P.R.I.M.E. Finance
Panel of Recognized International Market Experts in Finance

Benchmarking Update

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P.R.I.M.E. Finance Annual Conference 2020
3 February 2020, The Hague
LIBOR History

• 1960s - Banks start offering short term Eurodollar deposits

• 1969 - First syndicated loan priced to reference bank short term interest rates

• 1970s - Syndicated loans priced to reference bank rates proliferate

• 1981 - CME introduces cash settled 90 day Eurodeposit interest rate futures contract

• 1980s - Interest rate swaps grow in popularity; trading fueled by use of futures contracts for hedging and pricing

• 1986 - British Bankers Association begins administering LIBOR setting process
LIBOR History

• 2008 - WSJ reports on "understatement of LIBOR" during credit crisis. "LIBOR is in many ways the rate at which banks do not lend to each other." (Governor of the Bank of England)

• 2012 - LIBOR under regulatory scrutiny; fines paid; criminal investigations active; civil class actions filed

• 2013 - LIBOR determination reduced from 10 currencies to 5, and from 15 maturity buckets to 7.

• 2014 - (Jan) ICE takes over administration of daily LIBOR determination; (Dec) Alternative Reference Rates Committee (ARRC) convened by US banking and regulatory authorities

• 2017 - The interest rate on an estimated $350 trillion in assets are either based
Problems with LIBOR

• Rate setting process proved subject to manipulation

✓ Over $6 billion in fines paid to regulators since 2012.

• BUT manipulation was the result of some structural deficiencies

✓ Lack of liquidity in underlying deposit markets made the quoting banks dependent on models of yield curve structure rather than on actual transactions, which left the system prone to false quotations by participating banks.

✓ Lack of transparency hid the true cost of borrowing even for the more liquid points on the yield curve

✓ Internal controls and compliance functions were not focused on daily rate setting practices
SOFR Implementation Timeline

Jul 2014
FSB begins benchmark reform

Jun 2017
ARRC endorses SOFR

Apr 2018
• FRBNY begins publishing SOFR
• BOE introduces SONIA reforms

Nov 2014
Federal Reserve forms ARRC
CME Group joins ARRC in Jul 2015

Jul 2017
FCA says won’t mandate LIBOR submissions post-2021

May 2018
CME launches SOFR futures

Apr 2019
ARRC issues recommended fallback language for USD LIBOR-reference FRNs and syndicated loans

Dec 2018
ISDA recommends fallbacks for certain non-USD IBORs

Oct 2018
CME begins clearing OTC SOFR swaps

2020
ISDA expected to amend 2006 Definitions for OTC IBOR-reference IR derivatives to incorporate ARR-reference fallbacks, and to issue protocols for amending legacy IBOR-reference trades

Second Half of 2020
CCPs expected to begin applying SOFR-based price alignment/discounting to all USD OTC derivatives

End of 2021
ARRC expects publication of estimated forward-looking term SOFR rates
## Alternative Reference Rates by Currency

### Overview of identified alternative RFRs in selected currency areas

<table>
<thead>
<tr>
<th>Alternative rate</th>
<th>United States</th>
<th>United Kingdom</th>
<th>Euro area</th>
<th>Switzerland</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOFR</td>
<td>Federal Reserve Bank of New York</td>
<td>Bank of England</td>
<td>ECB</td>
<td>SIX Swiss Exchange</td>
<td>Bank of Japan</td>
</tr>
<tr>
<td>(secured overnight financing rate)</td>
<td>(sterling overnight index average)</td>
<td>(euro short-term rate)</td>
<td>(Swiss average overnight rate)</td>
<td>(Tokyo overnight average rate)</td>
<td></td>
</tr>
<tr>
<td>Administrator</td>
<td>Triparty repo, FICC GCF, FICC bilateral</td>
<td>Form SMMD (BoE data collection)</td>
<td>MMSR</td>
<td>CHF interbank repo</td>
<td>Money market brokers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wholesale non-bank counterparties</th>
<th>United States</th>
<th>United Kingdom</th>
<th>Euro area</th>
<th>Switzerland</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secured</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Overnight rate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Available now?</td>
<td>Yes</td>
<td>Yes</td>
<td>Oct 2019</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

FICC = Fixed Income Clearing Corporation; GCF = general collateral financing; MMSR = money market statistical reporting; SMMD = sterling money market data collection reporting.

Sources: ECB; Bank of Japan; Bank of England; Federal Reserve Bank of New York; Financial Stability Board; Bank of America Merrill Lynch; International Swaps and Derivatives Association.

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Issues Remain

• Will the new benchmarks be viewed as Fallbacks or Alternatives?

• Can term structure issues be resolved?

• Will users of products accept an overnight pricing benchmark instead of a term rate?
Thank you