. The goal of the new language is to create contract certainty in case of any permanent cessation in any new or existing benchmarks and to keep any change in contract values to a minimum. The ARRC in April released recommended fallback language for U.S. dollar Libor floating-rate notes and syndicated loans, and more in May for business loans and securitizations.

A good portion of the work to transition derivatives pricing will be done at utilities called clearinghouses that process many of the trades, such as LCH - a large clearinghouse for interest-rate swaps and other instruments that rely on LIBOR and other benchmarks.

The London Stock Exchange Group, the majority owner of LCH, has already done some of the preparation work. That includes listing SOFR swaps as eligible for clearing; helping the benchmark reform process in the U.K. with its Sterling Overnight Index Average or "SONIA" rate; and assisting

in the switch to the Swiss Average Rate Overnight, or "SARON."

LCH says it will focus on bringing a Euro Short-Term Rate, known as "ESTER," to the clearinghouse later this year, and encourage participants to start speaking with utility providers to help ease the transition process away from LIBOR.

"Many clients are well advanced with their planning, but we would encourage them to engage now with the system providers and infrastructures they rely on so as to ensure they understand what's changing and when, and remain able to manage their business activity through the program of change that lies ahead," says Phil Whitehurst, head of service development for rates at LCH in London.

The International Swaps and Derivatives Association (ISDA) is amending standardized swap contracts to fit the new benchmarks and LCH has said it is working on a mechanism to switch any transactions still referencing LIBOR once that work is complete, starting in 2020.

When ISDA canvassed the marketplace about suggested fallback language in July, 2018, a majority of derivatives market participants opted for backward-looking term rates in the theory it would reduce the risk of rate rigging.

Meanwhile, market participants want a forward-looking interest-rate term benchmark for non-cleared swaps, loans, bonds and mortgages. So far, there is no such thing and any forward-looking rate would have to be assembled out of derivatives tracking the new overnight benchmarks. It isn't clear when sufficient volumes will allow for this to happen.

Treasurers would like the replacements for different instruments to align so that a hedging mismatch is not created between assets and liabilities should a cash product, like a bond, fall back to one rate and the derivative used to hedge it fall back on another. This would create a headache for participants called "basis risk," where trades are no longer paired.

"The key is how the cash market

KEY TRANSITION DATES

	FCA says it will no longer compel banks to quote Libor after 2021 JULY 2017		Bank of England selects SONIA as UK reference rate			begins ring swaps to SOFR	Roadmap proposed for introducing TONAR in Japan		
			APRIL 23, 2018		JULY16,2018		AUGUST2018		
		APRIL3,2018		MAY7,2018		JULY26,2018		AUGUST30,2018	
		New York Fed begins publishing SOFR		CME Group launches SOFR futures		Fannie Mae issues \$6 billion in SOFR debt		MetLife announces \$1 billion SOFR- based FRN	

synchronizes with the derivatives market," says Rob Wilson, head of change at BNY Mellon Markets. The risks will not just be across different products but will also be a problem across different currencies.

MINIMIZING MISMATCHES

Since SOFR rates started to be quoted in April last year, exchanges have joined the fray. CME Group launched one- and three-month futures based on SOFR the following month. CME says from a slow start, average daily volumes had swelled to 38,533 futures contracts by March 2019.

The more futures are traded, the more liquid the off-exchange derivatives like swaps should become. "It is expected that this market will continue to develop and gain increasing acceptance," says Jeffrey Pearsall, managing director at Philadelphia-based financial consultancy PFM Swap Advisors.

This year through July 12, \$140.1 billion in swaps tied to SOFR have traded and were reported to US data repositories, according to ISDA. Only three issues to date have used the compounded SOFR calculation methodology that is being used for derivatives and is expected to become the market norm: a \$1 billion floating-rate note in November from the European Investment Bank, a \$1 billion one from Goldman Sachs Group Inc. in May, which reportedly received \$2.25 billion in orders, and a \$750 million one from Morgan Stanley in June.

Today, many participants are used to knowing their borrowing costs in advance. To approximate this for the new

ALTERNATIVE INTEREST RATE BENCHMARKS

SOFR The secured overnight financing rate

SONIA The sterling overnight index average

EONIA The European overnight index average

SARON The Swiss average rate overnight

TONAR The Tokyo overnight average rate

	ESTER selected as unsecured rate in Europe		ISDA releases benchmark consultation results		GBP term reference rate available (subject to consultation)		ECB starts publishing ESTER		Liquidity may be sufficient for SOFR term reference rate
	SEPTEMBER, 2018 OCTOBER1, 201		DECEMBER 2018 8 TBD 2019		TBD2019		Q4/2019		END 2021
						Q1/Q22019		H2/2020	
CME starts clearing swaps tied to SOFF		GBP/CHF/JPY recommende fallback langu available		d for fallbac		dation : language ans	CCPs plan to switch to SOFR discounting for cleared swaps		

benchmarks, the market compounds SOFR futures pricing over three months to deduce a term rate. Practically speaking, this means the exact interest rate that firms will receive or pay will not be known until after market events, such as Fed interest rate moves.

Many became concerned when SOFR spiked at year end, as overnight rates tend to do.

Some say those uncertainties and the month-end swings in SOFR rates aren't much more challenging than the LIBOR rate that was open to manipulation in the first place. In April, the ARRC weighed in on the appropriateness of overnight SOFR and laid out options which can be used to alleviate concerns for a variety of market participants.

"It's not clear to me that the status quo volatility with SOFR is any worse than what we had with LIBOR," says Gilbert at PwC. "People can understand SOFR and relate it to the underlying market a lot easier than the estimates that came with Libor."

BNY Mellon's Lynch says developing a term rate for SOFR rate involves

"some major challenges" and market participants cannot afford to wait for it to be available before pricing contracts. Instead, traders should adapt to backward-looking rates in the near term since liquidity may not support a term rate for some time.

Operationally, having contracts with two different benchmarks may also be difficult to manage. Alan Ganucheau, treasurer at Hancock Whitney Bank, a bank in Gulfport, Miss., says matching up assets and liabilities that may be benchmarked against different rates is tricky. If some rates suddenly switch away from LIBOR and some don't, that creates an unwanted "basis" mismatch.

Another concern is that during another financial crisis, the overnight SOFR rate will likely decline as institutions rush into the safety of US Treasuries. At the same time the cost of unsecured borrowing could rise sharply. "Suddenly I will be borrowing at a higher rate but receiving a lower rate for my assets, so managing that basis risk between the two sides of the balance sheet is a challenge," says Ganucheau.

Still, while the series of unknowns could tempt firms to hold back on beginning their preparation and analysis, there are enough certainties to act on now. SOFR is trading, so new products can be approved; compounding methodologies have been established for new debt issues so system changes can be made; and new fallback language has been issued for contracts.

"If you hold out hope of a term rate, you risk falling behind on execution and planning," says Lynch. ■

Oliver Bader is executive director of the LIBOR transition program at BNY Mellon Markets.

Questions or Comments?
For interest-rate derivatives contact
Timothy Comerford on
timothy.comerford@bnymellon.com;
for FX forwards contact Paul Matherne
on Paul.Matherne@bnymellon.com
or for other questions, reach out to
your usual BNY Mellon relationship
manager.

BNYMELLON.COM

BNY Mellon is the corporate brand of The Bank of New York Mellon Corporation and may be used as a generic term to reference the corporation as a whole and/or its various group entities. This material and any products and services may be issued or provided under various brand names of BNY Mellon in various countries by duly authorized and regulated subsidiaries, affiliates, and joint ventures of BNY Mellon. which may include any of those listed below:

The Bank of New York Mellon, a banking corporation organized pursuant to the laws of the State of New York, whose registered office is at 240 Greenwich St, NY, NY 10286, USA. The Bank of New York Mellon is supervised and regulated by the New York State Department of Financial Services and the US Federal Reserve and is authorized by the Prudential Regulation Authority (PRA). Details about the extent of our regulation by the PRA are available from us on request.

The Bank of New York Mellon operates in the UK through its London branch (UK companies house numbers FC005522 and BR000818) at One Canada Square, London E14 5AL and is subject to regulation by the Financial Conduct Authority (FCA) at 12 Endeavour Square, London, E20 IJN, UK and limited regulation by the PRA at Bank of England, Thread-peedle St. London, EC29 SAH LINDON, EC29 SAH US

The Bank of New York Mellon SA/NV, a Belgian limited liability company, registered in the RPM Brussels with company number 0806.743.159, whose registered office is at 46 Rue Montoyerstraat, B-1000 Brussels, Belgium, authorized and regulated as a significant credit institution by the European Central Bank (ECB) at Sonnemannstrasse 20, 60314 Frankfurt am Main, Germany, and the National Bank of Belgium (NBB) at Boulevard de Berlaimont/de Berlaimontlaan 14, 1000 Brussels, Belgium, under the Single Supervisory Mechanism and by the Belgian Financial Services and Markets Authority (FSMA) at Rue du Congrès/Congresstraat 12-14, 1000 Brussels, Belgium for conduct of business rules, and is a subsidiary of The Bank of New York Mellon.

The Bank of New York Mellon SA/NV operates in Ireland through its Dublin branch at Riverside II, Sir John Rogerson's Quay Grand Canal Dock, Dublin 2, D02KV60, Ireland and is registered with the Companies Registration Office in Ireland No. 907126 & with VAT No. IE 9578054E. The Bank of New York Mellon SA/NV, Dublin Branch is subject to limited additional regulation by the Central Bank of Ireland at New Wapping Street, North Wall Quay, Dublin 1, D01 F7X3, Ireland for conduct of business rules and registered with the Companies Registration Office in Ireland No. 907126 & with VAT No. IE 9578054E.

The Bank of New York Mellon SA/NV is trading in Germany as The Bank of New York Mellon SA/NV, Asset Servicing, Niederlassung Frankfurt am Main, and has its registered office at MesseTurm, Friedrich-Ebert-Anlage 49, 60327 Frankfurt am Main, Germany. It is subject to limited additional regulation by the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, Marie-Curie-Str. 24-28, 60439 Frankfurt, Germany) under registration number 12771

The Bank of New York Mellon SA/NV operates in the Netherlands through its Amsterdam branch at Strawinskylaan 337, WTC Building, Amsterdam, 1077 XX, the Netherlands. The Bank of New York Mellon SA/NV, Amsterdam Branch is subject to limited additional supervision by the Dutch Central Bank ('De Nederlandsche Bank' or 'DNB') on integrity issues only (registration number 34363596). DNB holds office at Westeinde 1, 1017 ZN Amsterdam, the Netherlands.

The Bank of New York Mellon SA/NV operates in Luxembourg through its Luxembourg branch at 2-4 rue Eugene Ruppert, Vertigo Building - Polaris, L-2453, Luxembourg. The Bank of New York Mellon SA/NV, Luxembourg Branch is subject to limited additional regulation by the Commission de Surveillance du Secteur Financier at 283, route d'Arlon, L-1150 Luxembourg for conduct of business rules, and in its role as UCITS/AIF depositary and central administration agent.

The Bank of New York Mellon SA/NV operates in France through its Paris branch at 7 Rue Scribe, Paris, Paris 75009, France. The Bank of New York Mellon SA/NV, Paris Branch is subject to limitted additional regulation by Secrétariat Genéral de l'Autorité de Contrôle Prudentiel at Première Direction du Contrôle de Banques (DCB 1), Service 2, 61, Rue Taitbout, 75436 Paris Cedex 09, France (registration number (SIREN) Nr. 538 228 420 RCS Paris - CIB 13733).

The Bank of New York Mellon SA/NV operates in Italy through its Milan branch at Via Mike Bongiorno no. 13, Diamantino building, 5th floor, Milan, 20124, Italy. The Bank of New York Mellon SA/NV, Milan Branch is subject to limiteed additional regulation by Banca d'Italia - Sede di Milano at Divisione Supervisione Banche, Via Cordusio no. 5, 20123 Milano, Italy (registration number 03351)

The Bank of New York Mellon SA/NV operates in England through its London branch at 160 Queen Victoria Street, London EC4V 4LA, UK, registered in England and Wales with numbers FC029379 and BR014361. The Bank of New York Mellon SA/NV, London branch is authorized by the ECB (address above) and subject to limited regulation by the FCA (address above) and the PRA (address above).

Regulatory information in relation to the above BNY Mellon entities operating out of Europe can be accessed at the following website: https://www. bnymellon.com/RID.

The Bank of New York Mellon, Singapore Branch, is subject to regulation by the Monetary Authority of Singapore. The Bank of New York Mellon, Hong Kong Branch, is subject to regulation by the Hong Kong Monetary Authority and the Securities & Futures Commission of Hong Kong. The Bank of New York Mellon, Australia Branch, is subject to regulation by the Australian Prudential Regulation Authority and is exempt from holding an Australian Financial Services License. The Bank of New York Mellon is regulated by the New York State Department of Financial Services under the New York Banking Law which is different from Australian law. The Bank of New York Mellon has various other branches in the Asia-Pacific Region which are subject to regulation by the relevant local regulator in that jurisdiction.

The Bank of New York Mellon Securities Company Japan Ltd, as intermediary for The Bank of New York Mellon

The Bank of New York Mellon, DIFC Branch, regulated by the Dubai Financial Services Authority (DFSA) and located at DIFC, The Exchange Building 5 North Level 6, Room 601, P.O. Box 506723, Dubai, UAE, on behalf of The Bank of New York Mellon, which is a wholly-owned subsidiary of The Bank of New York Mellon Corporation.

Past performance is not a guide to future performance of any instrument, transaction or financial structure and a loss of original capital may occur. Calls and communications with BNY Mellon may be recorded, for regulatory and other reasons.

Disclosures in relation to certain other BNY Mellon group entities can be accessed at the following web-

This material is intended for wholesale/professional clients (or the equivalent only), is not intended for use by retail clients and no other person should act upon it. Persons who do not have professional experience in matters relating to investments should not rely on this material. BNY Mellon will only provide the relevant investment services to investment professionals

Not all products and services are offered in al

If distributed in the UK, this material is a financial promotion. If distributed in the EU, this material is a marketing communication

This material, which may be considered advertising, is for general information purposes only and is not intended to provide legal, tax, accounting, investment, financial or other professional advice on any matter. This material does not constitute a recommendation or advice by BNY Mellon of any kind. Use of our products and services is subject to various regulations and regulatory oversight. You should discuss this material with appropriate advisors in the context of your circumstances before acting in any manner on this material or agreeing to use any of the referenced products or services and make your own independent assessment (based on such advice) as to whether the referenced products or services are appropriate or suitable for you. This material may not be comprehensive or up to date and there is no undertaking as to the accuracy, timeliness, completeness or fitness for a particular purpose of information given. BNY Mellon will not be responsible for updating any information contained within this material and opinions and information contained herein are subject to change without notice. BNY Mellon assumes no direct or consequential liability for any errors in or reliance upone this material.

This material may not be distributed or used for the purpose of providing any referenced products or services or making any offers or solicitations in any jurisdiction or in any circumstances in which such products, services, offers or solicitations are unlawful or not authorized, or where there would be, by virtue of such distribution, new or additional registration requirements.

Any references to dollars are to US dollars unless specified otherwise.

This material may not be reproduced or disseminated in any form without the prior written permission of BNY Mellon. Trademarks, logos and other intelelectual property marks belong to their respective

Neither BNY Mellon nor any of its respective officers, employees or agents are, by virtue of providing the materials or information contained herein, acting as an adviser to any recipient (including a "municipal advisor" within the meaning of Section 15B of the Securities Exchange Act of 1934, as amended, "Section 15B"), do not owe a fiduciary duty to the recipient hereof pursuant to Section 15B or otherwise, and are acting only for their own interests.

The Bank of New York Mellon, member of the Federal Deposit Insurance Corporation (FDIC)

© 2019 The Bank of New York Mellon Corporation. All rights reserved. This material has been distributed for informational purposes only. It is educational in nature and should not be considered as investment advice or a recommendation of any particular security, strategy or investment product.

Views expressed are those of the advisor/s stated and do not reflect views of other managers or the firm overall. Views are current as of the date of this publication and subject to change.

Reprinted with permission from The Bank of New York Mellon.

BNY Mellon Investment Adviser, Inc., Dreyfus Cash Investment Strategies (a division of BNY Mellon Investment Adviser, Inc.), Mellon Investments Corporation and BNY Mellon Securities Corporation (BNYMSC) are affiliated with The Bank of New York Mellon Corporation. ©2019 BNY Mellon Securities Corporation, distributor, 240 Greenwich St, 9th Fl., New York, NY 10286.

Not FDIC-Insured. Not Bank-Guaranteed. May Lose Value.

CIS-71416-2019-07-30