

INTEREST RATE BENCHMARKS REVIEW: Third Quarter of 2019 and Year-to- September 30, 2019

The ISDA Interest Rate Benchmarks Review analyzes trading volumes of interest rate derivatives (IRD) transactions in the US referencing the Secured Overnight Financing Rate (SOFR) and other selected alternative risk-free rates (RFRs), including the Sterling Overnight Index Average (SONIA), the Swiss Average Rate Overnight (SARON) and the Tokyo Overnight Average Rate (TONA). ISDA expects to add the Euro Short-Term Rate (€STR) to its analysis once there is trading activity. In addition, the report analyzes IRD traded notional referencing the London Interbank Offered Rate (LIBOR) denominated in US dollars, sterling, Swiss franc, yen, euro, as well as EURIBOR and TIBOR.

This report uses data from the Depository Trust & Clearing Corporation (DTCC) swap data repository (SDR). It therefore only covers trades that are required to be disclosed under US regulations.

KEY HIGHLIGHTS FOR THE THIRD QUARTER OF 2019 AND YEAR-TO- SEPTEMBER 30, 2019

In the third quarter of 2019, IRD traded notional referencing SOFR increased by 25.4% to \$106.3 billion from \$84.7 billion in the second quarter of 2019. The number of SOFR transactions increased to 478 from 188 over the same period. While growing, IRD traded notional referencing SOFR remained small, accounting for about 0.2% of total IRD traded notional.

Transactions referencing alternative RFRs represented a low percentage of total IRD trading activity, accounting for less than 4% of IRD traded notional in the third quarter of 2019. SOFR swaps accounted for 4.3% of IRD traded notional referencing alternative RFRs (which include SOFR, SONIA, SARON and TONA), while SONIA swaps represented 92.7% of transactions referencing alternative RFRs in the third quarter of 2019¹.

Trading in SOFR exchange-traded futures jumped significantly in September 2019, and increased overall in the third quarter of 2019². Trading volume in SOFR futures totaled \$10.7 trillion in the third quarter of 2019 compared with \$4.7 trillion in the second quarter of 2019. Open interest in SOFR futures jumped to \$1.6 trillion at the end of September 2019 from \$558.0 billion at the end of June 2019³. Trading volume in SONIA futures totaled \$2.5 trillion compared with \$2 trillion in the second quarter of 2019. Open interest increased to \$176.6 billion at the end of September 2019 from \$162.01 billion at the end of June 2019.

¹ This is expected, as the effective federal funds rate (EFFR) is still widely used as the reference rate for US dollar OIS, and SOFR was not published until the second quarter of 2018. SONIA has been and is currently used as the reference rate for sterling overnight index swaps (OIS)

² This was most likely linked to volatility in SOFR and Federal Reserve actions in the repo market in September

³ The analysis of trading activity in SOFR and SONIA exchange-traded futures is based on data from CME, ICE and LCH

In the third quarter of 2019:

IRD traded notional referencing alternative RFRs totaled \$2.5 trillion and represented 3.6% of total IRD traded notional, compared with \$1.8 trillion in the second quarter of 2019. The number of trades referencing alternative RFRs was 4,342 in the third quarter of 2019, representing 1.1% of total IRD trade count. That compares to 2,934 trades in the second quarter of 2019.

- SOFR traded notional increased by 25.4% compared with the second quarter of 2019 and totaled \$106.3 billion, including \$52.2 billion of basis swaps. Trade count jumped by 154.3% over the same period and totaled 478, including 159 basis swaps⁴.
- SONIA traded notional rose by 34.7% to \$2.3 trillion, including \$37.2 billion of basis swaps. Trade count increased by 39.5% and totaled 3,704, including 318 basis swaps.
- SARON traded notional and trade count increased to \$11.2 billion and 30, respectively.
- TONA traded notional and trade count increased to \$62.3 billion and 130, respectively.

IRD traded notional referencing IBORs totaled \$40.3 trillion and represented 58.4% of total IRD traded notional, compared with \$41.7 trillion in the second quarter of 2019. \$31.1 trillion of IRD traded notional was based on US dollar LIBOR, accounting for 45.0% of total IRD traded notional. IRD traded notional referencing the effective federal funds rate (EFFR) totaled \$11.0 trillion and accounted for 16.0% of IRD traded notional.

⁴See the note below regarding why basis swaps are tracked separately for the alternative RFRs

Year-to-September 30, 2019:

IRD traded notional referencing alternative RFRs totaled \$6.1 trillion and accounted for 2.9% of total IRD traded notional. The number of trades referencing RFRs was 10,363, representing 0.9% of total IRD trade count.

- SOFR traded notional totaled \$213.6 billion, including \$73.3 billion of basis swaps. Trade count totaled 735, including 235 basis swaps.
- SONIA traded notional was \$5.7 trillion, including \$112.4 billion of basis swaps. Trade count totaled 9,240, including 889 basis swaps.
- SARON traded notional and trade count was \$15.1 billion and 49, respectively.
- TONA traded notional totaled \$132.2 billion, including \$1.0 billion of basis swaps. Trade count totaled 339, including one basis swap.

IRD traded notional referencing IBORs totaled \$128.6 trillion and represented 62.1% of total IRD traded notional. \$98.2 trillion of IRD traded notional was based on US dollar LIBOR, accounting for 47.4% of total IRD traded notional. IRD traded notional referencing the EFRR totaled \$28.6 trillion and accounted for 13.8% of IRD traded notional.

Table 1: Interest Rate Benchmarks Traded Notional and Trade Count⁵

	Q3 2019		YTD Q3 2019	
	Traded Notional (US\$ billions)	Trade Count	Traded Notional (US\$ billions)	Trade Count
USD LIBOR	31,059.7	185,009	98,151.5	533,412
SOFR	54.1	319	140.3	500
Basis Swaps: SOFR	52.2	159	73.3	235
GBP LIBOR	2,385.6	24,726	8,202.9	70,053
SONIA	2,256.4	3,386	5,597.9	8,351
Basis Swaps: SONIA	37.2	318	112.4	889
CHF LIBOR	159.1	2,257	490.4	6,732
SARON	11.2	30	15.1	49
Basis Swaps: SARON	0.0	0	0.0	0
JPY LIBOR	779.5	9,099	3,088.8	30,640
TIBOR/Euroyen TIBOR	3.6	35	9.7	90
TONA	62.3	130	131.2	338
Basis Swaps: TONA	0.0	0	1.0	1
EUR LIBOR	0.0	0	0.0	3
EURIBOR	5,925.2	59,595	18,669.8	154,999
€STR	0.0	0	0.0	0
Other*	26,232.2	120,736	72,315.5	346,348
Total**	69,018.1	405,799	206,999.7	1,152,640

*Other includes IRD with other reference rates and IBOR/non-RFR basis swaps
**This data includes only the transactions required to be disclosed under US regulations and does not include any exchange-traded derivatives (futures)

Source: DTCC SDR

The alternative RFR basis swap data covers all basis swaps with the relevant alternative RFR as one of the underlying assets. This includes alternative RFR/IBOR basis swaps. The IBOR data does not cover any basis swaps. The 'Other' category covers non-alternative RFR/IBOR basis swaps and IRD with reference rates that are not otherwise covered.

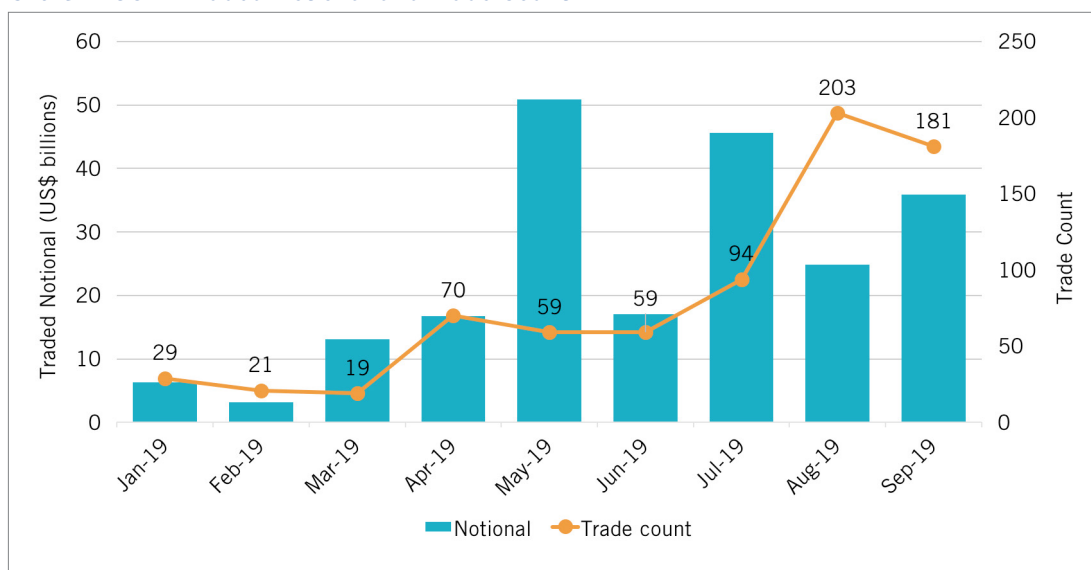
Basis swaps with the relevant alternative RFR as one of the underlying assets are tracked separately because market participants have specifically identified a robust basis swaps market as key to understanding the economic differences between the alternative RFRs and other rates, including IBORs. A robust and liquid basis swaps market for the alternative RFRs will also support hedging during the transition from IBORs to the alternative RFRs.

⁵ Data on €STR will be likely added next quarter. The European Central Bank started publishing €STR on October 2, 2019

SOFR

Trading activity in SOFR swaps picked up in the third quarter of 2019⁶. IRD traded notional referencing SOFR jumped by 25.4% to \$106.3 billion in the third quarter of 2019 from \$84.7 billion in the second quarter of 2019. The number of SOFR transactions increased by 154.3% to 478 from 188 over the same period.

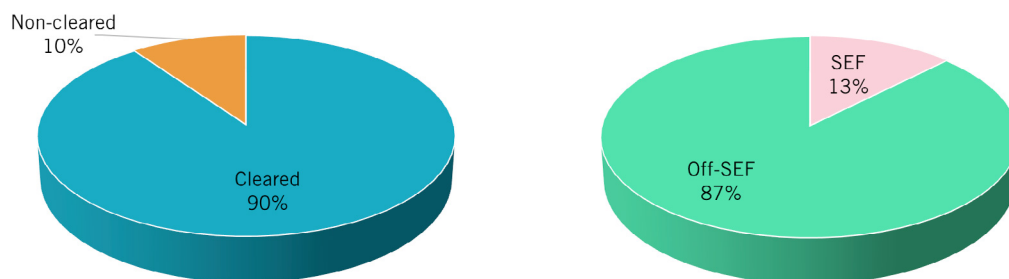
Chart 1: SOFR Traded Notional and Trade Count



Source: DTCC SDR

In the third quarter of 2019, \$95.7 billion of SOFR swaps was cleared, including \$46.3 billion of OIS and \$49.4 billion of basis swaps. Cleared swaps accounted for 90.0% of total SOFR traded notional. \$13.3 billion of SOFR traded notional was traded on swap execution facilities (SEFs) and represented 12.5% of total SOFR traded notional. 76 out of 478 transactions were traded on SEFs.

Chart 2: SOFR Traded Notional Q3 2019



Source: DTCC SDR

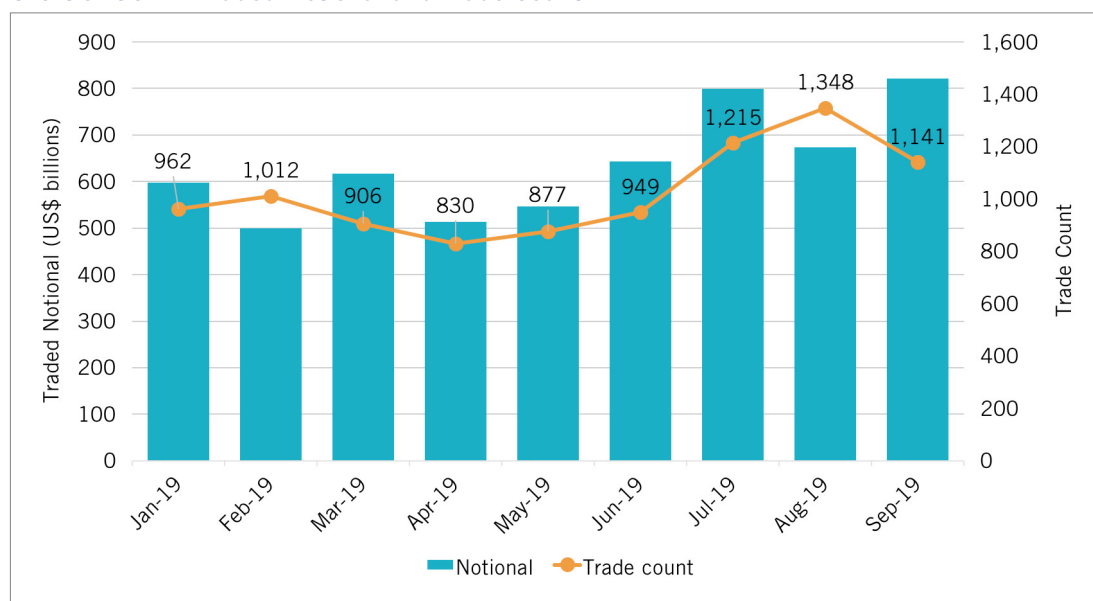
In the nine months to September 30, 2019, SOFR traded notional totaled \$213.6 billion, including \$73.3 billion of basis swaps. Total trade count was 735, including 235 basis swaps. Cleared notional totaled \$185.1 billion and accounted for 86.7% of total SOFR traded notional. SEF-traded notional totaled \$35.9 billion and represented 16.8% of total SOFR traded notional.

⁶SOFR swaps started trading in the third quarter of 2018

SONIA

SONIA traded notional grew by 34.7% to \$2.3 trillion in the third quarter of 2019 from \$1.7 trillion in the second quarter. Trade count increased by 39.5% to 3,704 from 2,656 over the same period.

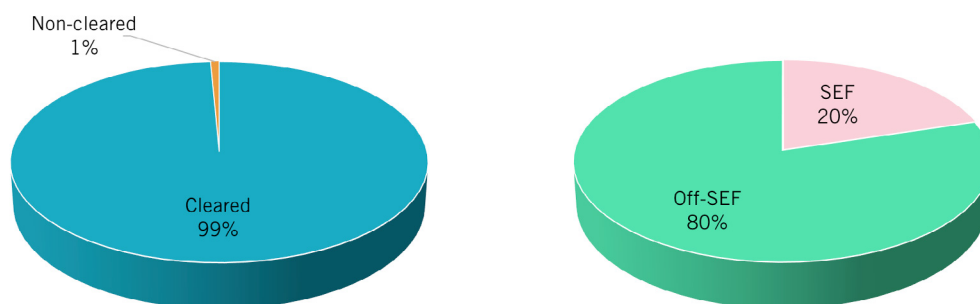
Chart 3: SONIA Traded Notional and Trade Count



Source: DTCC SDR

In the third quarter of 2019, \$2.3 trillion of SONIA swaps was cleared, including \$31.6 billion of basis swaps. Cleared transactions accounted for 99.3% of total SONIA traded notional. SEF-traded notional totaled \$465.5 billion and represented 20.3% of total SONIA traded notional.

Chart 4: SONIA Traded Notional Q3 2019



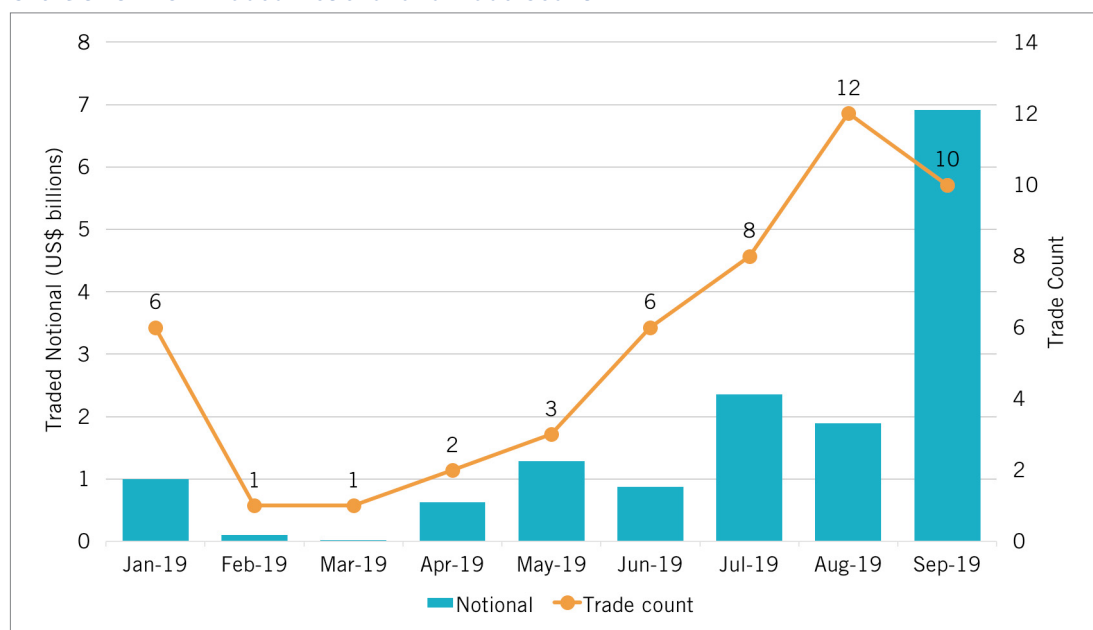
Source: DTCC SDR

In the nine months to September 30, 2019, SONIA traded notional was \$5.7 trillion, including \$112.4 billion of basis swaps. Total trade count was 9,240, including 889 basis swaps. Cleared notional totaled \$5.6 trillion and accounted for 98.8% of total SONIA traded notional. SEF-traded notional totaled \$1.0 trillion and represented 18.0% of overall SONIA traded notional.

SARON

SARON traded notional increased to \$11.2 billion in the third quarter of 2019 from \$2.8 billion in the second quarter. Trade count increased to 30 from 11 over the same period.

Chart 5: SARON Traded Notional and Trade Count



Source: DTCC SDR

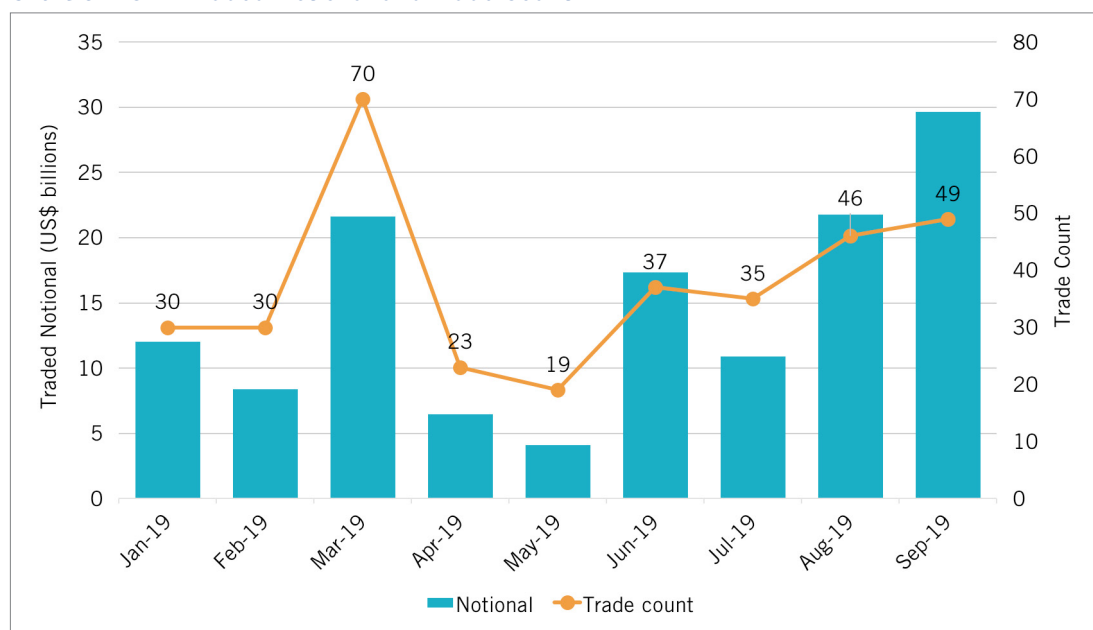
In the third quarter of 2019, cleared notional totaled \$11.0 billion and accounted for 98.4% of total SARON traded notional. SEF-traded notional totaled \$1.0 billion and represented 9.1% of overall SARON traded notional.

In the nine months to September 30, 2019, SARON traded notional was \$15.1 billion and trade count totaled 49. Cleared notional was \$14.9 billion, accounting for 98.8% of total SARON traded notional. SEF-traded notional reached \$3.6 billion and represented 23.9% of total traded notional.

TONA

TONA traded notional increased to \$62.3 billion in the third quarter of 2019 from \$27.9 billion in the second quarter of 2019. Trade count increased to 130 from 79 over the same period.

Chart 6: TONA Traded Notional and Trade Count



Source: DTCC SDR

In the third quarter of 2019, \$61.4 billion of TONA swaps was cleared, accounting for 98.4% of total TONA traded notional. SEF-traded notional reached \$32.5 billion and represented 52.1% of overall TONA traded notional.

In the nine months to September 30, 2019, TONA traded notional was \$132.2 billion, including \$1.0 billion of basis swaps. Total trade count was 339, including one basis swap. Cleared notional totaled \$128.1 billion and accounted for 96.8% of total TONA traded notional. SEF-traded notional totaled \$64.3 billion, representing 48.6% of total TONA traded notional.

Table 2: Interest Rate Benchmarks Traded Notional and Trade Count Quarterly Change

	Q3 2019		Q2 2019		Q3 2019 vs. Q2 2019	
	Traded Notional (US\$ billions)	Trade Count	Traded Notional (US\$ billions)	Trade Count	Traded Notional	Trade Count
USD LIBOR	31,059.7	185,009	32,351.0	177,357	-4.0%	4.3%
SOFR	106.3	478	84.7	188	25.4%	154.3%
GBP LIBOR	2,385.6	24,726	2,373.9	20,753	0.5%	19.1%
SONIA	2,293.6	3,704	1,703.2	2,656	34.7%	39.5%
CHF LIBOR	159.1	2,257	143.4	2,013	10.9%	12.1%
SARON	11.2	30	2.8	11	300.4%	172.7%
JPY LIBOR	779.5	9,099	1,072.2	10,326	-27.3%	-11.9%
TIBOR/Euroyen TIBOR	3.6	35	5.1	34	-29.0%	2.9%
TONA	62.3	130	27.9	79	123.5%	64.6%
EUR LIBOR	0.0	0	0.0	2	-100.0%	-100.0%
EURIBOR	5,925.2	59,595	5,708.1	45,280	3.8%	31.6%
€STR	0.0	0	0.0	0		
Other*	26,232.2	120,736	24,588.2	110,880	6.7%	8.9%
Total**	69,018.1	405,799	68,060.6	369,579	1.4%	9.8%

*Other includes IRD with other reference rates and IBOR/non-RFR basis swaps
 **This data includes only the transactions required to be disclosed under US regulations and does not include any exchange-traded derivatives (futures)

Source: DTCC SDR

Table 3: Interest Rate Benchmarks Cleared and Non-cleared Notional

	Q3 2019		YTD Q3 2019	
	Cleared Notional (US\$ billions)	Non-cleared Notional (US\$ billions)	Cleared Notional (US\$ billions)	Non-cleared Notional (US\$ billions)
USD LIBOR	28,353.8	2,705.8	88,977.6	9,173.9
SOFR	49.4	4.7	119.4	21.0
Basis Swaps: SOFR	46.3	5.9	65.8	7.5
GBP LIBOR	2,224.7	160.8	7,533.5	669.4
SONIA	2,245.0	11.4	5,547.0	50.9
Basis Swaps: SONIA	31.6	5.6	96.0	16.4
CHF LIBOR	157.0	2.0	487.7	2.8
SARON	10.97	0.18	14.9	0.2
Basis Swaps: SARON	0.00	0.00	0.0	0.0
JPY LIBOR	701.2	78.3	2,858.2	230.6
TIBOR/Euroyen TIBOR	0.4	3.2	2.4	7.3
TONA	61.4	1.0	128.1	3.2
Basis Swaps: TONA	0.0	0.0	0.0	1.0
EUR LIBOR	0.0	0.0	0.0	0.0
EURIBOR	5,111.0	814.2	16,220.4	2,449.4
€STR	0.0	0.0	0.0	0.0
Other*	23,094.7	3,137.5	62,716.2	9,599.2
Total**	62,087.6	6,930.6	184,767.1	22,232.6

*Other includes IRD with other reference rates and IBOR/non-RFR basis swaps
 **This data includes only the transactions required to be disclosed under US regulations and does not include any exchange-traded derivatives (futures)

Source: DTCC SDR

Table 4: Interest Rate Benchmarks SEF and Off-SEF Traded Notional

	Q3 2019		YTD Q3 2019	
	SEF Traded Notional (US\$ billions)	Off-SEF Traded Notional (US\$ billions)	SEF Traded Notional (US\$ billions)	Off-SEF Traded Notional (US\$ billions)
USD LIBOR	23,395.2	7,664.4	75,149.6	23,001.9
SOFR	1.7	52.3	14.8	125.5
Basis Swaps: SOFR	11.6	40.6	21.1	52.2
GBP LIBOR	1,229.6	1,156.0	4,560.4	3,642.5
SONIA	461.8	1,794.6	1,015.1	4,582.8
Basis Swaps: SONIA	3.7	33.5	12.7	99.7
CHF LIBOR	83.5	75.5	240.3	250.1
SARON	1.0	10.14	3.6	11.5
Basis Swaps: SARON	0.0	0.00	0.0	0.0
JPY LIBOR	426.7	352.8	2,034.8	1,054.0
TIBOR/Euroyen TIBOR	0.1	3.5	0.1	9.5
TONA	32.5	29.8	64.3	67.0
Basis Swaps: TONA	0.0	0.0	0.0	1.0
EUR LIBOR	0.0	0.0	0.0	0.0
EURIBOR	2,772.6	3,152.6	8,886.4	9,783.4
€STR	0.0	0.0	0.0	0.0
Other*	9,788.1	16,444.1	27,336.5	44,979.0
Total	38,208.2	30,810.0	119,339.8	87,660.0
*Other includes IRD with other reference rates and IBOR/non-RFR basis swaps				
**This data includes only the transactions required to be disclosed under US regulations and does not include any exchange-traded derivatives (futures)				

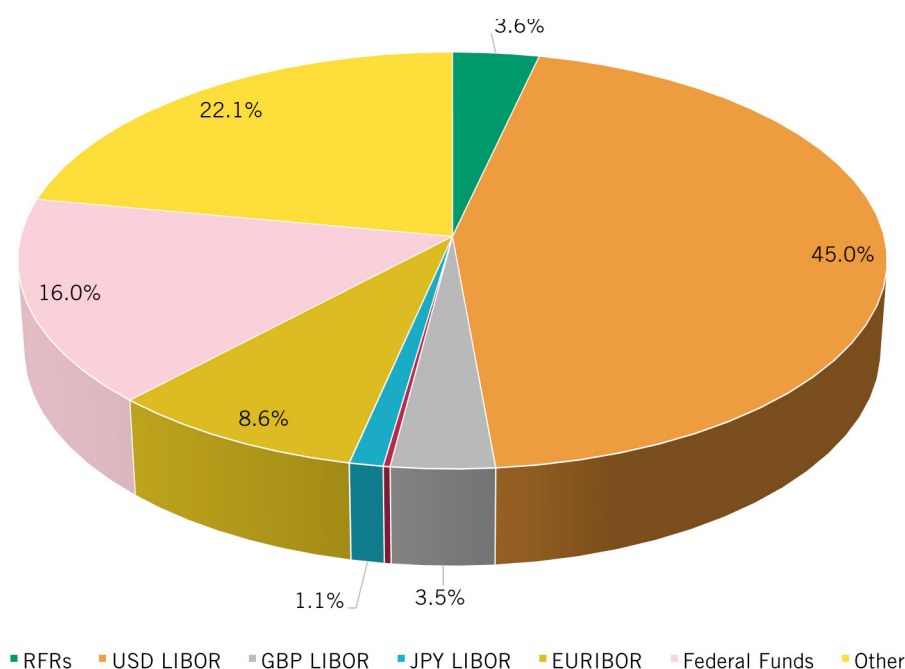
Source: DTCC SDR

IBORs

IRD traded notional referencing LIBOR denominated in US dollar, sterling, Swiss franc, yen, euro, as well as EURIBOR and TIBOR, totaled \$40.3 trillion and represented 58.4% of total IRD traded notional in the third quarter of 2019. The number of trades referencing IBORs totaled 280,721, accounting for 69.2% of total IRD trade count.

\$31.1 trillion of IRD traded notional was based on US dollar LIBOR, accounting for 45.0% of total IRD traded notional in the third quarter of 2019. EURIBOR and sterling LIBOR traded notional was \$5.9 trillion and \$2.4 trillion, respectively. IRD traded notional referencing the EFRR totaled \$11.0 trillion and accounted for 16.0% of IRD traded notional.

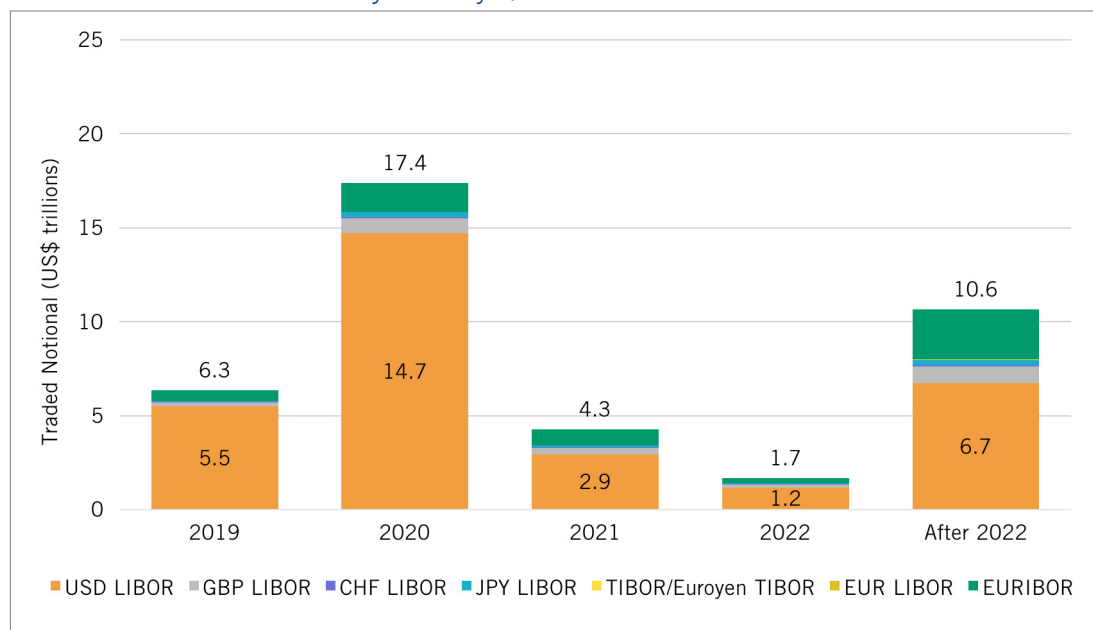
Chart 7: IRD Traded Notional Q3 2019



Source: DTCC SDR

In the third quarter of 2019, \$6.3 trillion of IRD traded notional referencing LIBOR had a 2019 maturity, including \$5.5 trillion of traded notional based on US dollar LIBOR, \$0.6 trillion based on EURIBOR and \$0.2 trillion based on sterling LIBOR. \$17.4 trillion of traded notional had a 2020 maturity. Traded notional maturing in 2021 and 2022 totaled \$4.3 trillion and \$1.7 trillion, respectively, while \$10.6 trillion of traded notional had a maturity after 2022.

Chart 8: IRD Traded Notional by Maturity Q3 2019



Source: DTCC SDR

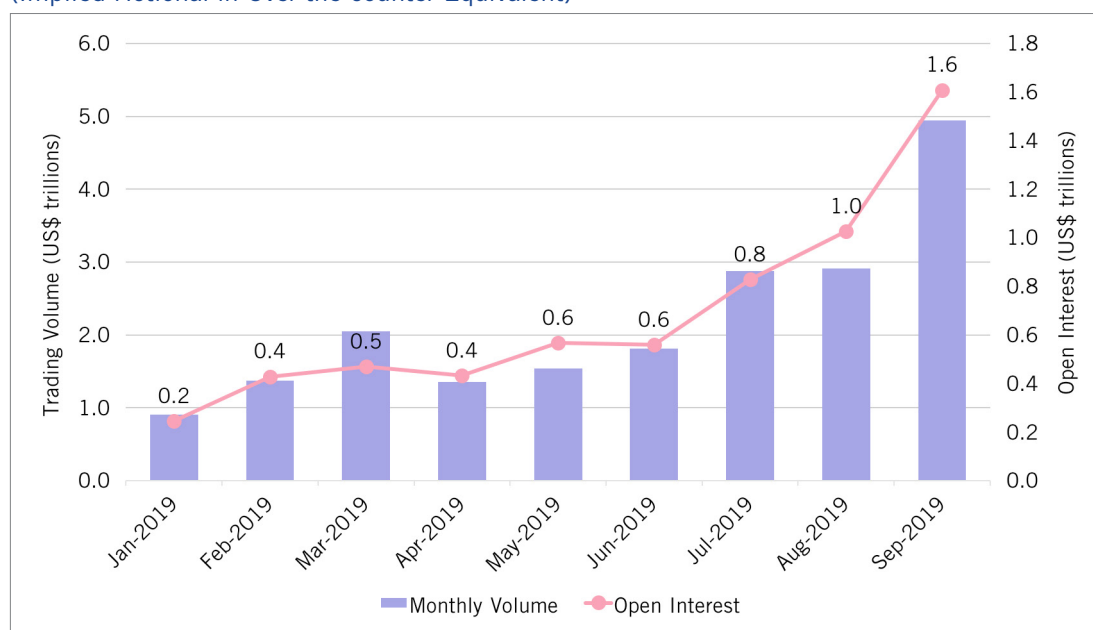
IRD traded notional referencing IBORs totaled \$128.6 trillion and represented 62.1% of total IRD traded notional in the nine months to September 30, 2019. The number of trades referencing IBORs totaled 795,929, accounting for 69.1% of total IRD trade count. \$98.2 trillion of IRD traded notional was based on US dollar LIBOR, accounting for 47.4% of total IRD traded notional. EURIBOR and sterling LIBOR traded notional was \$18.7 trillion and \$8.2 trillion, respectively. IRD traded notional referencing the EFR totalled \$28.6 trillion and accounted for 13.8% of IRD traded notional.

In the nine months to 2019, \$42.0 trillion of IRD traded notional referencing LIBOR had a 2019 maturity, including \$35.8 trillion of traded notional based on US dollar LIBOR, \$3.3 trillion based on EURIBOR and \$2.1 trillion based on sterling LIBOR. \$38.4 trillion of traded notional had a 2020 maturity. Traded notional maturing in 2021 and 2022 totalled \$12.1 trillion and \$5.5 trillion, respectively, while \$30.6 trillion of traded notional had a maturity after 2022.

SOFR and SONIA Futures

Trading in SOFR exchange-traded futures rose significantly in September 2019. This was most likely linked to volatility in SOFR and Federal Reserve actions in the repo market in September. Trading volume in SOFR futures increased to \$10.7 trillion in the third quarter of 2019 from \$4.7 trillion in the second quarter. Open interest jumped to \$1.6 trillion at the end of September 2019 from \$558.0 billion at the end of June 2019⁷.

Chart 9: SOFR Futures Monthly Trading Volume and Open Interest (Implied Notional in Over-the-counter Equivalent)



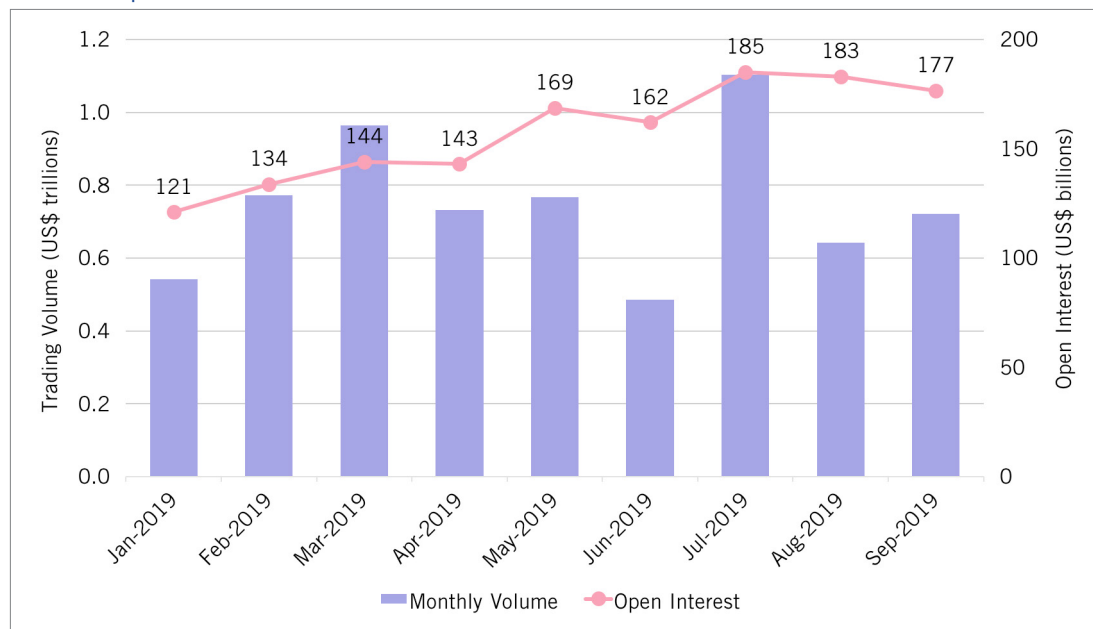
Source: CME and ICE

Trading volume in SONIA futures increased to \$2.5 trillion in the third quarter of 2019 from \$2.0 trillion in the second quarter. Open interest increased to \$176.6 billion at the end of September 2019 from \$162.0 billion at the end of June 2019⁸. In the first nine months of 2019, total trading volume in SOFR futures reached \$19.8 trillion, while trading volume in SONIA futures was \$6.7 trillion.

⁷ The analysis of trading activity in SOFR and SONIA exchange-traded futures is based on data from CME, ICE and LCH

⁸ All numbers are converted to US dollars based on the exchange rates at the end of each month: www.x-rates.com/historical

Chart 10: SONIA Monthly Trading Volume and Open Interest (Implied Notional in Over-the-counter Equivalent)



Source: CME, ICE and LCH



ISDA has published other recent research papers:

- ***SwapsInfo Third Quarter of 2019 and Year-to-September 30, 2019 Review: Summary, October 2019***

<https://www.isda.org/a/z9WTE/Swaps-Q3-Summary-2019.pdf>

- ***Global Credit Defaults Swaps Market Study, September 2019***

<https://www.isda.org/a/JUPT/Global-CDS-Market-Study.pdf>

- ***Interest Rate Benchmarks Review: Second Quarter of 2019 and First Half of 2019, July 2019***

<https://www.isda.org/a/J2qME/Interest-Rate-Benchmarks-Review-Q2-2019-and-1H-2019.pdf>

For questions on ISDA Research, please contact:

Olga Roman

Director of Research

International Swaps and Derivatives Association, Inc. (ISDA)

Office: 212-901-6017

oroman@isda.org

ABOUT ISDA

Since 1985, ISDA has worked to make the global derivatives markets safer and more efficient. Today, ISDA has more than 900 member institutions from 71 countries. These members comprise a broad range of derivatives market participants, including corporations, investment managers, government and supranational entities, insurance companies, energy and commodities firms, and international and

regional banks. In addition to market participants, members also include key components of the derivatives market infrastructure, such as exchanges, intermediaries, clearing houses and repositories, as well as law firms, accounting firms and other service providers. Information about ISDA and its activities is available on the Association's web site: www.isda.org. Follow us on Twitter @ISDA.