

The Evolution of STIBOR
SFBF Consultation Paper
March 2021

Responding to this paper

The Swedish Financial Benchmark Facility (SFBF) invites comments on all matters in this paper and in particular on the specific questions summarised in Appendix 1. Comments are most helpful if they:

- respond to the question stated;
- indicate the specific question to which the comment relates;
- contain a clear rationale; and
- describe any alternatives SFBF should consider.

SFBF will consider all comments received by close of business on 31 March 2021 at the latest.

All contributions should be submitted via email to cpresponses@swfbf.se under the heading 'STIBOR Evolution CP Response'. Please ensure to provide the name and contact details of the respondent. A template for responding is available from the Evolution of STIBOR section of the SFBF website: www.swfbf.se

Publication of response

All contributions received will be published following the close of the consultation unless you request otherwise. Please clearly and prominently indicate in your submission any part you do not wish to be publicly disclosed.

Data protection

Information on data protection and how SFBF handles personal information can be found at <https://swfbf.se/privacy/> under the heading Privacy.

Who should read this consultation paper?

This paper may be specifically of interest to contributors of input data to STIBOR and to any investor dealing with financial instruments and financial contracts whose value is determined by STIBOR or with investment funds whose performances are measured by means of STIBOR.

Further information regarding responding to this paper can found at the end of the document in Appendix 1.

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This paper discusses the proposed clarification of the STIBOR definition and revision of the STIBOR Calculation Methodology. Recipients of this public consultation are responsible for making their own assessments of the proposals.

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1. Introduction

The introduction of regulation EU 2016/1011 for financial benchmarks¹ (EU BMR) requires all administrators of benchmarks to meet defined standards. The EU BMR applies to the provision of a benchmark, the contribution of input data to a benchmark and the use of a benchmark in the European Union.

The EU BMR, introduced in the wake of the LIBOR scandal, imposes obligations for benchmark administrators according to the designation of the benchmark. In the case of STIBOR, it is a critical interest rate benchmark.

The EU BMR also requires administrators of benchmarks to be authorised and supervised by a competent authority. In the case of STIBOR, the competent authority is the Swedish regulator, Finansinspektionen (FI). During the authorisation process the FI will assess the SFBF's governance frameworks, policies, and procedures to ensure that it meets all aspects of EU BMR and the related Commission Delegated Regulation. Upon successful completion of the authorisation process the SFBF will be listed on the ESMA Benchmarks Register² as an authorised benchmark administrator.

The SFBF has until 31 December 2021 to lodge an authorisation application with the FI. ESMA has confirmed, through its Q & A communications, that supervised entities that use critical benchmarks will be able to continue to do so whilst the authorisation application is being assessed.

The SFBF assumed the administration responsibility for STIBOR in April 2020 and shortly after commenced a comprehensive review of STIBOR, including considering the definition of STIBOR and the calculation methodology applied for its determination. The SFBF has undertaken the review to ensure that STIBOR meets all the requirements of EU BMR, accurately reflects the underlying economic reality it measures and that it meets best practice.

The review has indicated the potential need to evolve STIBOR in such a manner as to not cause disruption to contracts referencing it.

The review undertaken by the SFBF has indicated that a clarification of the STIBOR definition and revision of the calculation methodology are desirable.

This consultation paper intends to duly inform and engage all stakeholders by providing comprehensive information regarding the proposed adjustments. The SFBF invites stakeholders to provide their feedback to the SFBF by responding to the posed questions within this consultation paper.

¹ [Regulation \(EU\) 2016/1011 of the European Parliament and of the Council of 8 June 2016](#)

² EU BMR Article 36

2. About STIBOR

STIBOR was originally created in 1986 by the leading banks operating in Sweden to serve as a reference rate for a select few loans and derivatives. SEB issued the first financial contract referenced to STIBOR in October 1987; a floating rate note tied to 3 month STIBOR. As more and more households as well as companies chose loans with floating interest rates, STIBOR acquired an increasingly important role in the Swedish economy.

Today, STIBOR is deemed an 'interest rate benchmark' as it meets the definition of an interest rate benchmark under EU BMR, which means a benchmark which is determined based on the rate at which banks may lend to, or borrow from, other banks, or agents other than banks, in the money market.

STIBOR was designated as a 'critical benchmark' on 17 October 2018 in accordance with Commission Implementing Regulation (EU) 2018/1557³. The decision to designate STIBOR as a critical benchmark was made based on the assessment by the FI that STIBOR is used as a reference in the pricing of over-the counter (OTC) interest rate derivatives denominated in Swedish krona (SEK) for an outstanding notional amount of EUR 3,500 billion. Close to one fourth of SEK-denominated bonds reference STIBOR and STIBOR is used in the pricing of 75% of total loans to Swedish households and non-financial institutions. The total value of financial instruments and financial contracts referencing STIBOR is about eight times larger than the gross national product of Sweden. STIBOR is therefore of vital importance for financial stability and market integrity in Sweden. The assessment concluded that STIBOR's discontinuity or unreliability could have a significant adverse impact on the functioning of financial markets in Sweden and on companies and consumers because it is used in loans, consumer credits products and investment funds.

STIBOR is calculated from contributions received from a select group of Panel Banks. The benchmark has 6 tenors and is published at 11:00am local time, Stockholm during all days banks are open in Sweden.

STIBOR is currently the key financial benchmark for Sweden that defines on a daily basis the average interest rate at which STIBOR Panel Banks are willing to lend to one another without collateral.

As such, STIBOR has established itself as the most important reference rate, plus margin where relevant, for the settlement of financial contracts, most notably being commercial lending and financial derivative contracts. Naturally, the benchmarks are predominantly used by clients domestically in Sweden, but it should be noted that international users managing SEK exposure will rely on STIBOR. Clients will range from market professionals such as financial institutions and large sophisticated corporates to retail customers where STIBOR has been used as a reference for loan agreements.

Furthermore, as a crucial measurement of the SEK local interest rate market the daily STIBOR determination provides a good indication to the Riksbank and financial institutions in general on market expectations for the future direction of SEK interest rates.

³ [Commission Implementing Regulation \(EU\) 2018/1557](#)

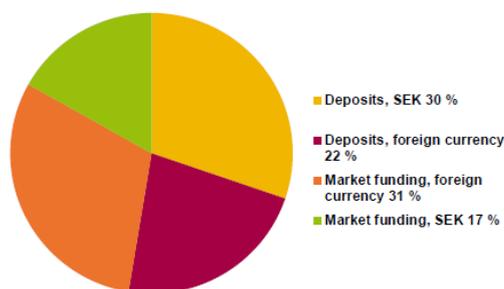
3. Bank short-term funding in the context of STIBOR

In the early days of STIBOR the contributing banks were participants in the Swedish money market. It was usual for banks to obtain their short-term funding through this market by borrowing from other banks active in the Swedish money market. For every borrower there was a corresponding lender and the STIBOR contributing banks would provide their lending rate information for the calculation of STIBOR.

Over more recent years banks participating in the Swedish market have sourced their short-term funding from foreign currency markets in addition to the Swedish market. Issuance of foreign currency certificates of deposit (CD) and commercial paper (CP) in currencies such as euro, British pounds and United States dollars have been widely used as a source of funding. Funds received in foreign currency can either be retained in the foreign currency to fund foreign currency assets or converted into Swedish krona if desired using the forward foreign exchange market.

In the report “FI Analysis 14: Reference Rates are Changing”⁴ published in 2018, the statistics on market activity showed the majority of interbank transactions during 2017 were in the overnight and tom/next periods with very little fixed-term activity.

In the report “FI: Stability in the Financial System May 2019”⁵ the FI states that “Swedish banks differ from many other European banks since they are more dependent on market financing, of which a large portion comes from foreign investors”. Over half of major banks’ funding is in foreign currency, as shown in the Figure 1 chart below:



Source: FI.

Figure 1: Major Swedish bank funding analysis

⁴ [FI Analysis: Reference Rates are Changing](#)

⁵ [FI: Stability in the Financial System May 2019](#)

4. Strengthening STIBOR

In the Financial Stability Board's (FSB) report: "Reforming Major Interest Rate Benchmarks" from July 2014, it is recommended to strengthen IBORs and other potential reference rates based on unsecured funding costs by underpinning them to the greatest extent possible with transaction data.

The EU BMR also states in paragraph 26 that "any discretion that can be exercised in providing input data creates an opportunity to manipulate a benchmark. Where the input data is transaction-based data, there is less discretion and therefore the opportunity to manipulate the data is reduced. As a general rule, benchmark administrators should therefore use actual transaction-based input data where possible but other data can be used in those cases where the transaction data is insufficient or inappropriate to ensure the integrity and accuracy of the benchmark".

The current STIBOR Calculation Methodology uses input data contributed from the STIBOR Panel Banks. The STIBOR Panel Bank Code of Conduct, Section 3.1 requires Panel Banks to provide to the SFBF "Quotes for the rate at which Panel Banks would lend to one another on an unsecured basis". Section 3.3 describes the priority use of input data and specifies that Panel Bank lending to other Panel Banks in the unsecured Swedish money market takes highest priority. Whilst the use of transactional based input data is the most desirable, as the STIBOR Panel Banks use the issuance of short-term securities in both SEK and foreign currency for funding, the current reliance on Panel Bank lending to one another is no longer the most reliable source of transactional data for the calculation of STIBOR.

As a result of the changed dynamics in bank funding the SFBF has concluded that an adjustment to the STIBOR Calculation Methodology is warranted to enable the input data from Panel Banks to be based upon their evidenced short-term securities issuance transactions. This adjustment moves the input data from interbank lending to the short-term securities issuance price, effectively capturing the Panel Banks' cost of funding.

STIBOR is currently defined as the average interest rate at which STIBOR Panel Banks are willing to lend to one another, so moving the input data from the lending rate to a cost of funds rate will alter the underlying value of the benchmark. In order to adjust for that movement, the revised STIBOR Calculation Methodology incorporates a Bid to Offer Spread adjustment which is added to each individual Panel Bank's calculated estimated cost of funds rate. The spread is of a default value for each tenor of STIBOR, which can be adjusted by Panel Banks only under certain controlled circumstances. The application of the spread adjustment ensures that the revised STIBOR Calculation Methodology produces a STIBOR output of similar value to the current STIBOR values. The revised STIBOR Calculation Methodology is addressed in more detail in Section 7.

5. Clarification to the STIBOR Definition

The SFBF has carefully considered the current definition of STIBOR and is of the opinion that a clarification is warranted.

The SFBF therefore proposes that the STIBOR definition or underlying interest be clarified to read as follows:

“STIBOR is a measure of the interest rate applied by panel banks for unsecured lending in Swedish krona (SEK) to leading banks⁶”.

5.1 Rationale for change

The current STIBOR definition is: “STIBOR is a reference rate that shows an average of the interest rates at which a Panel Banks active on the Swedish money market are willing to lend to one another without collateral at different maturities. STIBOR is set for tomorrow next, 1 week and 1, 2, 3 and 6 months”.

The SFBF has compared the current definition with the clarified definition with the following observations:

- “STIBOR is a reference rate that shows an average of the interest rates” is replaced with “STIBOR is a measure of the interest rate”. The rationale for change is that it is known and accepted that STIBOR is a reference rate and therefore not required to explicitly state it in the definition.
- The phrase “... at which Panel Banks active...” is replaced by “...applied by panel banks.” The rationale for the change being that the term “active” is subjective and that without a definition of active removing reference to the term streamlines the definition.
- “...on the Swedish money market...” is removed. The rationale for change is that the Swedish money market is no longer the primary source of funding for banks operating in Sweden, and therefore the inclusion of the term Swedish money market is misleading.
- “...are willing to lend...” is removed. The rationale for change is that the term is a subjective reference. Using the new terminology of “applied” is preferred.
- “...to one another without collateral...” is replaced by “...for unsecured lending in Swedish krona (SEK) to leading banks”. The rationale for change is that the use of the term unsecured is current financial market language whereas the term “without collateral” is not. The use of the term “lending in Swedish krona” clarifies the currency that the applied interest rate references. The rationale for the use of the term “leading banks” broadens the application of the lending activity to a wider group of banks from just Panel Banks, as described in the current definition by “...to one another...”.
- “...at different maturities. STIBOR is set for tomorrow next, 1 week and 1, 2, 3 and 6 months” is removed. The rationale for change is that there is no need to state the different maturities within the definition because the tenor rates of STIBOR are presented via information vendor screens and the SFBF website as a complete set. Also, not including specific tenors within the definition allows for potential adjustment to the tenor mix in the future without the requirement to amend the definition.

At this time, the SFBF has no intention to adjust the STIBOR tenor mix and it is proposed that the current six tenors will be continued.

⁶ A leading bank is defined as a bank of investment grade credit rating that is a participant in money and foreign exchange markets on competitive terms

Question 1:

- a) Do you consider that the SFBF's clarification of STIBOR's underlying interest provides enough transparency and allows stakeholders to understand its definition and decide on its use?
- b) Do you consider that the SFBF's clarification of STIBOR's definition will be generally accepted by stakeholders and counterparties to transactions that reference STIBOR and therefore minimise the risk of contract frustration?

6. Revision of the STIBOR Calculation Methodology

As described previously, the revised STIBOR Calculation Methodology aims to maximise the number of actual and evidenced Panel Bank transactions used to determine STIBOR. Shifting the input data from lending to the issuance of short-term securities, and where panel banks receive SEK deposits, increases the number of actual transactions that can be directly referenced to determine STIBOR.

In reviewing the STIBOR Calculation Methodology to ensure that transactions were used to the greatest extent possible the revised STIBOR Calculation Methodology will have a revised input data waterfall with actual transactions being provided directly to the SFBF as administrator to calculate an estimated Panel Bank cost of funds. Actual transactions are further employed by the SFBF through the application of interpolation and extrapolation and the use of a Market Adjustment Factor which allow for transactions from up to 5 previous business days to be used. This increases the number of tenors that can be calculated using transactions alone. Where transactional data is insufficient to produce a value for a tenor, Panel Banks will contribute their estimated cost of funds based upon CD and CP issuance prices, or if unavailable their estimations based upon their expert judgement.

As the revised calculation methodology produces a cost of funds, whereas STIBOR is an offered rate, there is a requirement to add a Bid to Offer Spread to the cost of funds to produce the STIBOR rates.

6.1 STIBOR Calculation Methodology Explained

Under the revised STIBOR Calculation Methodology, STIBOR will be determined with the input data contributed by a panel of credit institutions (Panel Banks) that are representative of the Swedish financial market. A Panel Bank's contribution will be based on executed transactions, when available, and on a combination of other sources of information and modelling techniques when transactional evidence is insufficient. The calculation process of a Panel Bank's contribution toward STIBOR is divided in two distinct steps:

1. A measure of the contributing bank's cost of funds calculated by means of an input data priority waterfall;
2. A Bid to Offer Spread, which reflects the difference between an estimated cost of funds' rate and STIBOR's underlying interest, is added to the Panel Bank's cost of funds as determined in step 1.

To the greatest extent possible a Panel Bank's cost of funds is determined in Step 1 using Panel Bank contributed transactional evidence for input data. To ensure robustness in the absence of transactions, the revised STIBOR Calculation Methodology follows a hierarchical waterfall consisting of three levels. These levels are employed progressively and, in the order, specified below:

- Level 1 consists of contributions based on transactions executed by the Panel Bank during the previous day that reflect the Panel Bank's cost of funds.
- Level 2 consists of contributions derived from the evidence of Level 1 transactions, using interpolation, extrapolation, and the application of a Market Adjustment Factor (MAF).
- Level 3 consists of contributions based on commercial paper (CP) and certificates of deposit (CD's) issuance prices, using data through the application of a combination of modelling techniques and the Panel Bank's judgement.

The application of the input data waterfall can be demonstrated through the use of an example as follows: if input data contributed by a given Panel Bank qualifies as a Level 1 contribution for the 1 month tenor, no further waterfall levels will be used for that tenor. In contrast, if conditions for a Level 1 contribution for a 3 month tenor are not met, then the calculation system will assess whether criteria for a Level 2 contribution for that tenor are fulfilled, and if they are, no further waterfall level will be used. If the criteria for Level 1 and Level 2 cannot be met the input data from Level 3 will be utilised.

A high-level description of the three levels of the waterfall calculation methodology is presented in Figure 3.

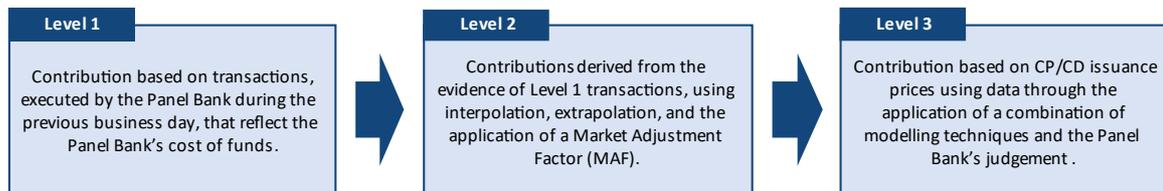


Figure 3: Diagram of STIBOR's waterfall calculation methodology

After an estimate of the Panel Banks' cost of funds has been obtained in Step 1 the STIBOR determination process progresses to Step 2. In Step 2 the calculation system adds a Bid to Offer Spread, which represents the difference between the calculated cost of funds rate and STIBOR's underlying interest.

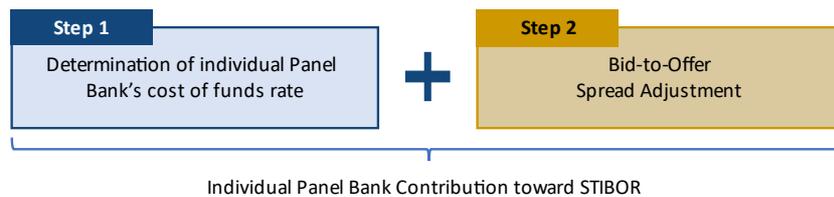


Figure 4: Determination of Panel Bank's STIBOR contribution

After all contributions have been calculated, STIBOR is determined as a trimmed mean of the resulting rates, following the rules described in the waterfall calculation methodology.

Input data can be both evidence of actual transactions undertaken by a Panel Bank, and contributed information provided by the Panel Bank in the absence of actual transaction.

The *Evolution of STIBOR – Proposed Revised Calculation Methodology* document describes in detail the calculation process, but in summary it is the mathematical arithmetic mean (rounded to three decimal places) of the Panel Bank contributed input data, with topping and tailing applied depending upon the number of contributions received. The receipt by the SFBF of a number of Panel Bank contributions ensures that there is a sufficiency of input data to produce an accurate and reliable STIBOR output.

7. Criteria and procedures used to calculate STIBOR

The revised STIBOR Calculation Methodology provides complete information on the criteria and procedures for the calculation of STIBOR. A summary of the criteria and procedures is provided here for the convenience of readers.

The input data for the calculation of STIBOR shall be contributed by Panel Banks to the SFBF every good business day (being defined as a day when banks are open in Sweden), between 6:30am and 10:00am⁷ local time, Stockholm.

Level 1 transactional evidence input data (for transactions executed on the business day T prior to that of the publication⁸ of STIBOR, T+1) is provided to the SFBF between 6:30am to 8:30am on the day of STIBOR determination.

Level 3 input data is provided to the SFBF between 8:00am and 10:00am on the day of the STIBOR determination.

Step 1 - Level 1

Level 1 is divided in two different sub-levels, depending on the currency in which the underlying set of transactions was performed. In sub-level 1.1, only transactions executed in Swedish krona (SEK) are considered as eligible; in sub-level 1.2, transactions from a wider basket of foreign currencies are deemed eligible, including euro (EUR), British pound (GBP), and United States dollar (USD). In this second case, transaction rates and volumes are converted to their SEK implied rates and SEK denominated volumes relying on standard formulas. Levels 1.1 and 1.2 are applied hierarchically, i.e., a Level 1.1 contribution takes precedence over Level 1.2.

Eligible transactions must have a counterparty type from one of the following sector- and/or sub-sector categories:⁹

Non-financial corporations (S11)	Other financial intermediaries (except insurance corporations and pension funds) (S125)
General government (S13)	Financial auxiliaries (S126)
Central bank (excluding monetary policy operations) (S121);	Captive financial institutions and money lenders (S127)
Deposit-taking corporations (except the central bank) (S122)	Insurance corporations (S128)
Money Market Funds (MMFs) (S123)	Pension funds (S129);
Non-MMF investment funds (S124)	

Step 1 - Level 2

Level 2 contributions are calculated in the cases when a Panel Bank does not have sufficient transactions to qualify for a Level 1 contribution but has had transactions in a nearby tenor or recent transactions to support a Level 1 contribution. Level 2 is subdivided in three different sub-levels, that apply hierarchically:

- Level 2.1. Adjusted linear interpolation from neighbouring tenors.
- Level 2.2. Transactions with maturity at broken dates
- Level 2.3. Transactions from previous days.

⁷ These times are still to be finalised

⁸ STIBOR is calculated each day commercial banks are open for general business in Sweden. A list of bank holidays is maintained by the Sveriges Riksbank (e.g., dates for bank holidays in 2021 can be found [here](#)).

⁹ The type of counterparty classification relies on the definitions of institutional sectors and subsectors described in European System of Accounts (ESA 2010)

Level 2.1

This methodology may only be applied for the calculation of contributions toward the 1 week, 1 month, 2 months, and 3 months tenors, and only when Level 1 contributions for the day have been determined for both the respective neighbouring tenors, i.e., a 1 month contribution under Level 2.1 is derived from Level 1 contributions in the 1 week and 2 month tenors.

For the purpose of calculation of a Level 2.1 submission, the original currency in which the transactions supporting the respective Level 1 contributions at the neighbouring tenors were carried out is not relevant, as they have been adequately converted to represent the bank's cost of funds in SEK.

Level 2.2

For a contribution at Level 2.2, the methodology considers transactions that are fully reflective of STIBOR's underlying interest but do not satisfy the standard tenor corridors for a Level 1 contribution, in particular off-tenor transactions denominated foreign currencies eligible under Level 1.2 are considered valid for the determination of Level 2.2 contributions. Transactions eligible for a Level 2.2 contribution must have maturity less than 6 months.

Level 2.2 applies to all STIBOR tenors and it is applied only in cases in which a contribution could not be derived from any of the previous methodological levels. The objective of this technique is to derive contributions for STIBOR tenors via the reallocation of volume and derivation of rates from off-tenor transactions using simple mathematical tools. Level 2.2 rates are determined based on a parallel shift which replicates the slope of the STIBOR yield curve from the previous day.

Level 2.3

Level 2.3 applies only to the 1 month, 2 months, 3 months and 6 months tenors and it is applied only in cases in which a contribution could not be derived from any of the previous methodological levels in the designated hierarchy. Level 2.3 applies solely to transactions in any of the eligible foreign currencies¹⁰ that have been previously used in the calculation of Level 1 contributions¹¹.

The historical 'look-back' period for level 2.3 contributions is set according to the following table:

Tenor	Transactions with trade date on any of	
T/N	Not eligible for Level 2.3 calculation	
1 Week	Not eligible for Level 2.3 calculation	
1 Month	5 previous business days	(Days T-1 to T-5)
2 Months	5 previous business days	(Days T-1 to T-5)
3 Months	5 previous business days	(Days T-1 to T-5)
6 Months	5 previous business days	(Days T-1 to T-5)

¹⁰ Historical SEK denominated transactions are not considered eligible under Level 2.3 due to lack of an appropriate market adjustment factor for moves in Swedish rates that fulfils the necessary criteria regarding transparency and verifiability

¹¹ In accordance with the STIBOR Panel Bank Code of Conduct, Panel Banks are required to report any changes in the details of previously reported transactions. For the purpose of a Level 2.3 contribution calculation, only transactions in a foreign currency used under Level 1, and not cancelled, or otherwise reported as erroneous, are considered. In case corrections on those transactions are reported, Level 2.3 will use the details of the most recent contribution

As a means to capture possible moves in interest rates between the date of the execution of the original transaction and the current date, a Market Adjustment Factor (MAF) will be added to the original trade rate, i.e.

$$r_i^{adj} = r_i + MAF$$

where r_i denotes the rate of transaction i on the respective trade date and r_i^{adj} the adjusted rate.

This procedure applies irrespective of the foreign currency in which the transaction was originally executed. For each currency, the SFBF stipulates the use of a specific MAF, as detailed below. For transactions executed in any of the eligible foreign currencies, the adjustment is performed prior to their conversion into SEK. For the calculation of the implied rate in SEK from the foreign currency rate, the standard formula is used.

The Level 2.3 contribution is calculated as the volume-weighted average of all eligible transactions from the most recent day within the time windows defined in the table above, after adjustment and conversion, as required.

Market Adjustment Factor

As mentioned above, the MAF intends to reflect overall movements in interest rates. The MAF is calculated relative to changes in the futures market in the currency underlying the original transaction, i.e., USD, EUR, or GBP, between the trade date of the original transaction and day T, in respect of a STIBOR calculation on day T+1. More concretely, the MAF is based on changes in the closing prices of the ICE futures contracts in the corresponding quarterly months.

Tenor	Transactions with trade date on any of
1 Month	First front 3 months contract
2 Months	First front 3 months contract
3 Months	First front 3 months contract
6 Months	First and second front 3 months contracts

In formulaic terms, the MAF is calculated as follows:

$$MAF = F_0^{FCY} - F_{-d}^{FCY}$$

where F_0^{FCY} represents the value of the appropriate future contract rate on day T and F_{-d}^{FCY} represents the rate of the corresponding future contract on day $T - d$, where $1 \leq d \leq 5$, as per the table describing the applicable look-back period per tenor above.

Note: It is worth mentioning the specifics in the calculation of the MAF at the dates in which the futures contracts expire, also known as IMM dates.

The future contracts on which the Level 2.3 methodology relies cease trading on the Monday preceding the third Wednesday of a March quarterly cycle. This means the third Wednesday of March, June, September, and December. For the calculation of a MAF on any third Tuesday of either of these months, the methodology relies on the contract that is about to expire. After the third Wednesday, the MAF is calculated based on the moves of the new contract.

Step 1 – Level 3

Level 3 contributions are required where a Panel Bank's contribution for a STIBOR tenor cannot be calculated automatically using either Level 1 or Level 2 of the calculation methodology. Under Level 3 Panel Banks are required to estimate their cost of funds (COF) rate on day T from market issuance prices of CP and CD's by determining the correct percentage weighting applicable to eligible currencies (SEK, EUR, USD, GBP) that represent their 'basket funding mix'.

Each Panel Bank's modelling used to estimate a COF rate from a basket of currencies should remain consistent over a reasonable time and be clearly documented by the Panel Bank.

CP and CD issuance prices are substantiated by the evidence provided in the daily metadata spreadsheet supplied by Panel Banks to the SFBF as part of their daily contributions. Panel Banks must report this additional information to support their rate level submissions referring to day T's end-of-day. Panel Banks are required to provide information to the SFBF upon request on their Level 3 determination methods, including methodology descriptions, performance, and independent reviews. Any changes to a Panel Bank's Level 3 determination methodology should be brought to SFBF's attention.

Step 2 Underlying Interest Spread Adjustment

The methodology described in the previous sections is anchored in executed transactional evidence, and other sources of data, to calculate an estimate of the rate at which Panel Banks in the STIBOR panel fund themselves in Swedish krona: a cost of funds (COF) rate. In contrast, as mentioned above, STIBOR aims at representing a measure of the rate applied by Panel Banks for unsecured lending in Swedish krona. The final step of the STIBOR Calculation Methodology addresses this difference in value by adding a Bid to Offer Spread' (BOS), which guarantees full representativeness of a Panel Bank's contribution toward STIBOR, effectively moving the calculated COF rate to that of a 'lending rate', in line with STIBOR's underlying value.

The application of the BOS is automatically performed by the STIBOR calculation system. Based on statistical studies performed by the SFBF, the following table lists the value (in basis points) of the BOS adjustment factor for each of STIBOR's official tenors.

Tenor	BOS
T/N	8 basis points
1 Week	10 basis points
1 Month	15 basis points
2 Months	15 basis points
3 Months	15 basis points
6 Months	15 basis points

The SFBF has however defined two specific scenarios where Panel Banks may be allowed to alter their default BOS due to circumstances that require adjustment to the calculated COF rate determined under Step 1 of the STIBOR methodology.

The two specific scenarios are:

- Balance-Sheet Considerations - the additional cost related to the adjustment of the Panel Bank's balance sheet for key reporting dates, most notably over year-end.
- Riksbank Deposit Rate – the calculation of an implied SEK rate derived from foreign currency funding generated by CP and CD issuance is out of line with the perceived Riksbank term rate structure determined by the floor created by the Riksbank overnight deposit rate.

The SFBF shall check the formal correctness of the input data contributed by the Panel Banks between 9:00am and 11:00am local time and resolve any discrepancies directly with the Panel Bank in question, should they occur. Panel Banks may, exceptionally, alter their input data at that time, but not later than 10:55am local time. The calculation of STIBOR shall take place at 11:00am local time.

Once announced and published, the STIBOR rates shall be final subject to the SFBF Post Publication Redetermination policy. This shall not rule out the possibility for the SFBF to publish a re-determined STIBOR rate before 3:00pm local time at the latest, having announced the intention to republish corrected STIBOR by 2:00pm local time.

If the SFBF Business Continuity Plan is initiated the methodology applied for the calculation of STIBOR will be unchanged.

A flow diagram illustrating the application of the STIBOR Calculation Methodology is shown in Appendix 1.

7.1 Minimum Input Data needed to determine STIBOR

After the calculation of all Panel Banks contributions using the STIBOR calculation methodology described in the previous sections, the STIBOR calculation methodology is endowed with an outlier removal technique that aims at removing any idiosyncratic (non-market driven) volatility and reducing any potential for manipulation.

STIBOR is calculated as the arithmetic mean, rounded to three decimal places, for all the STIBOR official tenors (Tom/Next, 1 week, 1 month, 2 months, 3 months and 6 months), in the following manner:

No. of Panel Bank contributions	Calculation method and contingency calculations (applied separately for each tenor)
9 or more	Arithmetic mean of the rates, net of the two highest and two lowest rates
6 - 8	Arithmetic mean of the remaining rates net of the highest and lowest rates
4 - 5	Arithmetic mean of all contributions
2 - 3 Contingency	The shortfall of one or two contributions will be replaced by using the previous day's STIBOR rates once or twice respectively
0-1 Contingency	Yesterday's STIBOR rate will be published

In extreme cases, such as natural disasters or extreme market events that lead to less than four Panel Banks contributing, the contingency calculation will be applied for an indefinite period. Stakeholders can be assured that should the contingency calculation be applied that after three consecutive business days the SFBF, as administrator, will consider all matters in respect to the immediate future publication of STIBOR.

Once announced and published, the STIBOR rates shall be final subject to the SFBF Post Publication Redetermination policy¹².

¹² The current version of the policy is available on the [SFBF website](#).

7.2 Quorum for Calculation

The quorum for calculation is 4. In the case that less than 4 contributions are received the contingency calculation will apply.

7.3 Expert Judgement

Rules which govern any exercise of expert judgement and ex-post evaluation process of any discretion are described in the STIBOR Panel Bank Code of Conduct¹³. Only adequately trained submitters from Panel Banks may exercise any expert judgement in their contribution in circumstances described.

Panel Banks are required to establish policies on the use of discretion that specify at least the following:

- a. the circumstances in which it may exercise discretion
- b. the persons within the Panel Bank that are permitted to exercise discretion
- c. any internal controls that govern the exercise of the Panel Bank's discretion in accordance with its policies
- d. any persons within the Panel Bank that may evaluate ex-post the exercise of discretion

Where the contribution of input data relies on expert judgement, the policies of a Panel Bank in relation of the use of judgement or the exercise of discretion shall include:

- a. a framework for ensuring consistency between different submitters, and consistency over time, in relation to the use of judgement or the exercise of discretion
- b. identification of the information that can be used to support expert judgement or discretion, and of any information that should not be taken into account
- c. procedures for the systematic review of any use of expert judgement

Each Panel Bank is required to maintain records of the input data source that was considered for each contribution and any related exercise of discretion.

The SFBF also carries out post publication analysis of all input data (including where discretion may have been applied) to identify suspicious or anomalous data and investigate further as appropriate.

The revised *Evolution of STIBOR – Proposed Revised Calculation Methodology* document is available on the SFBF's website within the Public Consultation section.

Question 2:

- a) Do you consider that the SFBF's revision of the STIBOR Calculation Methodology will be generally accepted by stakeholders and counterparties to transactions that reference STIBOR and therefore minimise the risk of contract frustration?

¹³ The STIBOR Panel Bank Code of Conduct will be updated to reflect the revised STIBOR Calculation Methodology once finalised

- b) Are there any aspects of the STIBOR Calculation Methodology for which you would like clarification by the SFBF? If yes, please elaborate.

Question 3:

- a) Do you agree with the SFBF's proposal for counterparty types to the transactions to be used in the calculation of the Panel Bank's estimated cost of funds?
- b) If not, on what basis would you seek to add or exclude any counterparty type for the determination of the Panel Bank's estimated cost of funds? Please provide your rationale.

8. Change of STIBOR input data transaction day

The current STIBOR Panel Bank Code of Conduct stipulates that the relevant period for transactional evidence to be used by the Panel Banks for either their Level 'a' and 'b' submissions, should be from 11:00am from the previous day until 10:15am of the calculation day. The exception to this rule is Tom/Next, where supporting transactions are only those concluded on the day of calculation until 10:15am.

The revised STIBOR Calculation Methodology will require Panel Banks to contribute their transactions for the day prior to the calculation of STIBOR. The day prior is day T. The transaction eligibility period will be from 8:00am to 6:00pm local time, Stockholm for day T. As previously described the transaction data will be used to calculate the estimated Panel Bank cost of funds for day T, so for consistency all Panel Bank contributions of Level 3 input data also relate solely to day T. As the contributions from the Panel Banks are contributed to the SFBF on T+1 (the day of STIBOR calculation) all market events for the previous day will be known to submitters.

As all market events will be known to submitters it removes the requirement for the STIBOR calculation methodology to contain a procedure for managing Exceptional Market Events (EME's) as all events will be reflected in transactions reported or contributions provided by each Panel Bank.

Should an event occur on day T that has a significant impact upon market pricing, it will be reflected in the transactional data on the assumption that there are transactions executed during or after the market event. In the absence of transactions, the estimated COF provided by the Panel Banks on T+1 should reflect the adjusted market prices to some extent, but it should be appreciated that any event affecting market pricing on day T may not be completely reflected in STIBOR calculated on T+1 and that it could potentially be that the full price adjustment is not completely reflected in STIBOR until T+2.

9. Analysis of test transactional data

As part of the preparatory work for the revised STIBOR Calculation Methodology, SFBF collected historical transactional evidence from Panel Banks spanning a two-year period and performed a series of tests and simulations on the data.

Calculation of a simulated STIBOR according to Section 7 provided very promising preliminary results. Any changes to the benchmark's features were well within reasonable constraints. However, due to the historical nature of the data used these results cannot be taken as a definitive.

To further provide additional assurance, SFBF is planning a pre-live testing exercise with Panel Banks. During this period data from Panel Banks will be collected daily to facilitate the calculation of a simulated STIBOR according to the proposed revised STIBOR Calculation Methodology described in this paper. The pre-live testing analysis will be used to evaluate the performance of the revised calculation methodology on current market data and to potentially cater for any possible inconsistencies within the revised calculation methodology. Results of this exercise will be made publicly available to all stakeholders after the exercise has concluded.

9.1 Reliance on respective Levels

Calculation of a simulated STIBOR based on historical data in accordance with the revised calculation methodology outlined in Section 7 allows for an estimate of the reliance on respective contribution levels. When interpreting the results presented in Figure 5, these should be considered together with the specificities of the Swedish money market, as described in Section 3, and more notably in the context of Figure 1.

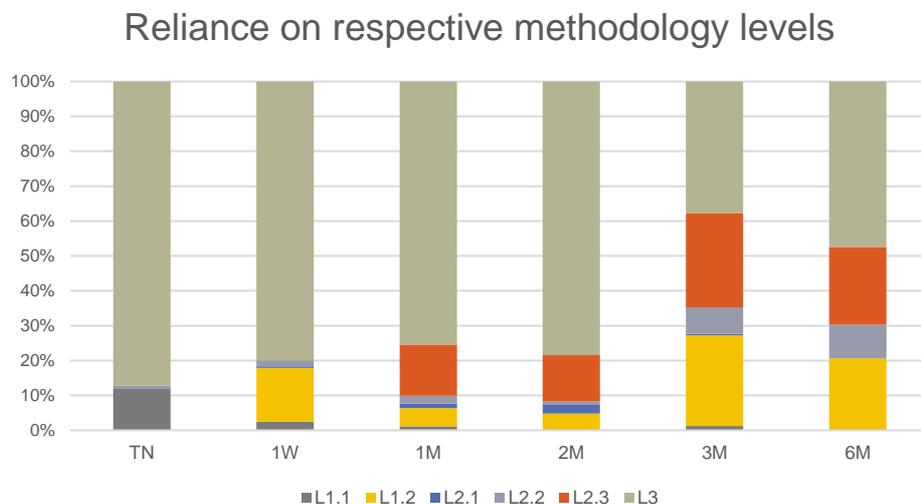


Figure 5: Estimated reliance of respective levels

Results from Figure 5 cannot be taken as a definite description of the market. During the testing period of 2 years, the representation of different levels changed over time. A more definite representation of the reliance on each of the calculation methodology levels will be presented following the pre-live testing period.

Question 4:

For institutions developing products referencing STIBOR or users of such products, what modifications, if any, do you anticipate will be required to those products as a result of the introduction of the revised STIBOR Calculation Methodology?

10. Benchmark Quarterly Indicators

The current STIBOR Calculation Methodology relies upon Panel Bank contributions of input data. Each day the STIBOR determined rates are published to the approved information vendors at 11:00am local time, Stockholm. Individual Panel Bank contributions are published at 3:00pm local time, Stockholm, to the approved information vendors and on a delayed basis to the SFBF website.

Under the revised STIBOR Calculation Methodology, Panel Banks will provide their own transactional data to the SFBF to enable it to calculate their estimated cost of funds. The SFBF intends to continue to publish the determined STIBOR values to the approved information vendors at 11:00am.

The transactional data will remain confidential to the SFBF, but as Panel Banks will only be required to provide their Level 3 contributions for those tenors where the transactional data cannot determine a STIBOR value, it is not in the Panel Banks' interest for their contributions to be revealed as, apart from other considerations, it would indicate in which tenors the Panel Bank had undertaken transactions. Publishing such information could deter financial institutions from participating in the STIBOR panel. The SFBF is therefore planning to discontinue the publication of individual Panel Bank contributions one month prior to the introduction of the revised STIBOR Calculation Methodology.

The EU BMR makes explicit reference to the need for a benchmark administrator to develop and operate the benchmark and its methodology transparently. In that respect, the SFBF considers that the implementation of the measure above would not, in any event, undermine STIBOR's transparency.

Moreover, in order to provide the market with enough information so that users have a better understanding of STIBOR, the SFBF intends to publish benchmark indicators on a quarterly basis. Publication of these indicators will commence at the end of the first calendar quarter post introduction of the revised STIBOR calculation methodology.

The indicators will include for each month:

- a breakdown by percentage of which level of the input data waterfall was used to determine STIBOR for each tenor
- the aggregate notional volumes of transactions used to determine STIBOR (Levels 1 and 2) for each tenor
- Counterparty sector share of volumes used to determine STIBOR (Levels 1 and 2) for each tenor

Question 5:

- a) Do you have any objection to the publication time of STIBOR being 11:00am as per the current modus operandi? Please provide your rationale.
- b) Are the proposed quarterly benchmark indicators suitable for your information purposes?
- c) Is a quarterly frequency for the publication of the quarterly benchmark indicators suitable for your information purposes?
- d) Is the maximum delay of 3 months from the date of STIBOR determination the appropriate period of delay for publishing the quarterly benchmark indicators?

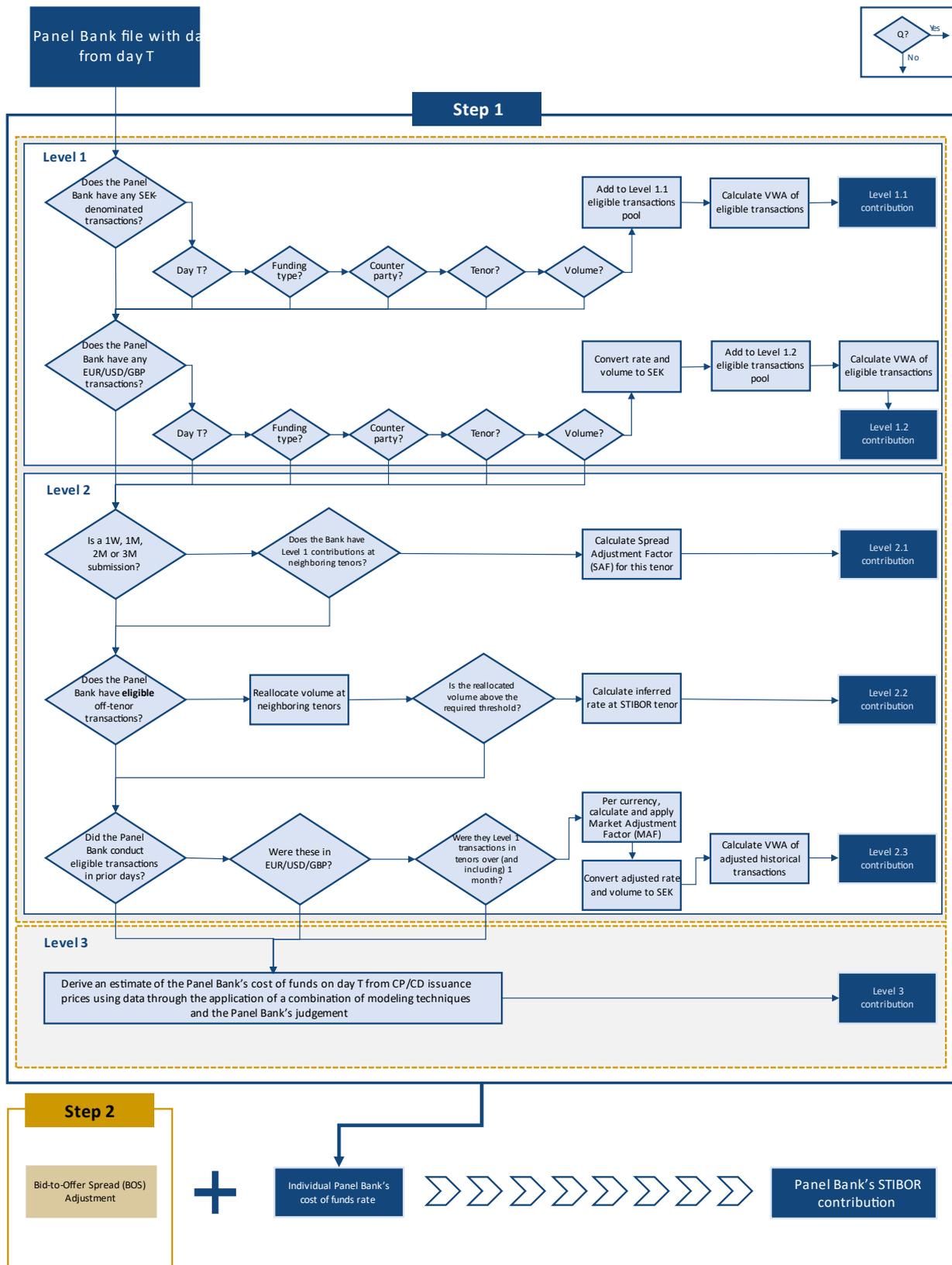
Question 6:

SFBF as the administrator of STIBOR will continue to pursue the adjustments to STIBOR's definition and calculation methodology with the highest degree of transparency and due diligence. Do you see or anticipate any other area not included in this Consultation Paper that should be addressed by the SFBF? Should you have any recommendations, please provide your feedback.

Other:

If you have any comments or remarks on any of the aspects regarding the proposed revisions described within the Consultation Paper, please include them in your response under 'Other comments'.

Appendix 1 – Flow diagram of STIBOR Calculation Methodology



Appendix 2 – Responding to this paper

SFBF invites all interested parties to respond to this consultation paper.

In particular, the SFBF would like to invite the following stakeholders to provide their feedback by Wednesday **31 March 2021** at the latest:

- Subscribers to STIBOR
- Representative trade associations and user associations
- STIBOR Panel Banks
- Regulatory Authorities (including Central Bank)

Please send your feedback by e-mail to: cpresponses@swfbf.se

In accordance with the SFBF Consultation Policy, the SFBF shall address feedback received from stakeholders in a published summary of contributions, anonymised and aggregated when stakeholders have requested anonymity. The SFBF will provide its rationale for the acceptance, modification or rejection of recommendations made by respondents to the consultation as part of this summary.

The SFBF will publish a summary of the consultation feedback on the SFBF website. Such publication shall take place as soon as practical after the approval of the summary by the SFBF Board of Directors.

SUMMARY OF QUESTIONS

Question 1:

- a) Do you consider that the SFBF's clarification of STIBOR's underlying interest provides enough transparency and allows stakeholders to understand its definition and decide on its use?
- b) Do you consider that the SFBF's clarification of STIBOR's definition will be generally accepted by stakeholders and counterparties to transactions that reference STIBOR and therefore minimise the risk of contract frustration?

Question 2:

- a) Do you consider that the SFBF's revision of the STIBOR Calculation Methodology will be generally accepted by stakeholders and counterparties to transactions that reference STIBOR and therefore minimise the risk of contract frustration?
- b) Are there any aspects of the STIBOR Calculation Methodology for which you would like clarification by the SFBF? If yes, please elaborate.

Question 3:

- a) Do you agree with the SFBF's proposal for counterparty types to the transactions to be used in the calculation of the Panel Bank's estimated cost of funds?

- b) If not, on what basis would you seek to exclude any counterparty type for the determination of the Panel Bank's estimated cost of funds? Please provide your rationale.
-

Question 4:

For institutions developing products referencing STIBOR or users of such products, what modifications, if any, do you anticipate will be required to those products as a result of the introduction of the revised STIBOR Calculation Methodology?

Question 5:

- a) Do you have any objection to the publication time of STIBOR being 11:00am as per the current *modus operandi*? Please provide your rationale.
- b) Are the proposed quarterly benchmark indicators suitable for your information purposes?
- c) Is a quarterly frequency for the publication of the quarterly benchmark indicators suitable for your information purposes?
- d) Is the maximum delay of 3 months from the date of STIBOR determination the appropriate period of delay for publishing the quarterly benchmark indicators?
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Question 6:

SFBF as the administrator of STIBOR will continue to pursue the adjustments to STIBOR's definition and calculation methodology with the highest degree of transparency and due diligence. Do you see or anticipate any other area not included in this Consultation Paper that should be addressed by the SFBF? Should you have any recommendations, please provide your feedback.

Other:

If you have any comments or remarks on any of the aspects regarding the proposed revisions described within the Consultation Paper, please include them in your response under 'Other comments'.
