

Synthetic LIBOR using Overnight Risk-Free Rates plus CDS Spreads

Hanyun (Laura) Zhang, GreenPoint Global Quantitative Associate

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Under guidance of Tim Glauner and Sanjay Sharma, Ph.D.

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Abstract

This study tests the fit of proxy USD LIBOR 3-month rate using compounded Fed Funds (FFR) to derive a term Fed Funds rate plus the Banking Index CDS spread. The same tests will then also be performed using quoted OIS Fed Funds 3-month term rates.

The broader context is that USD LIBOR contains a credit spread and the proposed new Risk-Free-Rates do not contain the credit spread. This difference in behavior of the rates raise questions about how appropriate it is to use the new Risk-Free-Rates as a benchmark for loan and MBS products.

CDS Data Overview

	Subordinated	Senior	FFR	LIBOR
No. Of Banks	17	18	-	-
Earliest Date Data Available	03/21/2016	06/25/2015	06/25/2015	06/25/2015
Average Date Available	09/20/2019	09/20/2019	-	-
Average (Trimmed Mean)	42.43bps	21.66bps	1.16%	1.47%

Notes and Assumptions

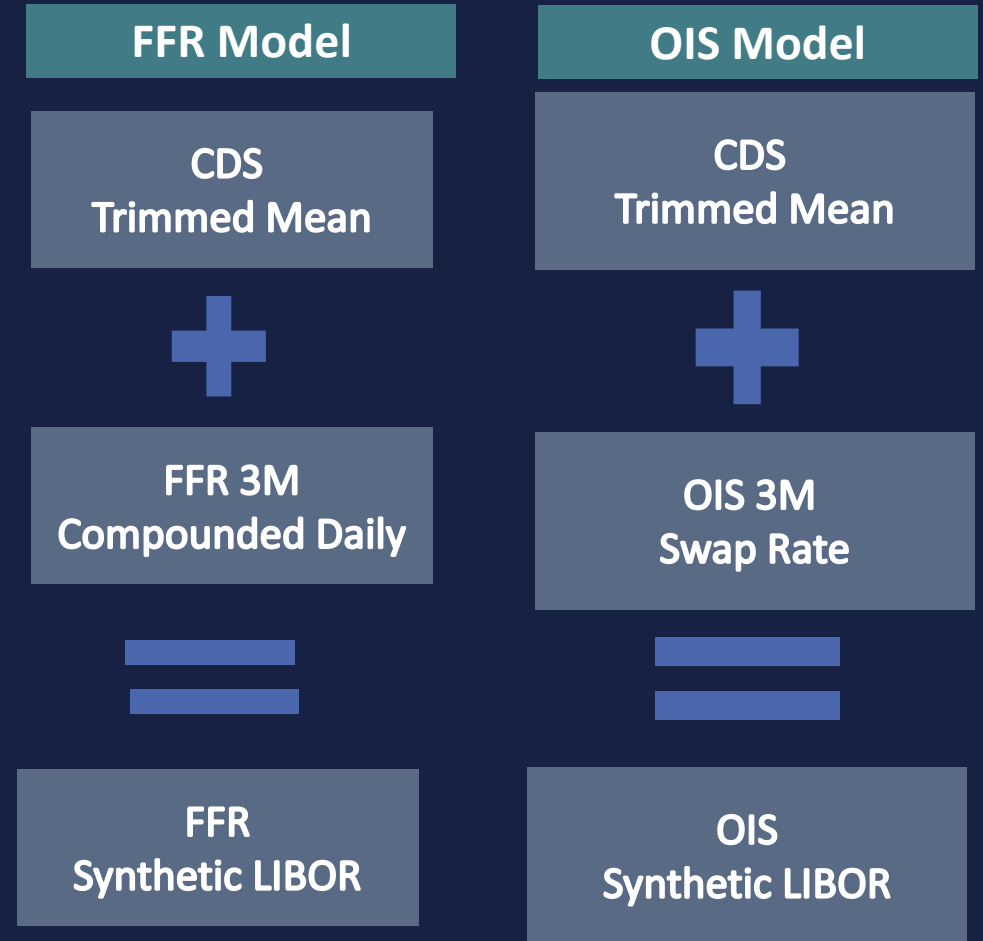
No volume data available

Used back fill to fill missing FFR data gap

For Synthetic Libor we utilize the Senior quotes as Counterparty risk is Senior

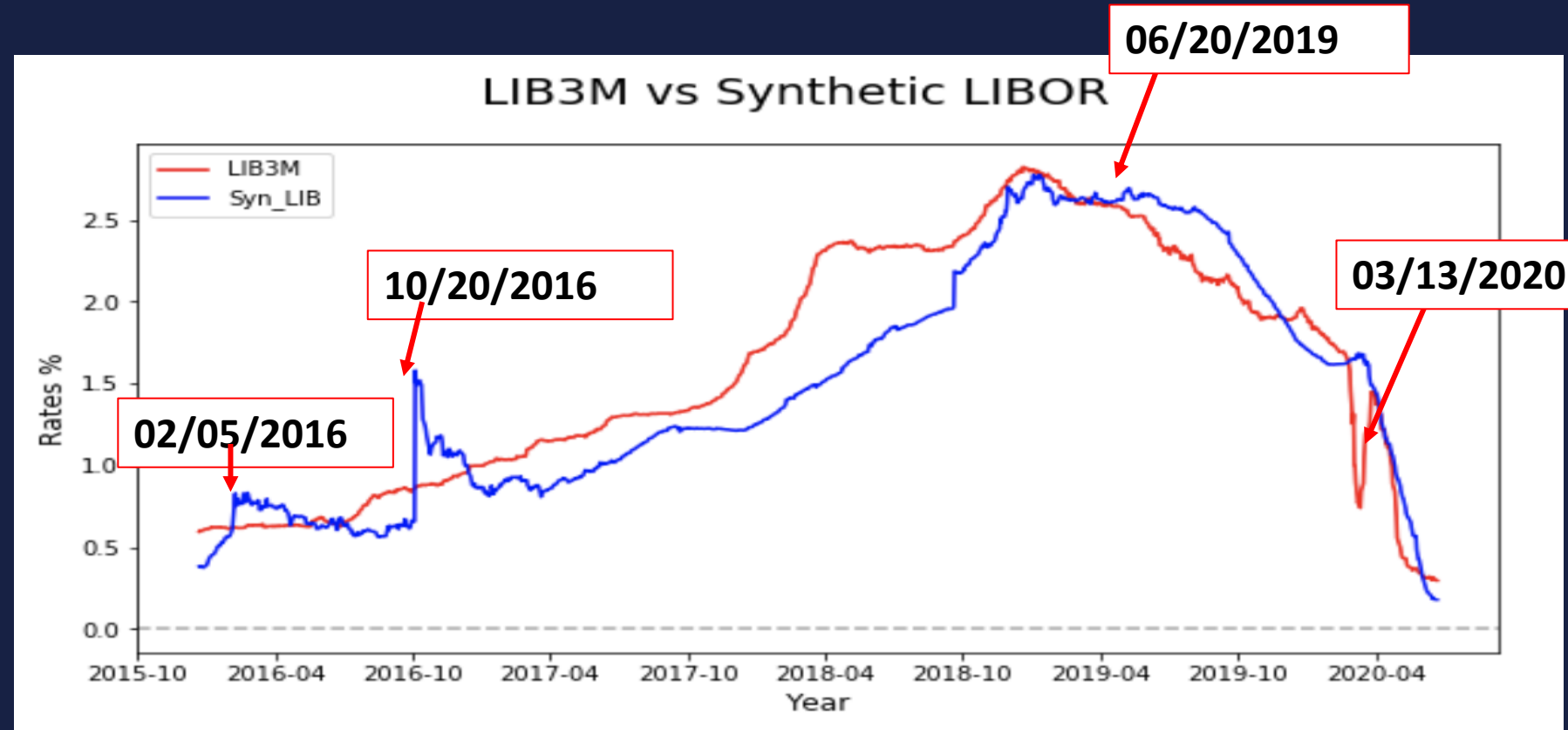
Methodology Explained

- **06/25/2015 - 09/20/2019**
 - Arithmetic average due to lack of data
- **09/20/2019 - 06/22/2020**
 - Arithmetic average of CDS data excluding the first and last quartile on a daily basis



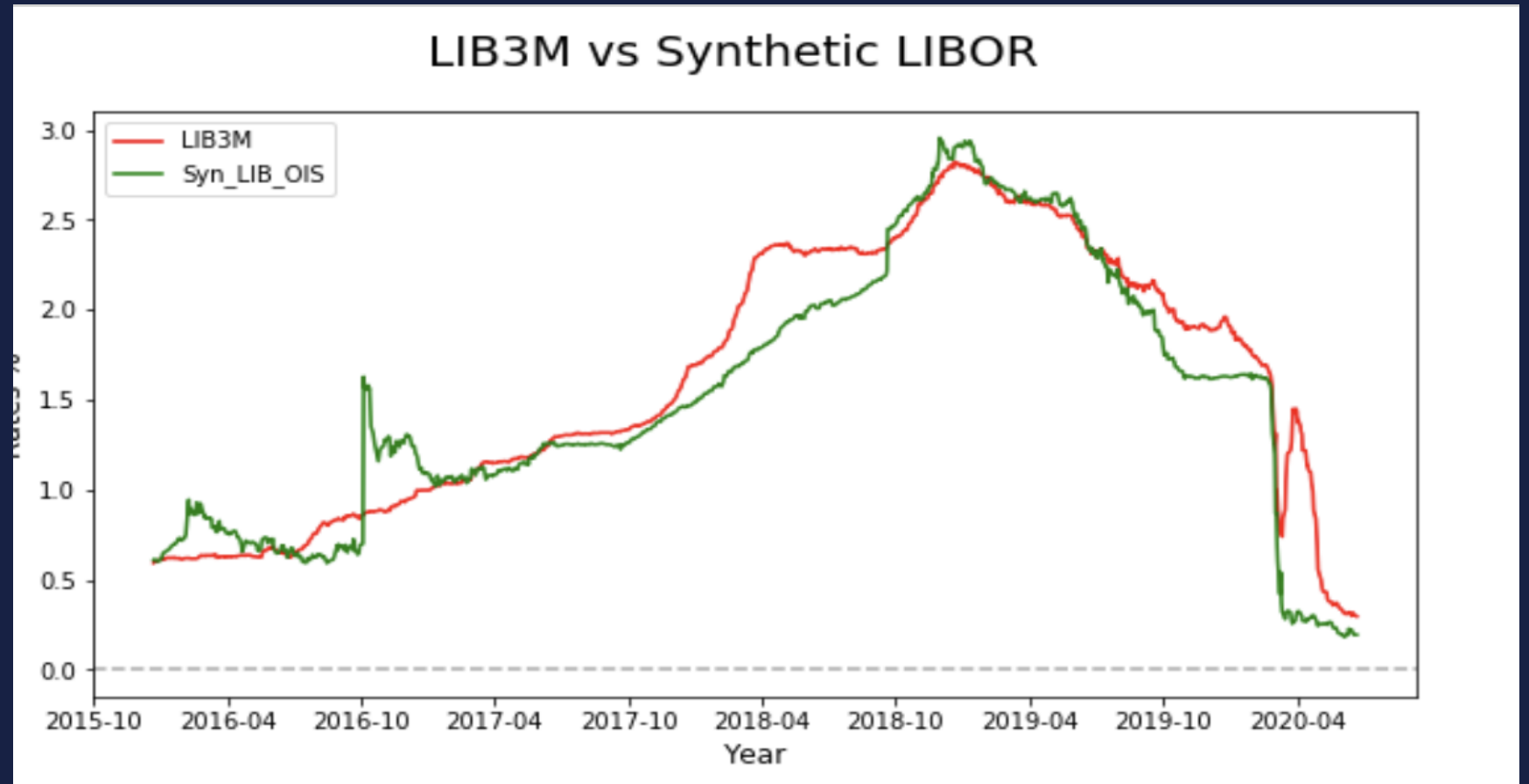
Actual LIB3M vs FFR SYNTHETIC LIBOR

- Average model difference: 0.10%
- Most days LIB3M is higher than Synthetic LIBOR



Actual LIB3M vs OIS Synthetic libor

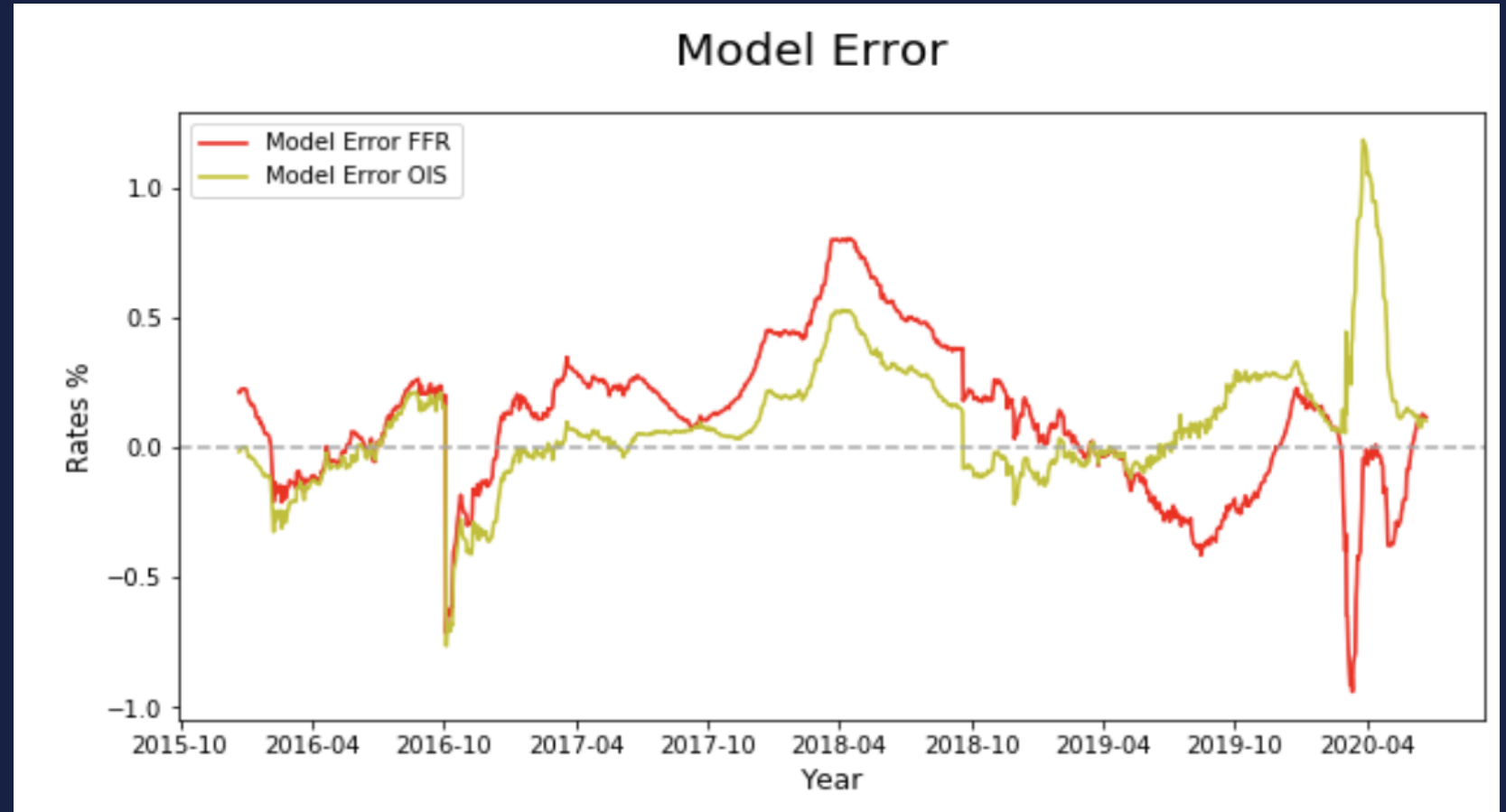
- Average model difference: 0.08%
- Most days LIB3M is higher than OIS3M Synthetic LIBOR



Model error

- Calculated by Actual LIBOR – Synthetic LIBORs

	FFR	OIS
Average model error	0.10%	0.08%
Average abs model error	0.24%	0.17%
Model Error Std Dev	0.28	0.23
Abs Model Error Std Dev	0.19	0.18



SIMILARITY TEST: Correlation

- LIBOR 3M is more correlated with OIS 3M Swap rate curve than with FFR compounded 3m curve
- After adding CDS spreads, both curves' correlation decreased
- OIS LIBOR curve is more correlated with LIBOR 3M than FFR LIBOR does

Correlation between LIBOR 3M and Synthetic Curves				
	FFR 3M	OIS 3M	FFR LIB	OIS LIB
LIBOR 3M	0.94	0.97	0.92	0.95

SIMILARITY TEST: Granger test

- Null hypothesis: Synthetic LIBOR does NOT Granger cause the actual LIBOR
- Significance level: 5%
- Max Lag: maximum lag before P-value gets larger than critical level, i.e. $pval < 0.05$ when $lag < max\ lag$
- SSR – F test: explained variance/ unexplained variance
- SSR – Chi test: explained variance/ unexplained variance between the expected frequencies and the observed frequencies

Granger Test Summary		
	FFR LIB	OIS LIB
Max Lag	5	2
SSR – F test (lag1)	20.10	29.08
SSR – Chi Test (lag1)	20.15	29.15