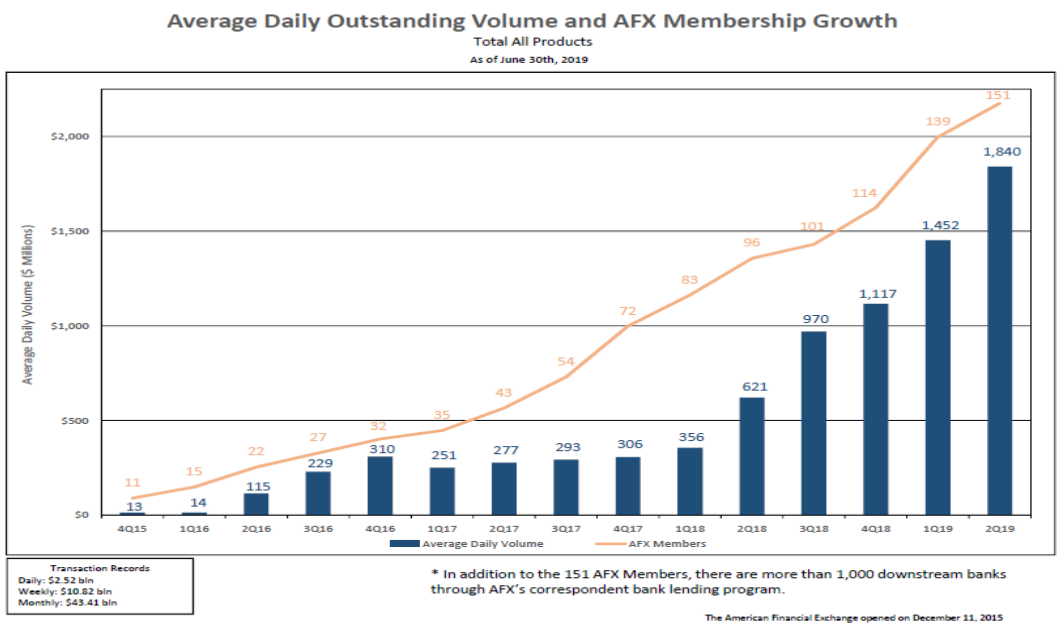
AMERIBOR® OVERNIGHT RATE

The American Interbank Offered Rate, or AMERIBOR® is a transaction-based benchmark interest rate and is calculated as the untrimmed, volume weighted average interest rate directly from the overnight UNSECURED borrowing and lending transactions on the AFX electronic exchange.

AMERIBOR® is calculated at the end of each trading day and adheres to IOSCO principles for financial benchmarks. AMERIBOR® is quoted on actual/360 day-count, following business day convention, rounded to the fifth decimal place and is published on Bloomberg under ticker symbol AMERIBOR®.

AMERIBOR® is a new interest rate benchmark create by the American Financial Exchange that reflects the actual unsecured borrowing costs of over 1,000 American banks and financial institutions and provides a new alternative benchmark interest rate for assets and liabilities and enables its users to optimize asset-liability management (ALM).

AMERIBOR® is providing American Financial Institutions with a Benchmark alternative and satisfying the demand for a rate with a credit component included. For more information please visit our website at www.ameribor.net



AMERIBOR® FUTURES

AMERIBOR® futures contracts are listed on the CBOE Futures Exchange. The 7-day AMERIBOR Futures and 3-month AMERIBOR Futures are live and they can provide several new inter-commodity spreads to the trading community. Examples will be presented in this document. The pricing convention for AMERIBOR® futures contracts is similar to the pricing convention used by other STIR contracts except that AMERIBOR® futures contracts use a multiplier of 100 (i.e., 10,000 – (Final Settlement Rate X 100)). For e.g., the settlement price for an AMERIBOR® futures contract with a final AMERIBOR® settlement rate of 2.45% would be: 10,000 – (2.45 X 100) = 9755.00.

	7-Day AMERIBOR Futures	3-Month AMERIBOR Futures
Contract Unit	Average daily American Interbank Offered Rate ("AMERIBOR") interest during futures contract delivery week, such that each basis point per annum of interest = $35 per contract.	Compounded daily American Interbank Offered Rate ("AMERIBOR") interest during contract Reference Quarter, such that each basis point per annum of interest = $25 per contract.
Price Convention	10,000 - (Rate X 100)	10,000 - (Rate X 100)
Contract Notional	$18,000,000	$1,000,000
Value of 1.0 Basis Point per Annum	$35	$25
Minimum Price Fluctuation	1/4 basis point per annum equal to $8.75 per contract	1/4 basis point per annum equal to $6.25 per contract
Listed Contracts	Up to nearest 52 weekly contracts	Up to 12 March Quarterly contracts (Mar, Jun, Sep, Dec)
Detailed Contract Specifications	Please refer to Appendix 1	Please refer to Appendix 2

https://cfe.cboe.com/cfe-products/ameribor-futures

7-Day Contract/ AMW

The AMERIBOR® 7-Day futures contract was designed to provide an interest rate futures contract to meet the following market needs:

1. Enable banks to efficiently hedge the interest rate exposure of their bi-weekly Federal Reserve System reserve requirements by using AMERIBOR® 7-Day futures contracts.

- The FR2900 report tracks commercial banks liquid accounts activity and generates a bi-weekly target number that each bank must hold as reserves as a daily average at the Fed based on the flows during a 2-week period. More information can be found at the following links
- https://www.federalreserve.gov/apps/reportforms/reportdetail.aspx?sOoYJ+5BzDblI7g2+r203S0gg6NcUIj6
- https://www.frbatlanta.us/banking/reporting/training/fr2900/FR2900%20Intro%20-%20Storyline%20output/story_html5.html

2. Serve as a complement to the AMERIBOR® 3-Month contract by providing a futures strip of 7-Day contracts for market participants who desire more granularity in trading the expectations for future AMERIBOR® rates

3. Provide market participants with the ability to attain greater exposure to future AMERIBOR® interest rate volatility through the simple average settle and the ability to price in Fed cuts without having to average previous days into the futures contract.

AMW Expirations

Contract Code	Last Trading Day	Final Settlement Date
AMW3/Q9 3rd Aug Contract	8/21/2019	8/22/2019
AMW4/Q9 4th Aug Contract	8/28/2019	8/29/2019
AMW1/U9 1st Sept Contract	9/4/2019	9/5/2019
AMW2/U9 2nd Sept Contract	9/11/2019	9/12/2019
AMW3/U9 3rd Sept Contract	9/18/2019	9/19/2019
AMW4/U9 4th Sept Contract	9/25/2019	9/26/2019
AMW1/V9 1st Oct Contract	10/2/2019	10/3/2019
AMW2/V9 2nd Oct Contract	10/9/2019	10/10/2019
AMW3/V9 3rd Oct Contract	10/16/2019	10/17/2019
AMW4/V9 4th Oct Contract	10/23/2019	10/24/2019
AMW5/V9 5th Oct Contract	10/30/2019	10/31/2019
AMW1/X9 1st Nov Contract	11/6/2019	11/7/2019
AMW2/X9 2nd Nov Contract	11/13/2019	11/14/2019

3-Month Contract / AMB3

AMERIBOR® 3-Month futures contract price reflects market expectations of business-day-compounded AMERIBOR® rates during the Reference Quarter, expressed as an interest rate per annum. After the nearby 3-month contract enters its Reference Quarter, the contract rate becomes a combination of (1) the known AMERIBOR® rates (i.e., the published AMERIBOR® values for all the days from the start of the Reference Quarter to the present), and (2) the market's expectations of AMERIBOR® values for the remaining days in the Reference Quarter between the present and the end of the Reference Quarter.

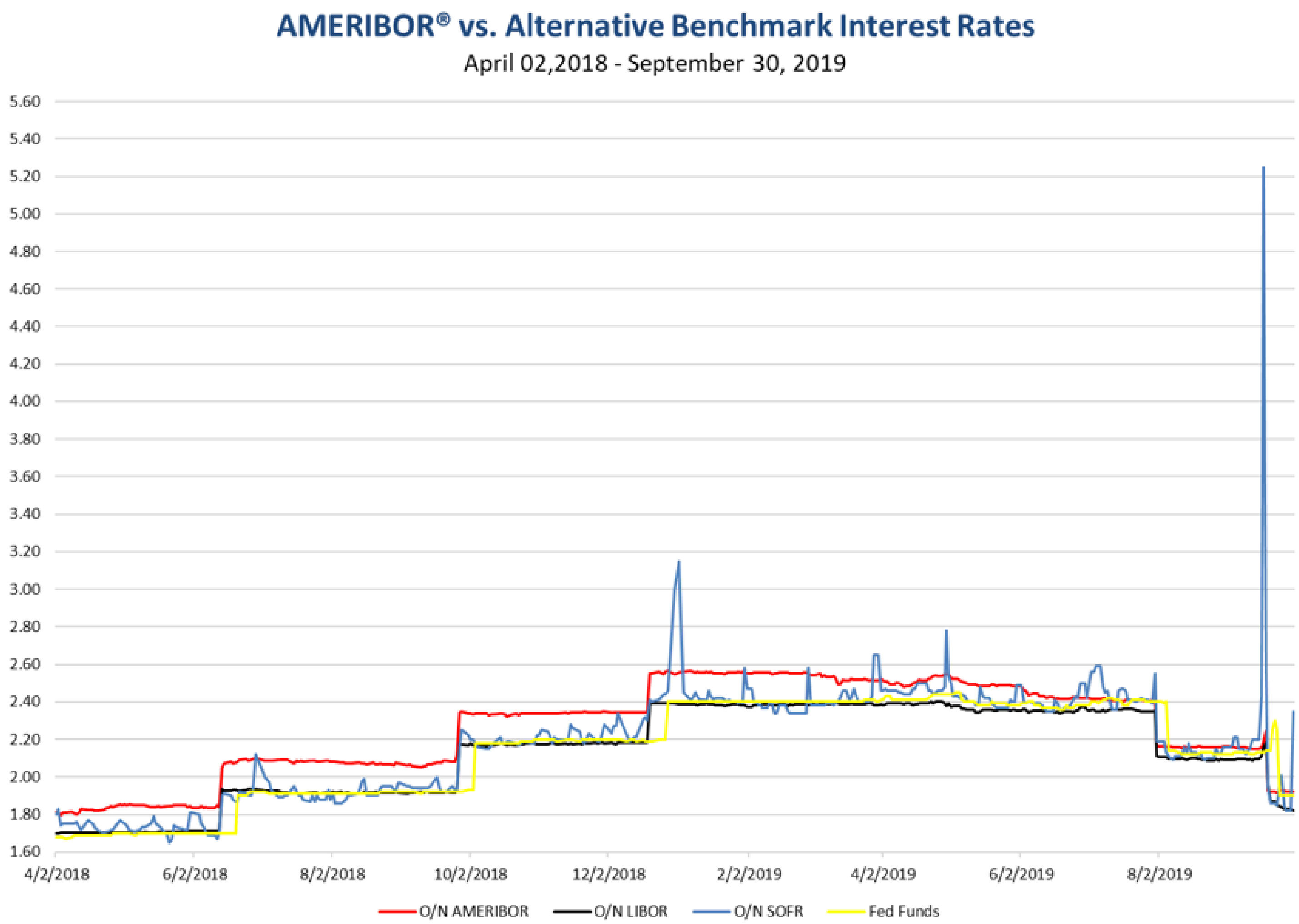
As the expiring 3-Month contract progresses through its Reference Quarter, the expectational component of the final settlement price will play a diminishing role in the fair valuation of the contract as it is compounding in arrears. In general, the progressively decreasing uncertainty about the contract's final settlement price results in steady decrease in the volatility of the contract price as the contract approaches the final settlement date. This type of decreasing price volatility as the contract approaches final settlement is common to some STIR contracts that use the method of compounding daily interest rates to determine the final settlement price.

AMB3 Expirations

Contract Code	Last Trading Day	Final Settlement Date
AMB3/M9 June Contract	9/17/2019	9/18/2019
AMB3/U9 Sept Contract	12/17/2019	12/18/2019
ASMB3Z9 Dec Contract	3/17/2019	3/18/2020
AMB3/H0 Mar Contract	6/16/2019	6/17/2020

SPREADING AMERIBOR, FED FUNDS, SOFR and ED FUTURES

The launch of CFE 7-day AMERIBOR futures and Three-Month AMERIBOR futures brings several new spreading opportunities to the short-term interest rate (STIR) markets. AMERIBOR offers the ability to spread Unsecured versus Secured rates and volatility between benchmarks in an uncertain market.



We will highlight 5 spreading opportunities:

- 7-Day AMW/ One-Month SOFR (AMW/SER)
- 7-Day AMW/ 30-Day Federal Funds (AMW/FF)
- 3-Month AMB / 3-Month Eurodollar (AMB/ED)
- 3-Month AMB / 3-Month SOFR (AMB/SFR)
- 3-Month AMB / 30-Day Federal Funds (AMB/FF)

7-Day AMW /ONE-Month SOFR (AMW/SER)

CAPTURE VOLATILITY WITH LESS RELATIVE COMPRESSION USING 7-DAY AMERIBOR FUTURES

10 X 1-Month SOFR Futures contract / 3 AMERIBOR strips of 4 sequential weeklies whose dates correspond most with the reference period of the Fed Funds contract. The 10: 12 ratio is designed to mitigate DV01 risk, see chart below.

	AMW	SER
DV01 per contract	35	41.67
DV01 per leg	420	416.7

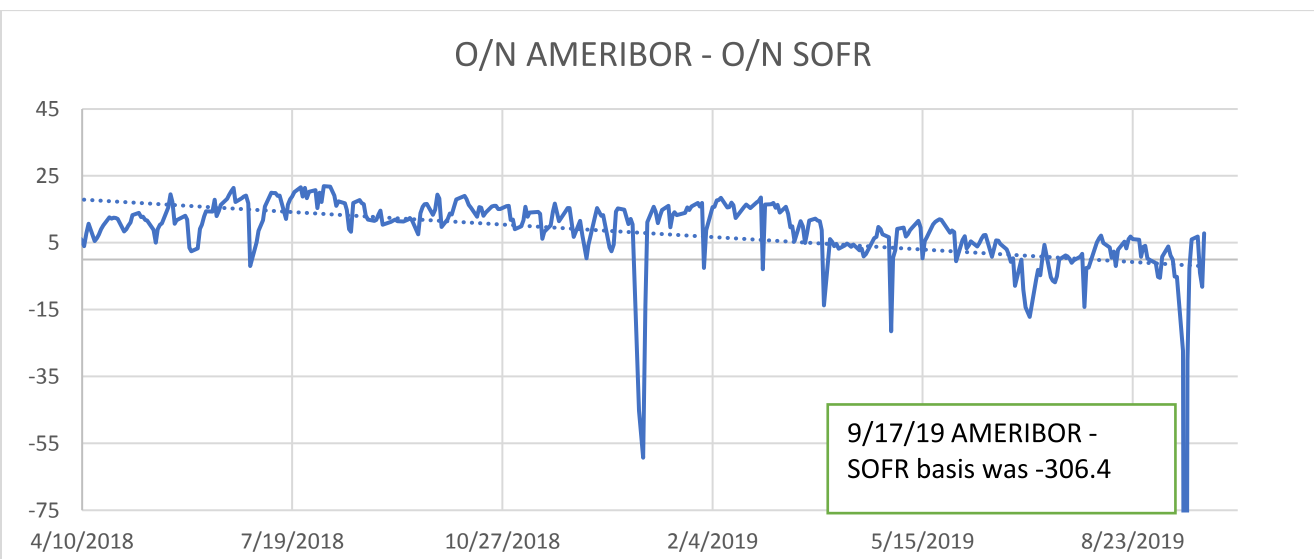
Example

10 SERU9 : 3 AMW1U9 + 3 AMW2U9 +3 AMW3U9 + 3 AMW4U9
Stub Periods: 8/29 – 8/31 and 9/26/19 – 9/30/19

- **Since the part of the reference period for AMW3U9 falls outside of the reference period for SR1U9, this creates diagonal rate risk. This diagonal risk can be mitigated using a rolling strategy if desired.**

x 3 contracts AMW1U9 (1st Sept Contract) Reference Period 8/28/19 – 9/4/19	**x 3 contracts AMW2U9 (2nd Sept Contract) Reference Period 9/5/19 – 9/11/19**	**x 3 contracts AMW3U9 (3rd Sept Contract) Reference Period 9/12/19 – 9/17/19**	**x 3 contracts AMW4U9 (4th Sept Contract) Reference Period 9/18/19 – 9/25/19**	**NO AMW Exposure 9/26/19 – 9/30/19**

No SER Exposure 8/28/19– 8/31/19	**x 10 contracts SERU9 (Sept SOFR Contract) Reference Period 9/1/19 – 9/30/19**



7-Day AMB /30-Day Federal Funds (AMB/FF)

CAPTURE VOLATILITY WITH LESS RELATIVE COMPRESSION USING 7-DAY AMERIBOR FUTURES

10 X 1-Month Federal Funds Futures contracts / 3 AMERIBOR strips of 4 sequential weeklies whose dates correspond most with the reference period of the Fed Funds contract. The 10: 12 ratio is designed to mitigate DV01 risk, see chart below.

	AMW	Fed Funds Futures
DV01 per contract	35	41.67
DV01 per leg	420	416.7

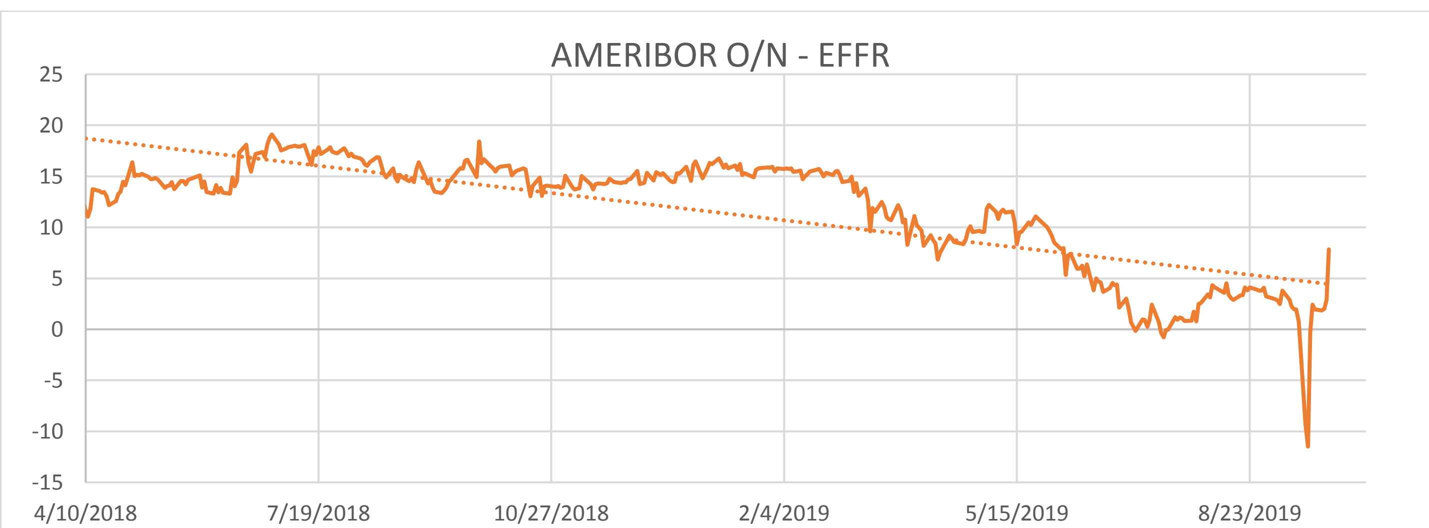
Example

10 ZQU9 : 3 AMW1U9 + 3 AMW2U9 +3 AMW3U9 + 3 AMW4U9
Stub Periods: 8/29 – 8/31 and 9/26/19 – 9/30/19

- **Since the part of the reference period for AMW3U9 falls outside of the reference period for ZQU9, and ZQU9's reference period runs past AMW4's reference period, this creates diagonal rate risk. This diagonal risk can be mitigated using a rolling strategy if desired.**

x 3 contracts AMW1U9 (1st Sept Contract) Reference Period 8/28/19 – 9/4/19	**x 3 contracts AMW2U9 (2nd Sept Contract) Reference Period 9/5/19 – 9/11/19**	**x 3 contracts AMW3U9 (3rd Sept Contract) Reference Period 9/12/19 – 9/17/19**	**x 3 contracts AMW4U9 (4th Sept Contract) Reference Period 9/18/19 – 9/25/19**	**NO AMW Exposure 9/26/19 – 9/30/19**

No Fed Funds Exposure 8/28/19– 8/31/19	**x 10 contracts ZQU9 (Sept Fed Funds Contract) Reference Period 9/1/19 – 9/30/19**



3-Month AMB/Three-Month Eurodollar (AMB/ED)

CAPTURE RELATIVE VOLATILITY BETWEEN AMERIBOR and EURODOLLARS

1 Eurodollar contract / 1 AMB3 contract. The AMB3 is named by the month in which it begins, as it compounds in arrears. The Eurodollar contract is a forward-looking interest rate futures contract and is named for the month in which it expires. To avoid diagonal rate risk once could for example put the Dec Eurodollar Contract against the Dec AMB3 contract even though the expirations are different.

The contract ratio is 1:1 because Dv01 in each contract is $25.00.

Example

1 AMB3Z9 (December 2019 3 mo. AMERIBOR contract) : 1 EDZ9 (December Eurodollar contract)

	12/18/19 – 3/17/19 Reference Period for AMB3Z9 **Contract settles on 3/18/19**
Contract Settles on 12/18/19	**12/18/19 – 3/17/19 Reference Period for EDZ9**

3-Month AMB/Three-Month SFR (AMB/SFR)

CAPTURE RELATIVE VOLATILITY BETWEEN UNSECURED AMERIBOR and SECURED SOFR

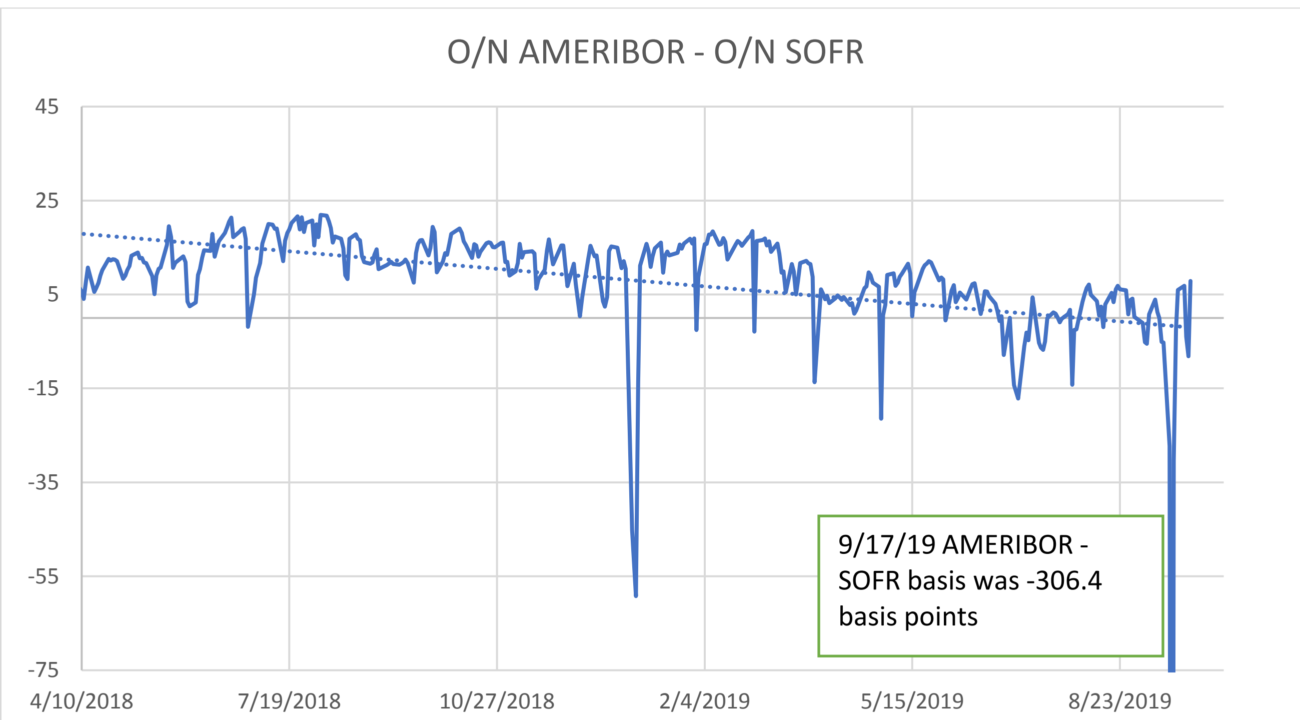
1 3-Month SOFR (SFR) / 1 AMB3 contract. The AMB3 is named by the month in which it begins, as it compounds in arrears same as is the SOFR 3 month contract. To avert diagonal rate risk one could for example put the Dec SFR Contract against the Dec AMB3 contract.

The contract ratio is 1:1 because Dv01 in each contract is $25.00.

Example

1 AMB3Z9 (December 2019 AMERIBOR contract): 1 SFRZ9 (December 2019 3 mo. SOFR contract)

12/18/19 – 3/17/19 Reference Period for AMB3Z9 **Contract settles on 3/18/19**
12/18/19 – 3/17/19 Reference Period for SFRZ9 **Contract settles on 3/18/19**



3-Month AMB/ 30-Day Federal Funds (AMB/FF)

CAPTURE RELATIVE RATE SPREAD COMPRESSION AND EXPANSION THROUGH FED CYCLES

10 AMB3 Futures Contracts / 6 Fed Funds Contracts.

The 10:6 ratio is designed to mitigate DV01 risk, see chart below.

	AMB3	Fed Funds Futures
DV01 per contract	25	41.67
DV01 per leg	250	250

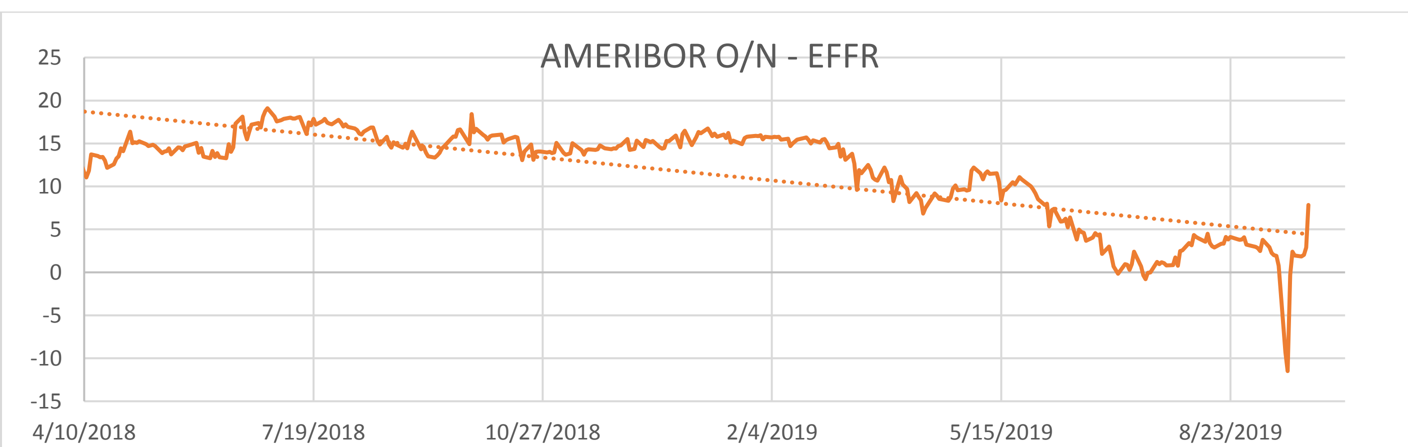
<u>Example</u>

10 AMB3U9 (September 2019 AMERIBOR contract) : 2 ZQV9 (Oct Fed Funds Contract) + 2 ZQX9 (Nov Fed Funds Contract) + 2 ZQZ9 (Dec Fed Funds Contract)
Stub Periods: 9/18/19 - 9/30/19, 12/18/19 – 12/31/19

- **Since part of the reference period for AMB3U9 falls outside of the reference period for ZQV9, and ZQZ9's reference period runs past AMB3U9's expiration, this creates diagonal risk. This diagonal risk can be mitigated using a rolling strategy if desired.**

9/18/19 – 9/30/19 No Fed Funds Exposure	**x 2 contracts 10/1/19 – 10/31/19 Reference Period for ZQV9 (Oct Fed Funds Contract)**	**x 2 contracts 11/1/19 – 11/30/19 Reference Period for ZQX9 (Nov Fed Funds Contract)**	**x 2 contracts 12/1/19 – 12/31/19 Reference Period for ZQZ9 (Dec Fed Funds Contract)**

x 10 contracts 9/18/19 – 12/17/19 Reference Period for AMB3U9 (September 2019 AMERIBOR contract)	**No AMERIBOR Exposure 12/18/19 – 12/31/19**



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