Presentation Materials

The Alternative Reference Rates Committee

June 16, 2017

Rate Evaluation Process

Tom Wipf – Morgan Stanley

The Alternative Reference Rates Committee

Alternative Rates – Rates Considered and Evaluation Process

Criteria for Potential Alternative Reference Rates

- **Benchmark Quality)** The degree to which the benchmark design ensures the integrity and continuity of the rate. The underlying market was evaluated according to its liquidity, transaction volume, and resilience.

- **Methodological Quality**)The degree to which the benchmark construction could satisfy the IOSCO Principles for soundness and robustness, including standardized terms, transparency of data, and availability of historic data.

- **Accountability)** Evidence of a process that ensures compliance with the IOSCO Principles.

- **Governance)** Evidence of governance structures that promote the integrity of the benchmark.

- **Ease of Implementation)** Assessed ease of transitioning to the rate, including:
  - Anticipated demand for and relevance to hedging/trading
  - Existence of, or potential for a term market in the underlying rate

Alternative Rates – Rates Considered and Evaluation Process

Based on these criteria, the ARRC identified two preferred rates as more suitable for use:

Less Suitable

- Policy Rates
- T-Bill or Bond Rates
- Term OIS Rates
- Term Unsecured Rates

More Suitable

- Overnight Unsecured lending rates (OBFR)
- Secured Lending Rates (Treasury Repo)

Broad Treasuries Repo Rate

Paul Scurfield – Bank of America

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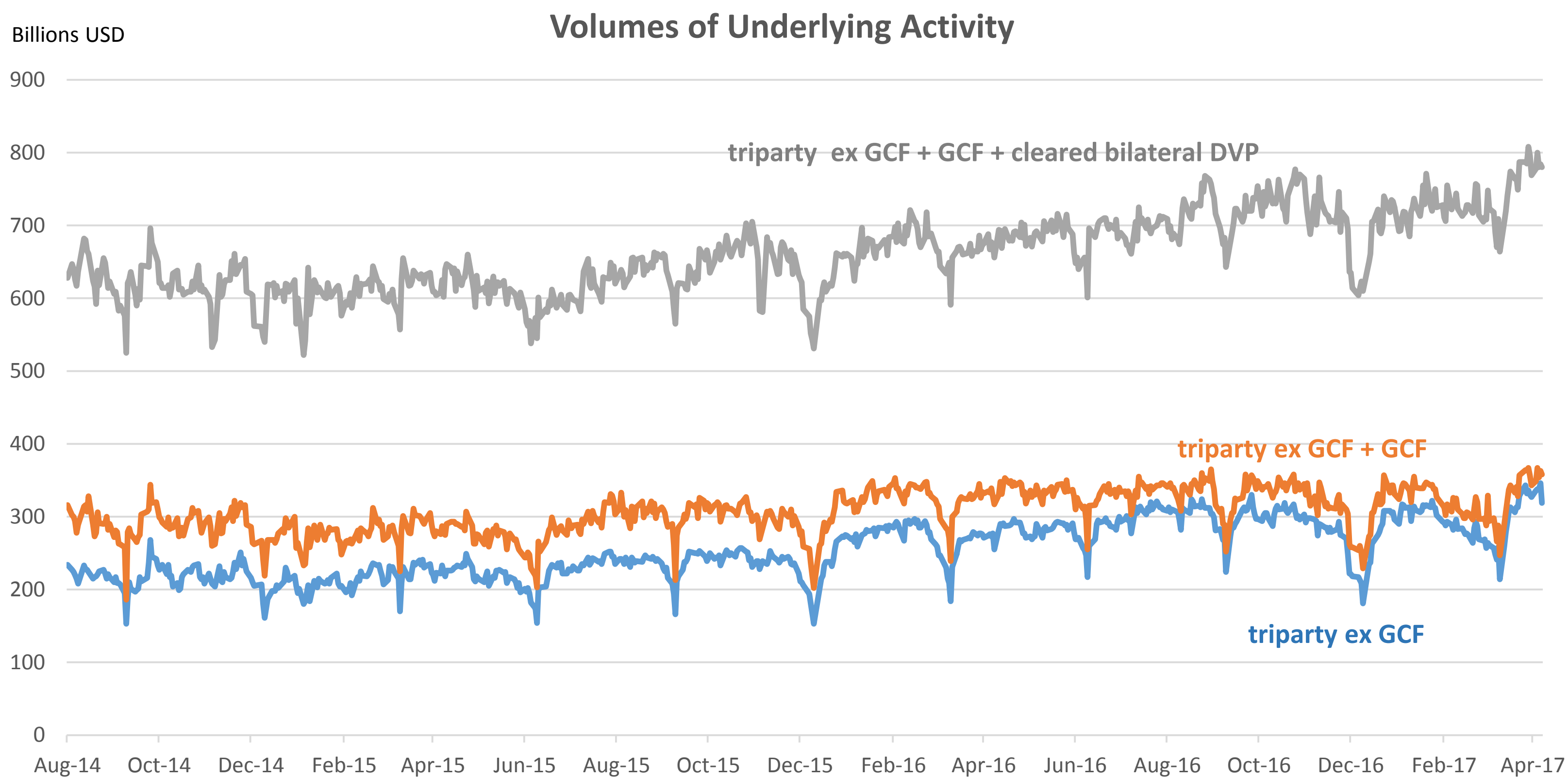
Broad Treasuries Financing Rate

In considering possible repo rates, the ARRC has expressed a preference for a rate that includes both cleared triparty and bilateral data. A rate that includes triparty data ex GCF, GCF and cleared bilateral DVP data from FICC would have as much as $800 billion in transactions and could evolve with the market. FRBNY has announced it intends to produce a broad Treasury financing repo rate that would include all three data sources while excluding Federal Reserve transactions.

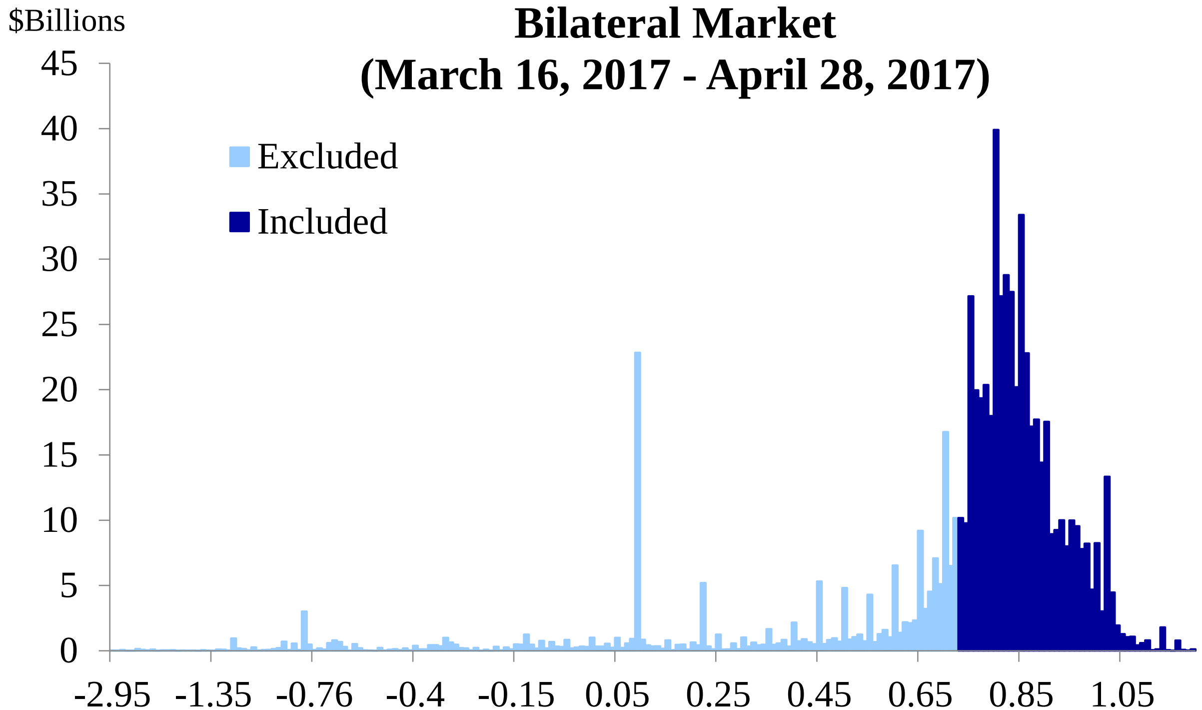


Source: Bank of New York Mellon, JP Morgan Chase, DTCC Solutions, LLC., Federal Reserve Bank of New York Staff Calculations

Broad Treasuries Financing Rate

But in including bilateral data, one must try to account for "specials" trades, although there is no failsafe way to do this. The February 2017 Feds Note by Bowman et al suggested excluding on-the-run and first-off-the-run Treasuries, but FRBNY is considering a more conservative approach that would exclude the lower 25 percent of bilateral trades each day before calculating the volume-weighted median. The chart below provides a representative depiction of how the trimming methodology would remove transactions below the 25th volume-weighted percentile rate, using the average daily distribution of volume, over a two month period.

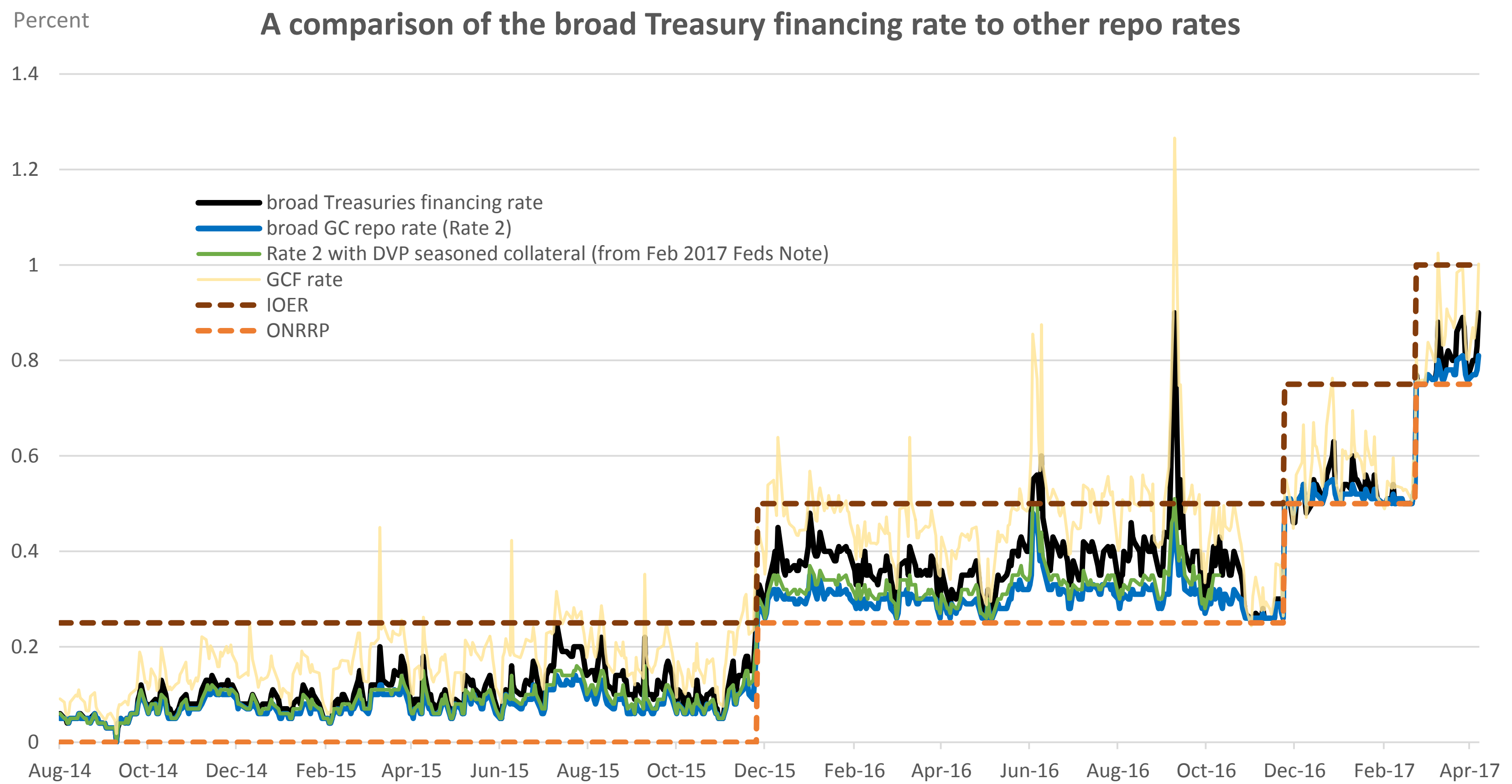
Average Daily Volume by Rate in the FICC-Cleared Bilateral Market (March 16, 2017 - April 28, 2017)



Note: March Quarter-end is excluded
Source: DTCC Solutions, LLC., Federal Reserve Bank of New York Staff Calculations

Broad Treasuries Financing Rate

The result of this more conservative filter is that the broad financing rate (in black) is a bit higher than the rate shown in the Feds Note (green) or a broad GC rate ("Rate 2," which includes triparty ex GCF and GCF data, is shown in blue). It has tended to trade closer to the middle of the corridor between the IOER and ON RRP rates, and was more volatile on the Q3 2016 quarter end, but it is much less volatile than the GCF rate (yellow) and in general only slightly more volatile than either triparty rate.



Source: Bank of New York Mellon, JP Morgan Chase, DTCC Solutions, LLC., Federal Reserve Bank of New York and Federal Reserve Board Staff Calculations

Broad Treasuries Financing Rate

On average, the broad Treasuries rate has been 4bp higher and 1bp more volatile than the narrow GC rate including BNYM triparty data or the broad GC rate including both BNYM and GCF data

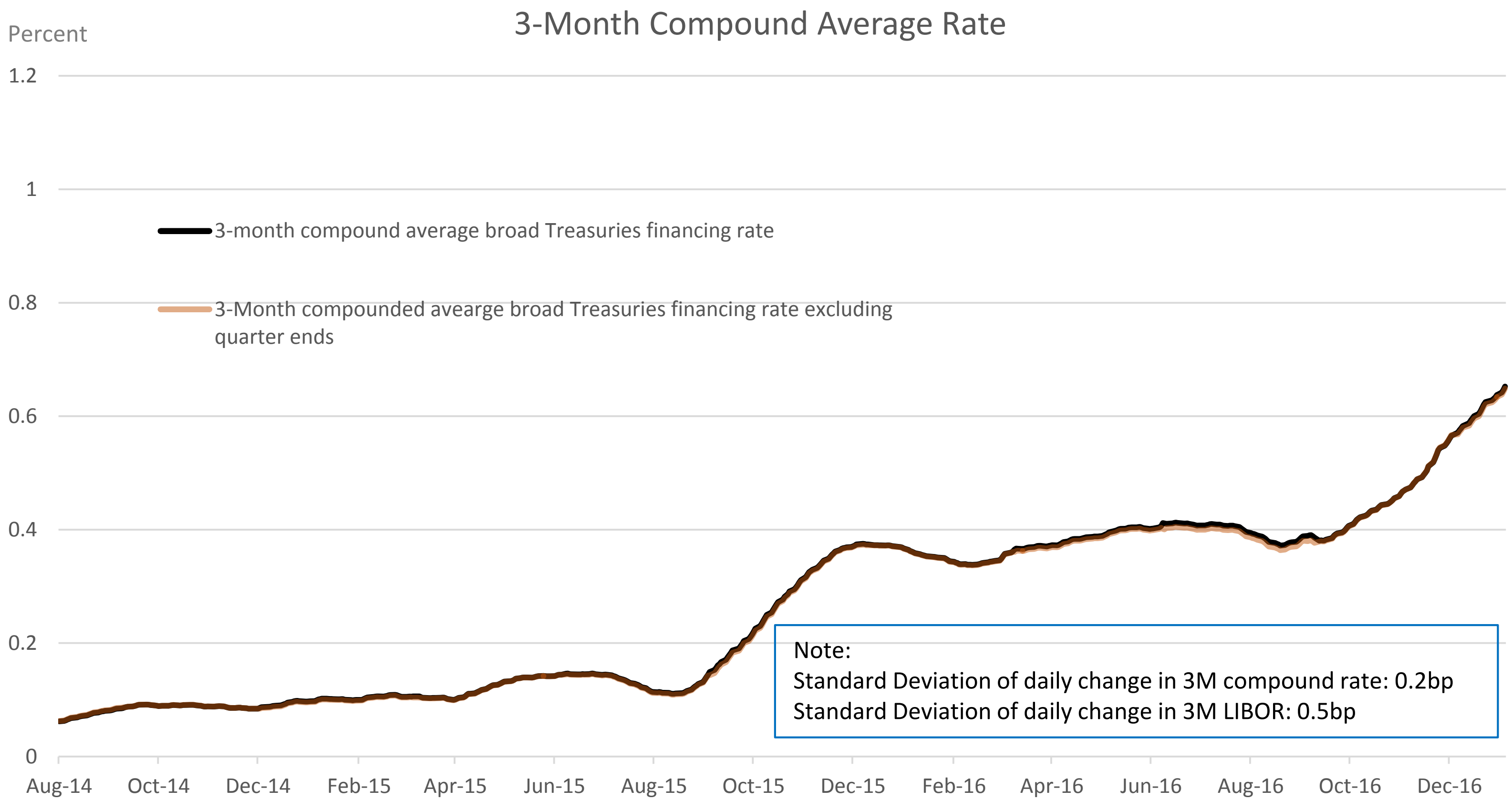
Key Statistics of Three Proposed Repo Rates Compared to the GCF Repo Index

	Average Daily Volume ($Billions)	Average Daily VWM Spread to IOER (bps)	Standard Deviation of the Daily Change in the VWM spread to IOER (bps)
Narrow GC repo rate	254	-19	2
Broad GC repo rate	306	-19	2
Broad Treasury financing rate	660	-15	3
GCF Repo Index	95	-9	6

Note: Figures include data from August 2014 through April 2017. Negative spreads imply that rates are trading below IOER. The GCF Repo Index includes trades from both legs of a transaction, whereas the GCF trades included in the broad GC repo rate and broad Treasury financing rate include each leg only once.
Source: Bank of New York Mellon, JP Morgan Chase, DTCC Solutions, LLC., Federal Reserve Bank of New York Staff Calculations

Broad Treasuries Financing Rate

Most of the day-to-day and quarter-end volatility will be averaged out in the floating rates paid in OIS contracts, which are based on quarterly compound averages of the overnight rate. The compound average is as smooth as LIBOR, whether quarter ends are included or not. If it helped with market acceptance, quarter ends could conceivably be excluded from OIS compound averages.



Source: Bank of New York Mellon, JP Morgan Chase, DTCC Solutions, LLC., Federal Reserve Bank of New York and Federal Reserve Board Staff Calculations

Overnight Bank Funding Rate

Heraclio Rojas – Citigroup

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Overnight Bank Funding Rate

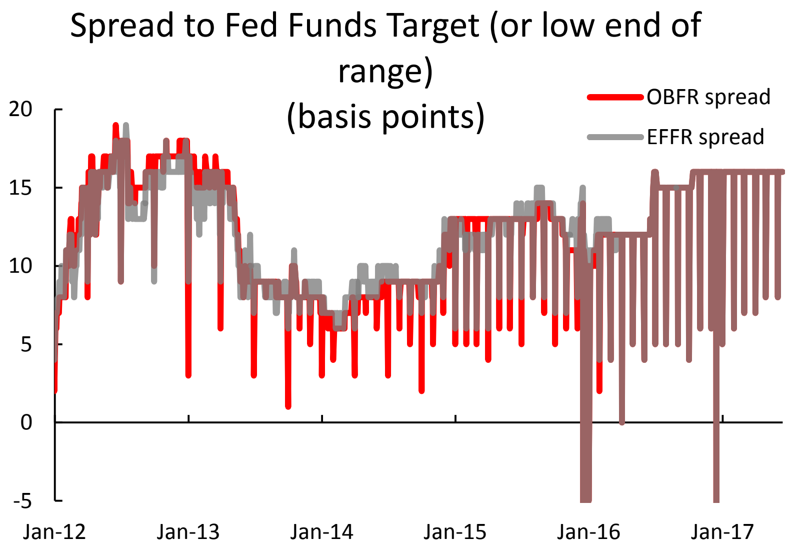
- ARRC believes the best unsecured rate alternative would be the Overnight Bank Funding Rate (OBFR). The OBFR is calculated from the FR 2420 collection using overnight federal funds transactions of domestic banks and US branches and agencies of foreign banks (those used to calculate the Effective Federal Funds Rate), as well as certain overnight Eurodollar transactions.
    - These Eurodollar transactions are unsecured borrowings of US dollars booked at international banking facilities and offshore branches managed by a US banking office

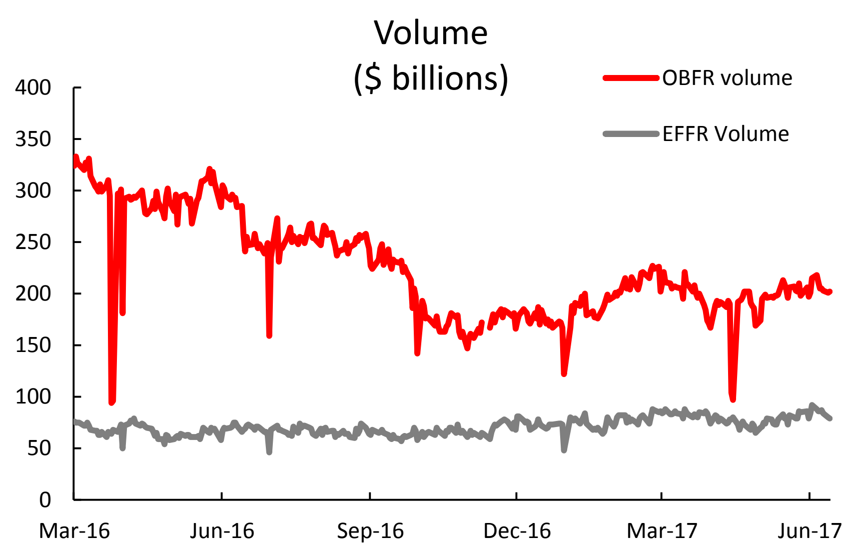
- The OBFR is calculated as a volume-weighted median

- Regular publication of the OBFR began on March 2, 2016, and in addition to the volume-weighted median rate, the New York Fed publishes the dollar amount of transactions, and the volume-weighted 1st, 25th, 75th, and 99th percentiles

Overnight Bank Funding Rate

- OBFR has historically behaved similarly to the EFFR, with comparable (though slightly larger early on) declines around month and quarter-end dates
- Critically, the volume of transactions used in calculating the OBFR is more than double that used in calculating the EFFR

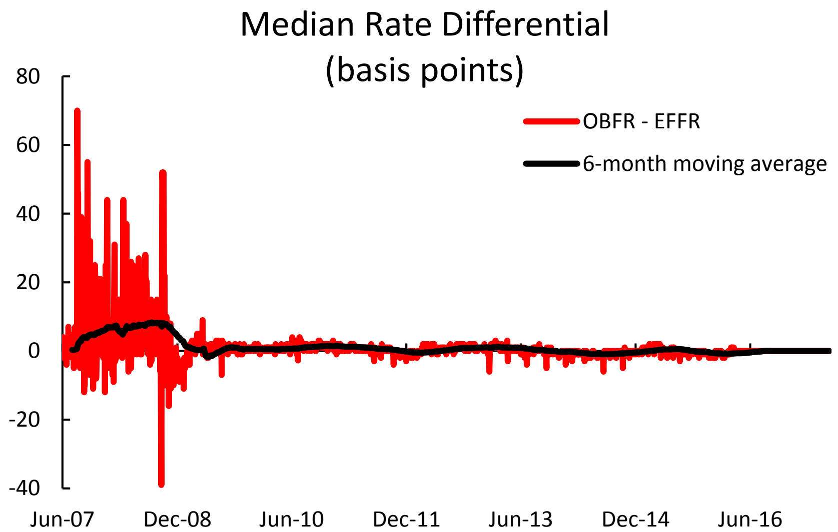


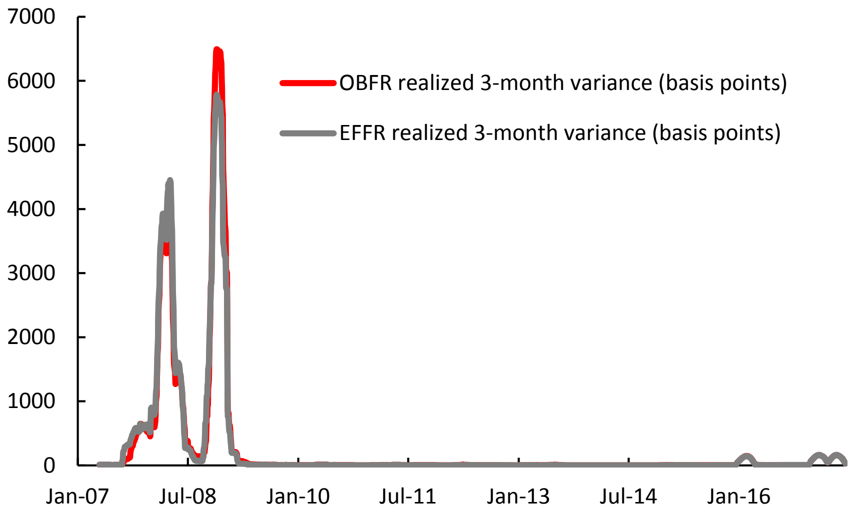


Source: New York Fed. Pre-October 2015 OBFR data is based on brokered data for fed funds and Eurodollar transactions

Overnight Bank Funding Rate

- The addition of Eurodollar transactions does suggest scope for divergence in times of stress, as can be seen in behavior of the rate from mid-2007 through 2008 (using data from a subset of brokers to calculate OBFR over the period)*
- However, the variance of the two rates is typically comparable, and was actually somewhat lower in the OBFR in the early part of the crisis





*Pre October 2015 OBFR data calculated using broker data for Fed Funds and Eurodollar transactions
Source: New York Fed

The Paced Transition Plan

Fred Sturm – CME

Phil Whitehurst – LCH

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The Paced Transition Plan

1. Nominate New Rate
   - Overnight Bank Funding Rate

   or

   - broad Treasury repo financing rate described in May 24 FRBNY Desk Statement

2. Set-Up
   - Operational and infrastructural preparation by ARRC members, exchanges, and CCPs
   - Requirement: Start regular production and publication of New Rate (if New Rate = broad Treasury repo rate)

3. Trading in New Rate futures and New Rate OIS
   - New Rate OIS are bilateral, uncleared

4. Cleared New Rate OIS
   - CCPs accept New Rate OIS for clearing, similar to other IR swaps
     - EFFR remains basis for PAI
     - Valued and margined on basis of EFFR OIS term structure
   - Requirement: Adequate New Rate history and market activity for CCPs to set margin levels for New Rate OIS

The Paced Transition Plan

5. New Rate PAI & discounting

- CCPs accept swap contracts with New Rate PAI & discounting
  - PAI based on New Rate
  - New Rate OIS curve as basis for discounting and valuation for, e.g.,
    - LIBOR reference plain vanilla IRS
    - LIBOR reference MAC
    - EFFR OIS
    - New Rate OIS
- CCPs continue to accept new swap contracts that specify EFFR PAI & discounting
- Users may choose PAI & discounting basis: EFFR or New Rate
- Swaps are cleared within same guarantee fund, regardless of PAI & discounting basis
- As term structure of liquidity in New Rate OIS lengthens and deepens, CCPs gradually lengthen tenors accepted for clearing in New Rate PAI & discounting environment
- Requirements
  - General acceptance of New Rate as alternative gauge of financing cost of settlement variation
  - Sufficient trading flows in New Rate futures/OIS to ensure valid daily marks
  - Broad acceptance of New Rate OIS term structure as alternative basis for valuation and margining

The Paced Transition Plan

6. CCPs stop accepting new swaps with EFFR PAI & discounting

- CCPs accept new swaps with EFFR PAI & discounting to close out or reduce outstanding risk in extant swaps with EFFR PAI & discounting
- Extant swaps with EFFR PAI & discounting are maintained until maturity or close-out
- Swaps are cleared within same guarantee fund, irrespective of PAI & discounting basis
- Methods for accelerating close-out may play a part, potentially including pre-announced discontinuation of CCPs' EFFR-based PAI & discounting capability
- Requirements
  - Broad consensus that New Rate represents financing cost of settlement variation
  - Broad consensus that New Rate OIS term structure is appropriate basis for valuation and margining

ARRC Advisory Group

Kiran Kini – Fannie Mae

Chair of the Advisory Group to the ARRC

ARRC Advisory Group

The ARRC formed an advisory group in November 2016 as part of its efforts to solicit feedback from a broad range of market participants. The advisory group provides input to the ARRC as it finalizes its recommendations for an alternative reference rate and transition strategy.

The advisory group is comprised of the following institutions:

- BlackRock
- Brevan Howard Asset Management
- Citadel
- GE Capital
- Manulife
- Met Life
- Office of the NYC Comptroller, Bureau of Asset Management (on behalf of NYC Pension Funds)
- Pacific Investment Management Company
- PNC Bank
- Quicken Loans
- The Federal Home Loan Bank of New York
- The Federal Home Loan Mortgage Corporation
- The Federal National Mortgage Association
- The International Bank for Reconstruction and Development – World Bank

A significant majority of the Advisory Group have supported the repo rate option due to their perception that a rate based on repo markets would be more robust than an unsecured funding rate and more indicative of an active funding market used by a wider set of market participants. However, a few Advisory Group members expressed a preference for the Overnight Bank Funding Rate, and some were indifferent between the two options or expressed a preference to continue trading LIBOR.