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INTEREST RATE BENCHMARKS REVIEW: Full Year 2019 and the Fourth Quarter of 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), the Tokyo Overnight Average Rate (TONA) and the Euro Short-Term Rate (€STR). In addition, the report analyzes IRD traded notional referencing the London Interbank Offered Rate (LIBOR) denominated in US dollars, sterling, Swiss franc, yen and 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 FULL YEAR 2019 AND THE FOURTH QUARTER OF 2019

Traded notional referencing alternative RFRs increased to \$8.7 trillion in 2019 compared to \$8.1 trillion the year before¹. However, RFR transactions continued to comprise a small percentage of total IRD trading activity, accounting for 3.4% of IRD traded notional in both years. The number of trades referencing RFRs increased to 14,478 in 2019 from 8,641 in 2018.

SOFR traded notional increased to \$392.7 billion in 2019 from \$6.3 billion in 2018. SOFR swaps started trading in the third quarter of 2018. Despite this growth, the proportion of IRD traded notional referencing SOFR remained small, accounting for 0.23% of US dollar IRD and 0.15% of total IRD traded notional in 2019. The number of SOFR transactions increased to 1,279 in 2019 from 52 in 2018.

SOFR swaps accounted for 4.5% of IRD traded notional referencing alternative RFRs (which include SOFR, SONIA, SARON, TONA and €STR), while SONIA swaps represented 92.2% of transactions referencing those RFRs in 2019².

Trading volume in SOFR futures totaled \$30.8 trillion in 2019. Open interest in SOFR futures jumped to \$2.1 trillion at the end of December 2019 from \$0.3 trillion at the end of January 2019³. Trading volume in SONIA futures, meanwhile, totaled \$8.7 trillion in 2019, with open interest increasing to \$211.4 billion at the end of the year from \$121.1 billion at the end of January 2019.

In the full year 2019:

- SOFR traded notional totaled \$392.7 billion, including \$193.8 billion of basis swaps. Trade count totaled 1,279, including 441 basis swaps.
- SONIA traded notional equaled \$8.0 trillion, including \$143.9 billion of basis swaps. Trade count totaled 12,618, including 1,143 basis swaps.

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

¹This data covers only transactions that are required to be disclosed under US regulations

² This is expected, as the effective federal funds rate (EFFR) is still widely used as the reference rate for US dollar overnight index swaps (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 OIS

- SARON traded notional and trade count was \$25.6 billion and 66, respectively.
- TONA traded notional equaled \$250.8 billion, including \$1.0 billion of basis swaps. Trade count totaled 505, including 1 basis swap.
- €STR traded notional and trade count was \$4.6 billion and 10, respectively. The European Central Bank started publishing €STR on October 2, 2019.

IRD traded notional referencing IBORs totaled \$157.3 trillion and represented 61.6% of total IRD traded notional. \$119.4 trillion of IRD traded notional was referenced to US dollar LIBOR, comprising 46.8% of total IRD traded notional. IRD traded notional referencing the effective federal funds rate (EFFR) totaled \$35.4 trillion and accounted for 13.9% of IRD traded notional.

In the fourth quarter of 2019:

IRD traded notional referencing alternative RFRs totaled \$2.6 trillion and represented 5.4% of total IRD traded notional, compared with \$2.5 trillion (3.6%) in the third quarter of 2019. The number of trades referencing alternative RFRs equaled 4,114 in the fourth quarter of 2019, compared with 4,342 in the third quarter of 2019. RFR trades accounted for 1.2% of total IRD trade count in the fourth quarter of 2019.

- SOFR traded notional increased by 68.2% compared with the third quarter of 2019 and totaled \$178.8 billion, including \$120.5 billion of basis swaps. Trade count increased by 13.6% over the same period and totaled 543, including 206 basis swaps⁴.
- SONIA traded notional rose by 0.5% to \$2.3 trillion, including \$31.4 billion of basis swaps. Trade count decreased by 8.8% and totaled 3,378, including 254 basis swaps.
- SARON traded notional and trade count decreased to \$10.6 billion and 17, respectively.
- TONA traded notional and trade count increased to \$118.6 billion and 166, respectively.
- €STR traded notional and trade count was \$4.6 billion and 10, respectively.

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⁴See the note below regarding why we track basis swaps separately for the alternative RFRs

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IRD traded notional referencing IBORs totaled \$28.7 trillion and represented 59.4% of total IRD traded notional, compared with \$40.3 trillion in the third quarter of 2019. \$21.3 trillion of IRD traded notional was referenced to US dollar LIBOR, accounting for 44.1% of total IRD traded notional. IRD traded notional referencing the EFFR totaled \$6.8 trillion and comprised 14.1% of IRD traded notional.

Table 1: Interest Rate Benchmarks Traded Notional and Trade Count

	Q4 2	Q4 2019		Full Year 2019		
	Traded Notional (US\$ billions)	Trade Count	Traded Notional (US\$ billions)	Trade Count		
USD LIBOR	21,301.8	149,454	119,439.2	683,146		
SOFR	58.3	337	198.9	838		
Basis Swaps: SOFR	120.5	206	193.8	441		
GBP LIBOR	2,157.3	20,973	10,360.2	91,020		
SONIA	2,273.2	3,124	7,871.0	11,475		
Basis Swaps: SONIA	31.4	254	143.9	1,143		
CHF LIBOR	127.7	2,013	618.2	8,745		
SARON	10.6	17	25.6	66		
Basis Swaps: SARON	0.0	0	0.0	0		
JPY LIBOR	896.2	9,440	3,985.5	40,078		
TIBOR/Euroyen TIBOR	0.8	15	10.5	105		
TONA	118.6	166	249.8	504		
Basis Swaps: TONA	0.0	0	1.0	1		
EUR LIBOR	1.1	6	1.1	9		
EURIBOR	4,215.9	45,404	22,883.9	200,402		
€STR	4.6	10	4.6	10		
Basis Swaps: €STR	0.0	0	0.0	0		
Other*	17,000.5	107,263	89,312.0	453,691		
Total**	48,318.6	338,682	255,299.2	1,491,674		

*Other includes IRD with other reference rates and IBOR/non-RFR basis swaps

**This data includes only the transactions required to be disclosed under U.S. regulations and does not include any exchange-traded derivatives (futures)

Source: DTCC SDR

The 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 RFRs will also support hedging during the transition from IBORs to alternative RFRs.

SOFR

Trading activity in SOFR swaps increased in the fourth quarter of 2019⁵. IRD traded notional referencing SOFR jumped by 68.2% to \$178.8 billion from \$106.3 billion in the third quarter of 2019. The number of SOFR transactions increased by 13.6% to 543 from 478 over the same period.

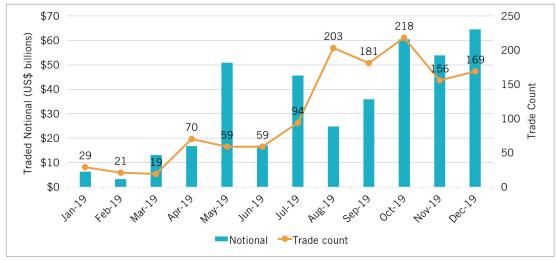
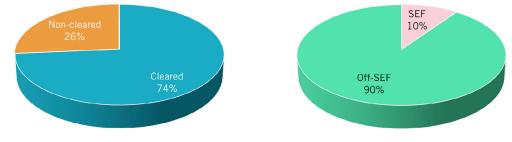


Chart 1: SOFR Traded Notional and Trade Count

Source: DTCC SDR

In the fourth quarter of 2019, \$131.6 billion of SOFR swaps was cleared, including \$87.9 billion of basis swaps. Cleared swaps accounted for 73.6% of total SOFR traded notional. \$17.5 billion of SOFR traded notional was traded on swap execution facilities (SEFs), representing 9.8% of total SOFR traded notional. 77 out of 543 transactions were traded on SEFs.

Chart 2: SOFR Traded Notional Q4 2019



Source: DTCC SDR

In the full year 2019, SOFR traded notional totaled \$392.7 billion, including \$193.8 billion of basis swaps. That compares to \$6.3 billion, including \$2.5 billion of basis swaps, in 2018. Total trade count was 1,279 in 2019 compared to 52 in 2018. Cleared notional totaled \$316.7 billion and accounted for 80.7% of total SOFR traded notional. SEF-traded notional equaled \$53.4 billion and represented 13.6% of total SOFR traded notional.

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SONIA

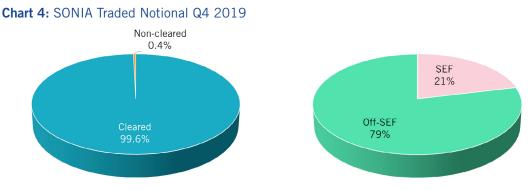
SONIA traded notional grew by 0.5% to \$2.3 trillion in the fourth quarter of 2019 from \$2.3 trillion in the third quarter of 2019. Trade count decreased by 8.8% to 3,378 from 3,704 over the same period.



Chart 3: SONIA Traded Notional and Trade Count

Source: DTCC SDR

In the fourth quarter of 2019, \$2.3 trillion of SONIA swaps was cleared, including \$30.1 billion of basis swaps. Cleared transactions accounted for 99.6% of total SONIA traded notional. SEF-traded notional totaled \$490.1 billion and represented 21.3% of total SONIA traded notional.



Source: DTCC SDR

In the full year 2019, SONIA traded notional was \$8.0 trillion, including \$143.9 billion of basis swaps. That compares to \$8.0 trillion, including \$134.1 billion of basis swaps, in 2018. Total trade count was 12,618 in 2019 compared to 8,215 in 2018.Cleared notional totaled \$7.9 trillion and accounted for 99.0% of total SONIA traded notional. SEF-traded notional equaled \$1.5 trillion and represented 18.9% of total SONIA traded notional.

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SARON

SARON traded notional decreased to \$10.6 billion in the fourth quarter of 2019 from \$11.2 billion in the third quarter of 2019. Trade count decreased to 17 from 30 over the same period.





Source: DTCC SDR

In the fourth quarter of 2019, cleared notional totaled \$10.6 billion and accounted for 100% of total SARON traded notional. There were no SARON trades executed on SEFs.

In the full year 2019, SARON traded notional was \$25.6 billion compared to \$2.5 billion in 2018. Trade count totaled 66 in 2019 and 16 in 2018. Cleared notional was \$25.4 billion, accounting for 99.3% of total SARON traded notional. SEF-traded notional equaled \$3.6 billion and represented 14.1% of total SARON traded notional.

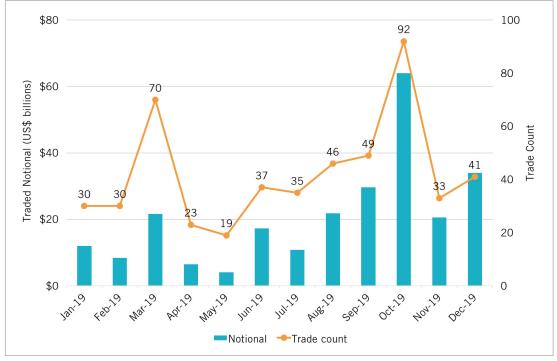
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TONA

TONA traded notional jumped to \$118.6 billion in the fourth quarter of 2019 from \$62.3 billion in the third quarter of 2019. Trade count increased to 166 from 130 over the same period.





Source: DTCC SDR

In the fourth quarter of 2019, \$112.5 billion of TONA swaps was cleared, which accounted for 94.9% of total TONA traded notional. SEF-traded notional totaled \$82.2 billion and represented 69.3% of total TONA traded notional.

In the full year 2019, TONA traded notional was \$250.8 billion, including \$1.0 billion of basis swaps. That compares to \$103.6 billion, including \$2.1 billion of basis swaps, in 2018. Total trade count was 505 in 2019 and 347 in 2018. Cleared notional totaled \$240.6 billion and accounted for 95.9% of total TONA traded notional. SEF-traded notional equaled \$146.5 billion and represented 58.4% of total TONA traded notional.

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	Q4 2	019	Q3 2	019	Q4 2019 vs. Q3 2019	
	Traded Notional (US\$ billions)	Trade Count	Traded Notional (US\$ billions)	Trade Count	Traded Notional	Trade Count
USD LIBOR	21,301.8	149,454	31,059.7	185,009	-31.4%	-19.2%
SOFR	178.8	543	106.3	478	68.2%	13.6%
GBP LIBOR	2,157.3	20,973	2,385.6	24,726	-9.6%	-15.2%
SONIA	2,304.6	3,378	2,293.6	3,704	0.5%	-8.8%
CHF LIBOR	127.7	2,013	159.1	2,257	-19.7%	-10.8%
SARON	10.6	17	11.2	30	-5.3%	-43.3%
JPY LIBOR	896.2	9,440	779.5	9,099	15.0%	3.7%
TIBOR/Euroyen TIBOR	0.8	15	3.6	35	-77.6%	-57.1%
TONA	118.6	166	62.3	130	90.2%	27.7%
EUR LIBOR	1.1	6	0.0	0		
EURIBOR	4,215.9	45,404	5,925.2	59,595	-28.8%	-23.8%
€STR	4.6	10	0.0	0		
Other*	17,000.5	107,263	26,232.2	120,736	-35.2%	-11.2%
Total**	48,318.6	338,682	69,018.1	405,799	-30.0%	-16.5%

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

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

Source: DTCC SDR

Table 3: Interest Rate Benchmarks Traded Notional and Trade Count Annual Change

	Full Year 2019		Full Year 2018		Full Year 2019 vs. Full Year 2018	
	Traded Notional (US\$ billions)	Trade Count	Traded Notional (US\$ billions)	Trade Count	Traded Notional (US\$ billions)	Trade Count
USD LIBOR	119,439.2	683,146	111,499.4	633,410	7.1%	7.9%
SOFR*	392.7	1,279	6.3	52	6176.6%	2359.6%
GBP LIBOR	10,360.2	91,020	9,815.8	78,158	5.5%	16.5%
SONIA	8,014.9	12,618	8,001.8	8,226	0.2%	53.4%
CHF LIBOR	618.2	8,745	473.6	6,770	30.5%	29.2%
SARON	25.6	66	2.5	16	916.6%	312.5%
JPY LIBOR	3,985.5	40,078	3,548.5	37,322	12.3%	7.4%
TIBOR/Euroyen TIBOR	10.5	105	2.2	76	376.9%	38.2%
TONA	250.8	505	103.6	347	142.0%	45.5%
EUR LIBOR	1.1	9	2.9	60	-62.9%	-85.0%
EURIBOR	22,883.9	200,402	22,914.5	162,579	-0.1%	23.3%
€STR**	4.6	10	0.0	0		
Other***	89,312.0	453,691	80,183.3	398,718	11.4%	13.8%
Total †	255,299.2	1,491,674	236,554.4	1,325,734	7.9%	12.5%

*SOFR swaps started trading in the third quarter of 2018

**€STR swaps started trading in the fourth quarter of 2019

***Other includes IRD with other reference rates and IBOR/non-RFR basis swaps

† This data includes only the transactions required to be disclosed under U.S. regulations and does not include any exchange-traded derivatives (futures)

Source: DTCC SDR

Table 4: Interest Rate Benchmarks Cleared and Non-cleared Notional

	Q4 :	2019	Full Ye	Full Year 2019		
	Cleared Notional (US\$ billions)	Non-cleared Notional (US\$ billions)	Cleared Notional (US\$ billions)	Non-cleared Notional (US\$ billions)		
USD LIBOR	18,736.0	2,565.8	107,713.4	11,725.9		
SOFR	43.7	14.6	163.1	35.8		
Basis Swaps: SOFR	87.9	32.6	153.7	40.1		
GBP LIBOR	1,909.8	247.5	9,443.4	916.9		
SONIA	2,265.0	8.2	7,812.0	59.1		
Basis Swaps: SONIA	30.1	1.4	126.1	17.8		
CHF LIBOR	127.6	0.1	615.3	2.9		
SARON	10.6	0.0	25.4	0.2		
Basis Swaps: SARON	0.0	0.0	0.0	0.0		
JPY LIBOR	821.0	75.2	3,679.2	306.2		
TIBOR/Euroyen TIBOR	0.7	0.1	3.1	7.4		
TONA	112.5	6.0	240.6	9.2		
Basis Swaps: TONA	0.0	0.0	0.0	1.0		
EUR LIBOR	0.0	1.1	0.0	1.1		
EURIBOR	3,631.1	584.9	19,851.5	3,032.4		
€STR	0.0	4.6	0.0	4.6		
Basis Swaps: €STR	0.0	0.0	0.0	0.0		
Other*	14,434.6	2,565.9	77,150.2	12,161.8		
Total**	42,210.7	6,107.9	226,976.8	28,322.3		

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

Source: DTCC SDR

Table 5: Interest Rate Benchmarks SEF and Off-SEF Traded Notional

	Q4 :	2019	Full Yea	Full Year 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	15,235.4	6,066.4	90,385.8	29,053.4		
SOFR	0.3	58.1	15.1	183.8		
Basis Swaps: SOFR	17.3	103.2	38.4	155.4		
GBP LIBOR	1,037.5	1,119.8	5,597.8	4,762.4		
SONIA	486.9	1,786.3	1,501.9	6,369.1		
Basis Swaps: SONIA	3.3	28.2	16.0	127.9		
CHF LIBOR	45.6	82.2	285.9	332.3		
SARON	0.0	10.6	3.6	22.0		
Basis Swaps: SARON	0.0	0.0	0.0	0.0		
JPY LIBOR	546.2	350.0	2,581.0	1,404.5		
TIBOR/Euroyen TIBOR	0.0	0.8	0.1	10.4		
TONA	82.2	36.4	146.5	103.3		
Basis Swaps: TONA	0.0	0.0	0.0	1.0		
EUR LIBOR	0.0	1.1	0.0	1.1		
EURIBOR	2,095.9	2,120.0	10,982.3	11,901.6		
€STR	0.0	4.6	0.0	4.6		
Basis Swaps: €STR	0.0	0.0	0.0	0.0		
Other*	5,568.0	11,432.6	32,904.6	56,407.4		
Total**	25,118.3	23,200.3	144,458.9	110,840.2		

*Other includes IRD with other reference rates and IBOR/non-RFR basis swaps **This data includes only the transactions required to be disclosed under U.S. 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 and euro, as well as EURIBOR and TIBOR, totaled \$28.7 trillion and represented 59.4% of total IRD traded notional in the fourth quarter of 2019. The number of trades referencing IBORs totaled 227,305, comprising 67.1% of total IRD trade count.

\$21.3 trillion of IRD traded notional was based on US dollar LIBOR, accounting for 44.1% of total IRD traded notional in the fourth quarter of 2019. EURIBOR and sterling LIBOR traded notional was \$4.2 trillion and \$2.2 trillion, respectively. IRD traded notional referencing the EFFR totaled \$6.8 trillion and accounted for 14.1% of IRD traded notional.

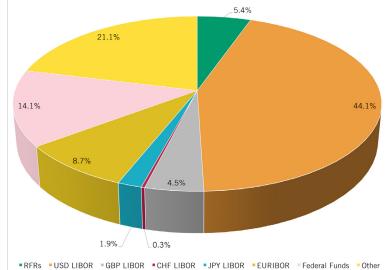


Chart 7: IRD Traded Notional Q4 2019

• KERS • USD LIBOR • GBP LIBOR • CHE LIBOR • JPY LIBOR • EURIBOR • Federal FU

In the fourth quarter 2019, \$0.5 trillion of IRD traded notional referencing IBORs had a 2019 maturity and \$14.4 trillion had a 2020 maturity, including \$11.8 trillion of traded notional based on US dollar LIBOR, \$1.4 trillion referencing EURIBOR and \$0.8 trillion based on sterling LIBOR. Traded notional maturing in 2021 totaled \$3.9 trillion, while \$9.9 trillion of traded notional had a maturity after 2021.

Source: DTCC SDR

\$25 \$20 **Fraded Notional (US\$ trillions)** 14.4 \$15 9.9 \$10 11.8 \$5 39 6.2 0.5 2.8 OF \$0 2019 2020 2021 After 2021 USD LIBOR = GBP LIBOR = CHF LIBOR = JPY LIBOR = TIBOR/Euroyen TIBOR = EUR LIBOR = EURIBOR

Chart 8: IRD Traded Notional by Maturity Q4 2019

Source: DTCC SDR

In the full year 2019, IRD traded notional referencing IBORs totaled \$157.3 trillion and represented 61.6% of total IRD traded notional. The number of trades referencing IBORs totaled 1,023,505, comprising 68.6% of total IRD trade count. \$119.4 trillion of IRD traded notional was based on US dollar LIBOR, accounting for 46.8% of total IRD traded notional. EURIBOR and sterling LIBOR traded notional was \$22.9 trillion and \$10.4 trillion, respectively. IRD traded notional referencing the EFFR totaled \$35.4 trillion and accounted for 13.9% of IRD traded notional.

\$42.5 trillion of IRD traded notional referencing IBORs had a 2019 maturity, including \$36.3 trillion of traded notional based on US dollar LIBOR, \$3.3 trillion based on EURIBOR and \$2.1 trillion referencing sterling LIBOR. \$52.8 trillion of traded notional had a 2020 maturity. Traded notional maturing in 2021 totaled \$16.0 trillion, while \$46.0 trillion of traded notional had a maturity after 2021.

In comparison, IRD traded notional referencing IBORs totaled \$148.3 trillion and represented 62.7% of total IRD traded notional in 2018. The number of trades referencing IBORs totaled 918,375, accounting for 69.3% of total IRD trade count. \$111.5 trillion of IRD traded notional was based on US dollar LIBOR, accounting for 47.1% of total IRD traded notional. EURIBOR and sterling LIBOR traded notional was \$22.9 trillion and \$9.8 trillion, respectively. IRD traded notional referencing the EFFR totaled \$33.1 trillion and accounted for 14.0% of IRD traded notional.

In 2018, \$35.0 trillion of IRD traded notional referencing IBORs had a 2018 maturity, including \$30.3 trillion of traded notional based on US dollar LIBOR, \$2.5 trillion based on EURIBOR and \$1.6 trillion based on sterling LIBOR. \$46.9 trillion of IRD traded notional had a 2019 maturity, \$17.8 trillion matured in 2020, \$9.0 trillion matured in 2021, while \$39.6 trillion of traded notional had a maturity after 2021.

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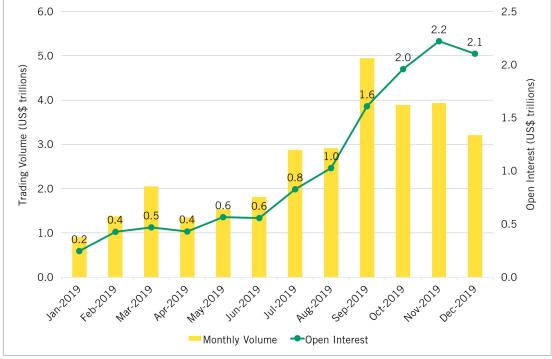
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SOFR and SONIA Futures

Trading volume in SOFR futures increased to \$11.0 trillion in the fourth quarter of 2019 from \$10.7 trillion in the third quarter of 2019.

Trading volume in SOFR futures totaled \$30.8 trillion in the full year 2019. Open interest in SOFR futures jumped to \$2.1 trillion at the end of December 2019 from \$0.3 trillion at the end of January 2019⁶.

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 decreased to \$2.0 trillion in the fourth quarter of 2019 from \$2.5 trillion in the third quarter of 2019.

Trading volume in SONIA futures totaled \$8.7 trillion in the full year 2019. Open interest increased to \$211.4 billion at the end of December 2019 from \$121.1 billion at the end of January 2019.

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

Source: CME, ICE and LCH

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ISDA has published other recent research papers:

• Key Trends in The Size and Composition of OTC Derivatives Markets in the First Half of 2019, November 2019

https://www.isda.org/a/CicTE/Key-Trends-in-the-Size-and-Composition-of-OTC-Derivatives-Markets-1H-2019.pdf

• Interest Rate Benchmarks Review: Third Quarter of 2019 and Year-to-September 30, 2019, October 2019 https://www.iede.org/g//2010.pdf

https://www.isda.org/a/Gq5TE/Interest-Rate-Benchmarks-Review-Q3-2019.pdf

• Global Credit Defaults Swaps Market Study, September 2019 https://www.isda.org/a/JUPTE/Global-CDS-Market-Study.pdf

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