# SARON Compound Rates

June 2020

SIX operates the fully automated trading platform for the **secured money market** (short-term credit funding) in Switzerland (SIX Repo). The SARON® reference rate reflects this repo market. **"Funding against collateral"** is the rule in the repo market. More than **160 banks and insurance companies** take part in the Swiss repo market, including the Swiss National Bank (SNB), which uses it to supply Switzerland's economy with liquidity.
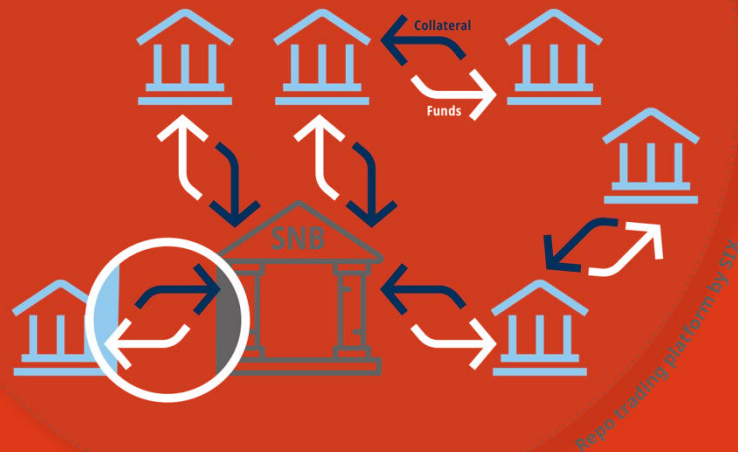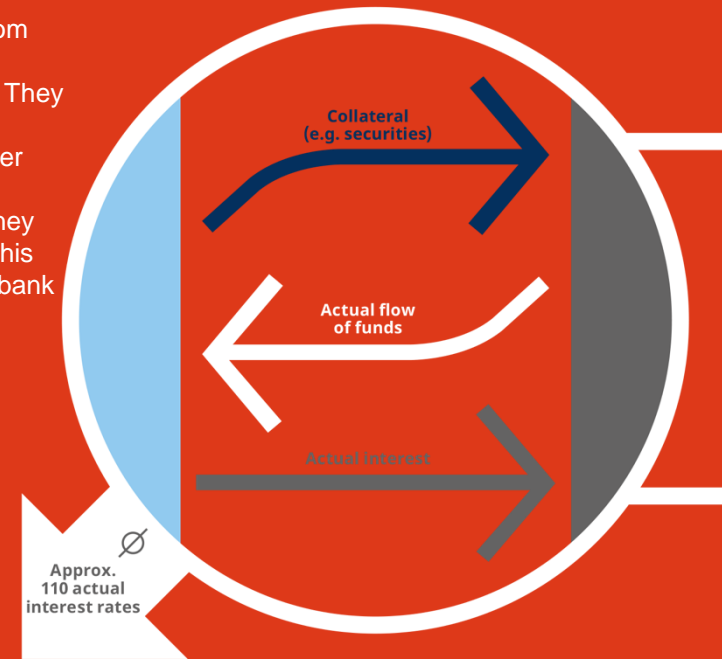
Secured Money Market in Switzerland

Banks receive funds from the SNB by depositing securities as collateral. They pledge to buy back those securities at a later date and **pay interest.** Banks also borrow money from each other using this principle (secured interbank market).

Actual **concluded transactions and quotes** flow into the calculation of SARON. **Approximately 110 interest rates** per day on an annual average.

Collateral

Funds

SNB

Repo trading platform by SIX

Collateral (e.g. securities)

Actual flow of funds

Actual interest

Ø Approx. 110 actual interest rates

SARON is an Overnight Rate and applies for the upcoming overnight period.
To allow market participants to engage in longer term contracts over several months or longer for mortgages, loans, swaps, futures and floating rate notes SIX is going to offer a **SARON® Compound**.
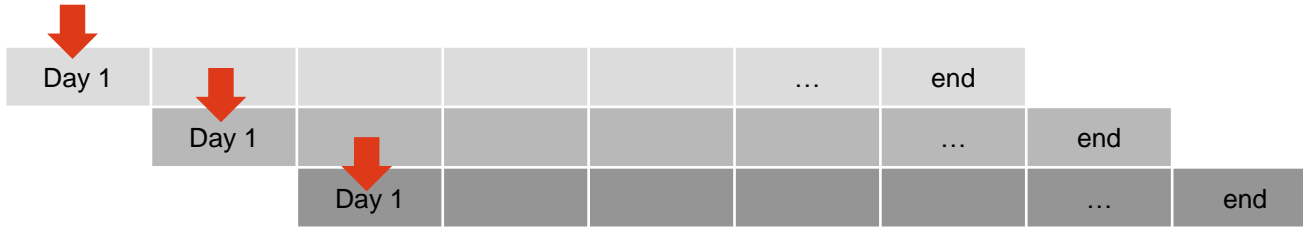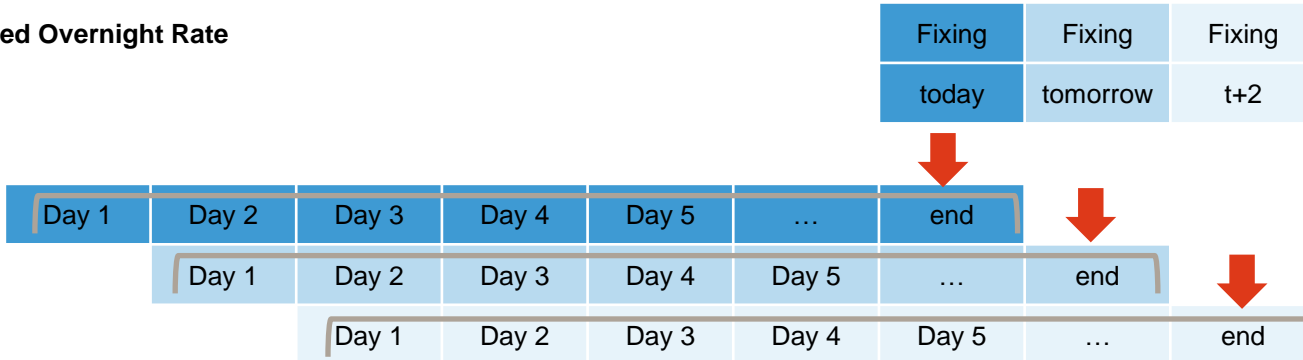
SARON
Swiss Average Rate Overnight

A compounded Overnight Rate is finalized at the end of the observation period vs. today's fixing in advance

LIBOR

Fixing	Fixing	Fixing
today	tomorrow	t+2

Day 1					…	end		
	Day 1					…	end	
		Day 1					…	end

Compounded Overnight Rate

Fixing	Fixing	Fixing
today	tomorrow	t+2

Day 1	Day 2	Day 3	Day 4	Day 5	…	end		
	Day 1	Day 2	Day 3	Day 4	Day 5	…	end	
		Day 1	Day 2	Day 3	Day 4	Day 5	…	end

Background Information

LIBOR: The rate is determined ex-ante based on estimations for the next three months period

From overnight rates to a compounded SARON:
SARON is published the day before for the upcoming overnight period.
The compounded SARON is determined at the end of the period

3

SIX

Overview

- SARON is a reference rate reflecting both actual transactions and binding quotes of the underlying Swiss repo market. SIX as the benchmark administrator of SARON provides in addition calculations for a compounded SARON for pre-defined time periods. These SARON Compound Rates support the market for benchmarking and for the determination of the observation period of a compounded SARON in financial products like Floating Rate Notes, Overnight Indexed Swaps and Futures.

- The **SARON 1/3/6 month Compound Rate** reflects the aggregation of all daily SARON rates over the time period of one/three/six month(s) and is calculated in arrears. The time period for the SARON 1/3/6 month Compound Rate ends on each business day of a given month and starts on a business day one/three/six month(s) earlier.

- The **SARON 1/3 IMM Compound Rate** reflects the aggregation of all daily SARON rates over the time period of one/three month(s) and is calculated in arrears. The time period for the SARON 1/3 IMM Compound Rate ends on the 3rd Wednesday of a given month and starts on the 3rd Wednesday one/three month(s) earlier.

Calculation formula for the SARON Compound Rates

The SARON Compound Rate is calculated in arrears using the following formula:

$$SARON\ Compound\ Rate = \left[\prod_{i=1}^{bd}\left(1 + \frac{r_i a_i}{360}\right) - 1\right]\frac{360}{n}$$

- bd - number of business days in the observation period from (and including) the start date to (but excluding) the end date. E.g. bd equals one for an observation period from Monday to Tuesday.

- i – index from one to bd

- n – number of calendar days of the observation period from (and including) the start date to (but excluding) the end date. E.g. n equals one for an observation period from Monday to Tuesday.

- r_i – SARON on business day i

- a_i – number of calendar days for which SARON r_i applies

The SARON Compound Rates are calculated with four decimals and rounded to half away from zero.

This formula can be applied to calculate a compounded SARON for any combination of business days.

SIX

Alternative calculation formula for the SARON Compound Rates using SAION

An alternative method to calculate a compounded SARON and the SARON Compound Rates is the SARON Index (SAION) which is also part of the Swiss Reference Rates family. The SAION is an index representing the performance generated by a daily compounding of SARON. Further details about the methodology and formula of the SAION are available in the Swiss Reference Rates methodology book in chapter 4.

$$SARON\ Compound\ Rate = \left(\frac{SAION_E}{SAION_S} - 1\right)\frac{360}{n}$$

- n – number of calendar days of the observation period from (and including) the start date S to (but excluding) the end date E
- $SAION_S$ and $SAION_E$ - SAION value at the start date S and end date E

The advantage of using SAION is that for any given time period only two data points are needed to obtain a compounded SARON while the standard formula requires the collection of every daily SARON value.

This formula can be applied to calculate a compounded SARON for any combination of business days.

Given that SAION reflects the same arithmetic as a compounded SARON and the SARON Compound Rates, rates calculated using the SAION Index with the same start and end dates should effectively produce equivalent results. However, because SAION is rounded its values do not maintain the same precision as the compounded SARON; as a result, minor differences may occasionally occur at the fourth decimal place.

/IX

Definition of the start and end dates for the SARON Compound Rates

The SARON Compound Rates are calculated in arrears therefore the Modified Following Business Day Convention cannot be applied directly, but to align and be as close as possible with the CHF money market calendar and the Business Day Convention the start date determination applies the following sequence:

- If the start date is unique according to the CHF money market calendar, this start date is used.
- If the end date is the last business day of a month, the start date must also be the last business day of a month.
- For each end date with multiple start date possibilities according to the CHF money market calendar – unless the end date is the last business day of a month – the following steps are taken:
    - the middle date is selected as the start date if there is an uneven number of possible start dates
    - the preceding of the two dates surrounding the mid-point is chosen, if there is an even number of possible start dates
- Otherwise, if the initially determined start date falls on a non-business day, the business day that precedes the calculated start date will be the used start date, unless this new start date would fall within a different month. In such cases not the preceding business day, but the following business day will be used as the final start date.

- SIX provides the SARON IMM Compound Rates for pre-defined time periods. The end date of such time periods is the 3rd Wednesday of the month according to IMM (International Money Market Calendar) and is by definition always a business day. The start date is the 3rd Wednesday the respective number of months before the end date.

Examples to determine start dates

Time period	End date	Start date	Comment
1 month	30.04.2018	29.03.2018	Last business day of the month. The start date is moved to the last business day of a month
1 month	15.06.2018	15.05.2018	One option in the money market calendar
1 month	08.10.2018	06.09.2018 or 07.09.2018	Two options in the money market calendar that lead to the end date 08.10.2018. The earlier date 06.09.2018 is selected
1 month	23.04.2018	21.03.2018 or 22.03.2018 or 23.03.2018	Three options in the money market calendar that lead to the end date 23.04.2018. The middle date 22.03.2018 is selected
1 month	10.12.2019	08.11.2019	The previous business day is used because 10.11.2019 is a non-business day

SIX

Calculation example of a SARON 1 month Compound Rate

Date	SARON	multiplier (1+ SARON x day_count / 360)	day_count	SAION
06.09.2018	-0.739773	0.999979	1	11048.90141
07.09.2018	-0.737137	0.999938572	3	
10.09.2018	-0.73405	0.99997961	1	
11.09.2018	-0.742549	0.999979374	1	
12.09.2018	-0.744533	0.999979319	1	
13.09.2018	-0.739139	0.999979468	1	
14.09.2018	-0.734535	0.999938789	3	
17.09.2018	-0.732281	0.999979659	1	
18.09.2018	-0.739414	0.999979461	1	
19.09.2018	-0.741015	0.999979416	1	
20.09.2018	-0.740611	0.999979427	1	
21.09.2018	-0.743656	0.999938029	3	
24.09.2018	-0.736047	0.999979554	1	
25.09.2018	-0.745040	0.999979304	1	
26.09.2018	-0.760342	0.999978879	1	
27.09.2018	-0.753971	0.999979056	1	
28.09.2018	-0.785767	0.999934519	3	
01.10.2018	-0.738704	0.99997948	1	
02.10.2018	-0.734949	0.999979585	1	
03.10.2018	-0.743903	0.999979336	1	
04.10.2018	-0.742927	0.999979363	1	
05.10.2018	-0.746194	0.999937817	3	
08.10.2018				11041.58344

end_date	08.10.2018
start_date (two options in the money market calendar that lead to the end date 08.10.2018. The earlier date 06.09.2018 is selected)	06.09.2018
day_count	32
SARON Compound Rate: (product (multiplier) -1 *360 / day_count)	-0.7451
SARON Compound Rate (alternative method): SAION(end) / SAION(start) -1 (360/ day_count)	-0.7451

SIX

SIX data offering

Overnight Rate: SARON (available)	A daily value expressed in percent (%) for a specific currency. E.g. CHF SARON: -0.75%
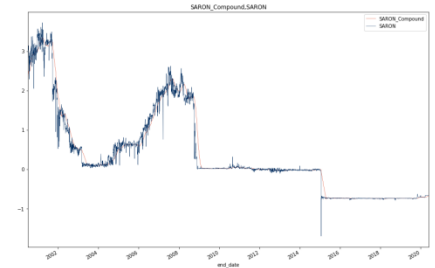
Compounded Overnight Rates for pre-defined periods (available)	A rate that compounds the daily Overnight Rate over a pre-defined period in arrears. E.g. SARON 1, 3 or 6 months Compound Rate: -0.74%

Daily Overnight Rate Index (available)	An index that reflects a daily compounding of the overnight rate expressed in index points. E.g. SAION (SARON Index) compounds SARON on a daily basis: 10954.09 index points
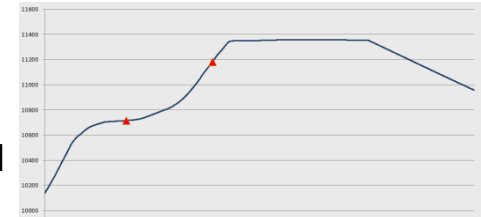
ISIN and symbols of the SARON Compound Rates

Name	Short Name	Symbol	ISIN
SARON 1 month Compound Rate	SARON1M Comp	SAR1MC	CH0477123886
SARON 3 months Compound Rate	SARON3M Comp	SAR3MC	CH0477123902
SARON 6 months Compound Rate	SARON6M Comp	SAR6MC	CH0477123910
SARON 1 IMM Compound Rate	SARON1IMM Comp	SAR1IMMC	CH0477123860
SARON 3 IMM Compound Rate	SARON3IMM Comp	SAR3IMMC	CH0477123878

Contact

Swiss Index Support
T +41 58 399 2229
indexsupport@six-group.com

Swiss Index Licensing, Sales and Data
T +41 58 399 2600
indexdata@six-group.com

www.six-group.com/saron

® SAR, SAR SWISS AVERAGE RATE, SARON, SCR, SCR SWISS CURRENT RATE, SCRON, SAION, SCION are registered or pending trademarks of SIX Swiss Exchange. Licensing is subject to a fee.

Appendix

Latest updates and outlook

Launch of SARON Compound Rates

SIX went live with several enhancements on March 25, 2020

- The **SARON Compound Rates** for benchmarking and financial products. All data is available at 18:30 CET including the values for the next business day. The SARON Compound methodology is included in the existing Swiss Reference Rate rule book (German / English)

- The **compound matrix**, a file (csv) with all business day combinations over the last 12 months and the corresponding compounded value

https://www.six-group.com/exchanges/indices/data_centre/swiss_reference_rates/compound_rates_en.html

Name	Short Name	Symbol	ISIN
SARON 1 month Compound Rate	SARON1M Comp	SAR1MC	CH0477123886
SARON 3 months Compound Rate	SARON3M Comp	SAR3MC	CH0477123902
SARON 6 months Compound Rate	SARON6M Comp	SAR6MC	CH0477123910
SARON 1 IMM Compound Rate	SARON1IMM Comp	SAR1IMMC	CH0477123860
SARON 3 IMM Compound Rate	SARON3IMM Comp	SAR3IMMC	CH0477123878

SARON / SAION snapshot files and factsheets

- In addition to providing the SARON data over the real-time data feed a **snapshot file (csv)** was introduced
- This allows a faster end of day processing for clients who do not want to use the data feed.
- The file is provided on a daily basis at 18:20 CET and contains the close values of SARON and SAION of the current day
- Factsheets (EN, DE, FR)

Swiss Reference Rates (SARON)

Terms to maturity	Swiss Reference Rates						
	Average Rates	Current Rates	Average Indices	Current Indices	Historical values	Latest values	Snapshot 6pm
Overnight ON	SARON	SCRON	SAION	SCION			

https://www.six-group.com/exchanges/indices/data_centre/swiss_reference_rates/reference_rates_en.html

Planned extensions for a compounded SARON, snapshot file and web-calculator

- Extend the matrix (csv) to include the NWG recommended approximation for non-business days

- Extend snapshot file to include the SAION value already for the next business day

- Provide a calculator (web-based) on the SIX website to enable retail users (free to use) to calculate the compounded value for flexible date combinations (includes non-business days combinations with the NWG recommended approximation)


SARON Compound Rates

Compounded SARON data	Index values
SARON 1 month Compound Rate	
SARON 3 months Compound Rate	
SARON 6 months Compound Rate	
SARON 1 IMM Compound Rate	
SARON 3 IMM Compound Rate	
SARON Compound calculation matrix	

NDEX INFORMATION

Description	Download
Rules governing the Swiss Reference Rates	
SARON Compound Rates methodology (short overview)	

Swiss Reference Rates (SARON)

Terms to maturity	Swiss Reference Rates						
	Average Rates	Current Rates	Average Indices	Current Indices	Historical values	Latest values	Snapshot files
Overnight ON	SARON	SCRON	SAION	SCION			

(illustrative example)

EU Benchmark Regulation (BMR) / Endorsement

- Several SIX indices including SARON and SAION were endorsed under EU BMR in January 2020 and the SARON Compound Rates were endorsed in May 2020. All indices are listed in the ESMA Benchmark register now

- The Benchmark Statements are provided on the SIX website

- SIX index regulation website: https://www.six-group.com/exchanges/indices/data_centre/index_regulation_en.html

SIX indices endorsed under EU Benchmark Regulation	Benchmark Statement	Methodology
Equity Indices:	📄	
SMI, SMIM, SLI, SPI, SXI Real Estate Broad, SXI Real Estate Funds Broad, UBS100		📄
SMI Daily Short Leverage		📄
SMI Dividend Points		📄
Fixed Income and Money Market Indices:	📄	
SBI Foreign AAA-BBB 1-5, SBI Foreign AAA-BBB 5-10, SBI Domestic Government 1-3, SBI Domestic Government 3-7		📄
SARON, SAION		📄

SIX Index Licensing

- SIX published the FAQ on the licensing of the Swiss Reference Rates (SRR) /SARON.

- The scope of the existing data license for SARON will remain unchanged

- For additional use-cases an extended data license will be introduced effective July 1st, 2020. SIX published an updated price list to cover these additional use-cases.

- Intraday SARON values (first 24 hours) as well as both intraday and historic SARON Compound indices are considered restricted index data

- The SIX disclaimer and the registered sign ® are optional in combination with SARON

- SIX will update the FAQ in case further questions arise

https://www.six-group.com/exchanges/indices/data_centre/licensing_en.html

FURTHER LICENSING INFORMATION

Description	Download
List index-based Products	📕
Index Data Packages Overview	📕
Index Data Packages (valid as of 01.01.2018)	📊
SARON Frequently Asked Questions (FAQ)	📕
Price List 2020 – Swiss Reference Rates	📕
Instruction of using SIX Disclaimer	📕
Introduction of using FTSE Disclaimer	📕

Appendix

Compounded SARON over non-business days

Compounded SARON on non-business days

SAION and the SARON Compound Rates are provided for trading days and are not available on non-business days. For instances when a compounded SARON is required for a non-business day (e.g. starting or ending on a weekend) the NWG (page 78) has developed the following approximation to cover non-business days. The amendments of the definitions are marked in red below.

$$SARON\ Compound = \left[\prod_{i=1}^{bd}\left(1 + \frac{r_i a_i}{360}\right) - 1\right]\frac{360}{n}$$

bd   number of business days in the observation period from and including the first calendar date (start date) to but excluding the last calendar date (end date), except if, the start date is not a business day, then "bd" is increased by one. E.g. bd equals one for an observation period from Monday to Tuesday, two for an observation period from Sunday to a Tuesday and one for an observation period from Friday to Sunday.

i   index that goes from one to bd

n   number of calendar days in the observation period from (and including) the start date to (but excluding) the end date. E.g. n equals one for an observation period from Monday to Tuesday.

r_i SARON for business day i. In case the start date is not a business day, SARON from the preceding business day is used.

a_i number of calendar days for which SARON r_i applies. If the observation period ends on a Sunday, a_{bd} equals two. If the observation period starts on a Sunday, a_1 equals one and SARON from the preceding business day is used.

Examples: Compounded SARON on non-business days

$$SARON\ Compound\ = \left[\prod_{i=1}^{bd}\left(1 + \frac{r_i a_i}{360}\right) - 1\right]\frac{360}{n}$$

	TH	FR	SA	SU	MO	TU	WE	TH	FR	SA	SU	number of business days	number of calendar days
Example SARON Compound Rates (Monday to Monday)	-0.72	-0.75			-0.78	-0.74	-0.75	-0.76	-0.71				
applicable days	1	3			1	1	1	1	1			bd = 5	n = 7
Example non-business days (Monday to Sunday)	-0.72	-0.75			-0.78	-0.74	-0.75	-0.76	-0.71				
applicable days					1	1	1	1	2			bd = 5	n = 6
Example non-business days (Sunday to Sunday)	-0.72	-0.75		-0.75	-0.78	-0.74	-0.75	-0.76	-0.71				
applicable days				1	1	1	1	1	2			bd = 5 +1	n = 7

Disclaimer

This material has been prepared by SIX Group Ltd, its subsidiaries, affiliates and/or their branches (together, "SIX") for the exclusive use of the persons to whom SIX delivers this material. This material or any of its content is not to be construed as a binding agreement, recommendation, investment advice, solicitation, invitation or offer to buy or sell financial information, products, solutions or services. It is solely for information purposes and is subject to change without notice at any time. SIX is under no obligation to update, revise or keep current the content of this material. No representation, warranty, guarantee or undertaking – express or implied – is or will be given by SIX as to the accuracy, completeness, sufficiency, suitability or reliability of the content of this material. Neither SIX nor any of its directors, officers, employees, representatives or agents accept any liability for any loss, damage or injury arising out of or in relation to this material. This material is property of SIX and may not be printed, copied, reproduced, published, passed on, disclosed or distributed in any form without the express prior written consent of SIX.