Anticipating Life without LIBOR

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The Data Incubator – Capstone Proposal

What exactly is LIBOR?

- London Interbank Offered Rate (LIBOR) is a set of benchmark rates widely used as a base interest rate by financial institutions globally.
- LIBOR is issued daily as 35 different rates: for five currencies (the U.S. dollar, euro, British pound, Japanese yen, and Swiss franc) and seven lending periods (ranging from overnight to 12 months).
- The ICE Benchmark Administration surveys participating banks every day, asking "At what rate could you borrow funds, were you to do so by asking for and then accepting interbank offers in a reasonable market size just prior to 11 am London time?"
- The rates quoted by banks are annualized interest rates. The ICE Benchmark Association uses these responses to calculate the reported LIBOR as a trimmed arithmetic mean.
- **Hundreds of trillions of dollars' worth of interest rate exposure is tied to ICE LIBOR:** from student loans holders to mortgage holders, from small business owners to corporations, from the world's largest banks to pension funds buying futures contracts.

Data – and the lack thereof – has been LIBOR's death knell.

- During the 2007 financial crisis, LIBOR's rates behaved abruptly and out of line to expectation to other prices.[3]
- By 2012, investigation showed the abnormal behavior was not due to markets, but that some participating banks were manipulating the benchmark by submitting false rates. (Barclays was fined
- The UK's Financial Conduct Authority took over oversight but determined "the absence of active underlying markets raises a serious question about the sustainability of the LIBOR benchmarks that are based upon these markets" In 2017, FCA announced that the publication of LIBOR is not guaranteed beyond 2021.
- In other words, even though LIBOR is "market and transaction data-based expert judgment," **there are simply too few banks participating after the financial crisis to continue to use this methodology given the sample size.**

SOFR is a proxy, not an equivalent replacement.

Other countries are introducing their own local-currency-denominated alternative reference rates for short-term lending, but **SOFR is expected to supplant USD LIBOR as the dominant global benchmark rate.**

SOFR

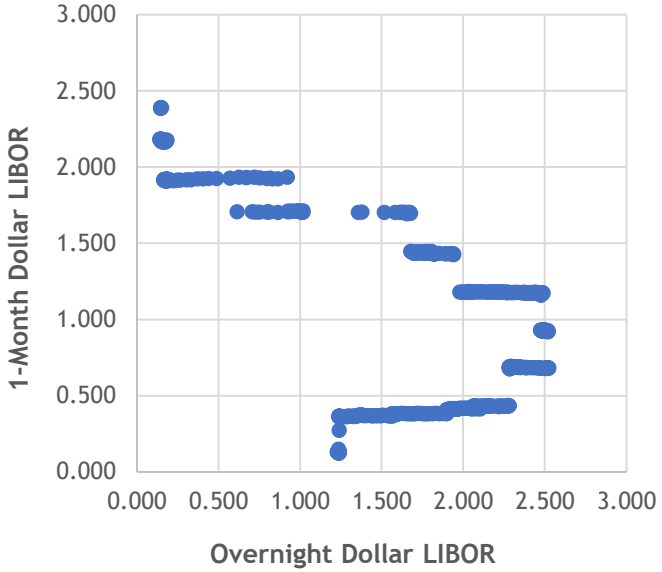
- Relies entirely on transaction data: derived as an average daily volume of more than $1 trillion of actual transactions in the U.S. Treasury repo market
- Reflects real volatility because repo market prices respond rationally to changes in supply and demand
- Purely a daily rate—i.e. an overnight rate
- Represents a “risk free” rate because it is based on borrowing of Treasurys.

LIBOR

- Relies on a small sample of active member banks that represent the underlying marks
- Based partially on market-data “expert judgment“ that sets representative pricing
- Seven varying rates from terms of one day to one year
- Built-in credit-risk component because it represents the average cost of borrowing by a bank.

If SOFR will differ, what is needed to create an equivalent?

- **Lenders will need to estimate rates for consumers using a prior compounding period to approximate LIBOR's terms**



Source: Federal Reserve Bank of St. Louis. Daily rates reported between 10-20-2015 and 10-20-2020

Data:

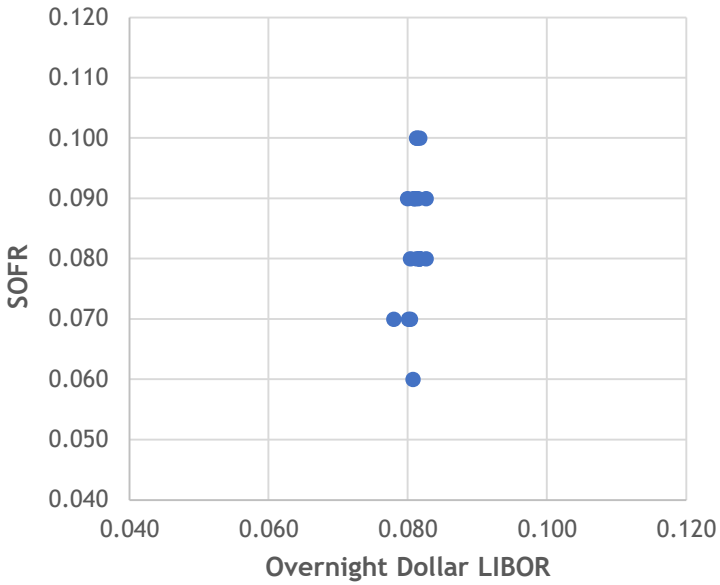
- SOFR daily transaction data since 2018
- LIBOR historical rate data

Analysis method:

- Discover descriptive statistics of SOFR data that most closely replicates LIBOR term rate (e.g. geometric mean) and the smoothing period, if any
- Clean/correct data for any autocorrelation
- Use regressions to explore consistency of relationship of SOFR aggregated transaction data to LIBOR
- Bootstrap the "expected value" of SOFR for t+1 using a model trained on the above regressions

If SOFR will differ, where will valuations break down?

- **Interest rate swaps and derivatives must be re-valued /re-hedged**



Source: Federal Reserve Bank of St. Louis. Subset of SOFR and LIBOR daily rates reported between 9-21-2020 and 10-20-2020. SOFR data reported as 50th percentile of transaction data.

Data:

- SOFR daily transaction data since 2018
- LIBOR historical rate data
- [Credit data] - TBD

Analysis method:

- Identify periods during which SOFR and LIBOR are not well correlated
- Construct a principal component analysis to identify the explanatory components in the residuals between LIBOR and SOFR
- Construct a model that bootstraps an appropriate "strip" encompassing LIBOR's residual risk (i.e. SOFR + "LIBOR premium")

What could go wrong?

- **Data are messy.**
  - Comparisons with SOFR would require considering the daily distribution and volume of transaction data
  - SOFR averages and indexes are only recently available, and thus a smaller sample size
- **Applications of LIBOR are simply too broad to expect explanatory correlations.**
  - Comparisons with LIBOR would require multiple other potential datasets for interest rate risk
  - Other market factors (e.g. pandemic sentiment) not addressed in this study are driving rate changes