

Staff Memo

Some questions about the design of SWESTR

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Staff Memos

A Staff Memo provides members of the Riksbank's staff with the opportunity to publish advanced analyses of relevant issues. It is a publication for civil servants that is free of policy conclusions and individual standpoints on current policy issues. Publication is approved by the appropriate Head of Department. The opinions expressed in Staff Memos are those of the authors and should not be regarded as the Riksbank's standpoint.

Summary

We highlight how the Riksbank's design of SWESTR affects the properties of the reference rate. There are only small differences between this design and a number of alternative ways of designing SWESTR. We also show that the concentration risks in the transaction dataset are small and that very few transactions lack an LEI.

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Since September 2021, the Riksbank has been providing the transaction-based reference rate SWESTR (Swedish krona Short Term Rate). Due to the Riksbank being the administrator, we have access to all transactions that have formed the basis for the reference rate. By analysing these data, we can shed light on what the transaction dataset actually looks like and how the various choices made by the Riksbank in the design of SWESTR affect the level and other characteristics of the reference rate.

The questions that we shed light on have been chosen on the basis of comments that the Riksbank has received regarding SWESTR. For instance, we investigate how SWESTR would be affected if transactions with non-financial corporations were excluded. Our analysis of data for 2022 shows there would have been a very small difference in the average level and volatility of the reference rate. We also analyse how the properties of SWESTR would have been affected if the minimum volume for the individual transactions included in the transaction dataset was raised from 10 to 100 million SEK: the impact on SWESTR would be negligible. Nor does the data support the suggestion that the pricing of small transactions or transactions with non-financial corporations deviates so much that these would no longer be representative of the overnight market as a whole.

Before SWESTR is determined as a volume-weighted average, the transaction dataset is trimmed to remove a total of 25 per cent of the volume. Our analysis of data for 2022 shows that SWESTR's average level would have been marginally higher and volatility slightly lower if the Riksbank had removed a total of 50 per cent of the transaction dataset, i.e. applied the same level of trimming that the European Central Bank (ECB) and Bank of England (BOE) do for the reference rates €STR and SONIA. In practice, however, this difference should be insignificant as it corresponds to a small and stable level change for SWESTR.

The Riksbank has also received questions about concentration risks in the transaction dataset. Our analysis indicates that these risks are limited. The Riksbank has also received questions about the share of the transaction dataset that transactions lacking a Legal Entity Identifier (LEI) constitute. Without this code, the Riksbank does not know

¹ The authors thank Per Åsberg-Sommar, Johannes Forss Sandahl, Denise Hansson and Buster Carlsen for valuable comments and Marianne Sterner and Calum McDonald for plain language review and English translation respectively.

the identity of the specific counterparty. Our analysis shows, however, that only a very small share of the transaction dataset in 2022 lacked such information.

1 Some questions about the design of SWESTR

Based on the complete transaction dataset for SWESTR, we analyse a number of issues concerning the design of the SWESTR reference rate. We find that the average level and volatility of the reference rate is affected to a very small extent by the design choices that we investigate.

1.1 About SWESTR

SWESTR (Swedish krona Short Term Rate) is a transaction-based reference rate for the shortest maturity in Swedish krona provided by the Riksbank. The reference rate is determined using data on executed money market transactions that the Riksbank collects from its monetary policy counterparties. Hereafter, we use the term “reporters” or “reporting banks” for the monetary policy counterparties that report their transactions on a daily basis to the Riksbank and whose transactions form the basis for SWESTR.

SWESTR is defined so that the reference rate reflects the interest rate on the unsecured overnight market in Swedish kronor. To calculate SWESTR, the Riksbank uses data on the transactions in which reporters borrow funds with a maturity of one day (“overnight”) from a wide range of counterparties consisting of banks, the Swedish National Debt Office and financial as well as non-financial corporations; see the fact box on page 8.

It became possible to start using SWESTR as a reference rate in financial contracts as of the value with a value date of 1 September 2021.² Prior to this, a test period was conducted during which preliminary SWESTR values were published for information. The Riksbank has also published historical estimates for SWESTR for the period 2016-2021.³

1.2 About the analysis

In this analysis, we investigate a number of questions regarding the design of SWESTR. The questions that we have chosen to highlight were selected in light of the comments and questions that the Riksbank has received. We briefly describe the Riksbank’s reasoning and international practice regarding these matters. In addition, we also present updated data on the transaction dataset for SWESTR and shed light on

² See Sveriges Riksbank (2021a).

³ See Sveriges Riksbank (2021b).

how the different choices made by the Riksbank in the design of SWESTR affect the level and volatility of the reference rate.⁴

Our analysis is based on data from all transactions that formed the basis for SWESTR.⁵ This is a unique dataset to which the Riksbank, as administrator, has access. The dataset is subject to secrecy under Chapter 24, Section 8 of the Public Access to Information and Secrecy Act (2009:400), which means that we cannot present all our results in detail.

The analytical results presented in this staff memo are mainly based on data from the calendar year 2022. However, data series for alternative SWESTR calculations are presented for the period 1 September 2021 – 31 December 2022. In order for our analytical results not to be distorted by changes in monetary policy during the period in question, we have consistently adjusted the interest rates for the level of the Riksbank's policy rate that applied when the transactions were executed. This means that all interest rates presented are actually interest rate differentials against the policy rate.

We have also replicated our analyses using historical data for the period 1 January 2016 - 31 December 2021. This time span includes the period that the Riksbank previously published historical estimates for SWESTR as well as the initial months when SWESTR was available for use as a reference rate in financial contracts. The overall conclusions that can be drawn from this older material regarding the design of SWESTR largely agree with the conclusions presented in this staff memo.

Even in these older data, we have been able to show that SWESTR's average level and volatility were only affected by the design choices made by the Riksbank to a limited degree. Raising the minimum volume for the individual transactions from SEK 10 million to 100 million has a negligible effect throughout. The exact impact of excluding non-financial counterparties and the trimming method varies somewhat over time, but is small overall. Concentration risks also consistently appear limited in these data and it is also unusual for transactions to lack an LEI.⁶

A clear year-end effect for SWESTR is reflected in the analysis

Interest rates on money market transactions usually fall sharply ahead of year-end. One of the reasons for this is that banks pay the resolution fee and bank tax on the basis of their balance sheets at year-end. Consequently, SWESTR with value date on the last banking day of the year tends to be noticeably lower than on the other days

⁴ The data and results presented in this analysis are complemented by the data on SWESTR provided by the Riksbank on an ongoing or regular basis. As of 1 June 2023, the Riksbank will publish, on a daily basis, the total transaction volume, the total number of transactions, the number of reporters contributing transactions and the interest rates at the trimming boundaries. In addition, the Riksbank regularly publishes statistics on the composition of the transaction dataset. See Sveriges Riksbank (2023c and 2023d).

⁵ Only transactions that formed the basis for the determined SWESTR values are used in the analysis. Any changes that have subsequently come to the attention of the Riksbank have thus not been included.

⁶ We have not examined the presence of an LEI in the material collected specifically for the historical estimates, as the correct reporting of an LEI is mainly an operational issue and this material was compiled after the fact. The investigation of this has thus been restricted to 2020-2022.

of the year.⁷ On 30 December 2022, SWESTR was determined at -9.038 per cent, which can be compared to 2,375 per cent the previous day.

The analyses in this staff memo are thus heavily influenced by the SWESTR value on the last banking day of the year. We therefore also present analytical results where the impact of the last banking day of the year has been removed.

How the different parameters in the design of SWESTR influence the value on the last banking day of the year depends entirely on the nature of the transaction dataset on the day in question. It is therefore difficult to say whether the year-end SWESTR value is systematically affected by the ways of designing SWESTR discussed in this analysis.

⁷ This effect is also clearly visible in the historical estimates for SWESTR produced by the Riksbank; see Sveriges Riksbank (2021b).

FACT BOX – Transaction dataset and normal calculation method for SWESTR

The transaction data forming the basis for the calculation of SWESTR is part of the transaction reporting submitted by the Riksbank's monetary policy counterparties in accordance with the Riksbank's *Terms and Conditions for RIX and Monetary Policy Instruments* and further instructions. At present, nine banks contribute transactions to the transaction dataset.⁸

The transaction dataset for SWESTR consists of the transactions in Swedish krona that⁹

- lead to unsecured deposits received by the monetary policy counterparty
- have an overnight maturity
- have a volume of at least SEK 10 million
- are executed between the monetary policy counterparty and an agent belonging to one of the following counterparty categories:¹⁰
 - banks and financial corporations (S122-S129)
 - non-financial corporations (S11)
 - the Swedish National Debt Office.¹¹

The breakdown into counterparty categories follows the standard of the European System of Accounts (ESA2010). The classification is based on information about the Legal Entity Identifier (LEI) that monetary policy counterparties shall provide.¹²

Before SWESTR is calculated, the transaction dataset is trimmed by a total of 25 per cent of the transaction volume. The 12.5 per cent with the highest and the lowest rates respectively are excluded. This means that SWESTR is determined on the basis of the middle 75 per cent of the transaction volume once the transactions have been ranked according to their respective interest rate levels.

The normal calculation method is to determine SWESTR as a volume-weighted average of the interest rates in the trimmed dataset.

⁸ For the list of reporters, please refer to the Riksbank website, Sveriges Riksbank (2023b).

⁹ For more information on the transaction dataset and calculation method, see Sveriges Riksbank (2023c).

¹⁰ Intra-Group transactions with the reporters are not included in the dataset for SWESTR.

¹¹ In many other countries, the liquidity management tasks performed by the Swedish National Debt Office on behalf of the central government are carried out by the central bank at interest rates that the central bank, in many cases, determines itself. This is not the case in Sweden, where the Swedish National Debt Office manages central government liquidity on market terms and is thus an important player on the Swedish overnight market. The Riksbank has therefore chosen to include the reporters' deposits from the Swedish National Debt Office in the transaction dataset for SWESTR, even though transactions with the public sector are not usually included in the transaction dataset for such reference rates. The reporters' deposits from the public sector in general are not included. For more information, see Sveriges Riksbank (2020).

¹² If the reporter cannot provide an LEI, the classification shall instead be based on a sector code according to ESA2010, which the reporter shall provide. The reporter must also provide a country code for their counterparty.

2 Transactions with non-financial corporations

SWESTR's level and other properties differ only to a very small extent between the existing design and an alternative design in which transactions with non-financial corporations are not included in the transaction dataset.

The transaction data for SWESTR includes the reporters' overnight deposit transactions with a wide range of counterparties consisting of banks (S122), financial corporations (S123-129), non-financial corporations (S11) and the Swedish National Debt Office.^{13,14} The Riksbank has previously been asked about the degree to which transactions with non-financial corporations are representative of pricing on the money market.

Our analysis shows that the interest rates on reporters' transactions with non-financial corporations do not markedly deviate from the rest of the transaction dataset. The transactions should thus be regarded as representative of the unsecured overnight market. Excluding transactions with non-financial corporations would also have a very small impact on the level and volatility of SWESTR values.

In addition, there are demarcation problems between financial and non-financial corporations; see appendix 1. These problems can also be addressed by including both financial and non-financial counterparties in the transaction dataset.

Transactions with non-financial corporations are also included in the transaction dataset that determines the cost of funding used to determine the STIBOR reference rate at its various maturities.¹⁵

2.1 International practice

When it comes to which counterparties to include in the transaction dataset, somewhat different choices have been made for reference rates; see Table 1 below. Transactions with non-financial corporations are not included in the dataset for the reference rate €STR. In contrast, they are included in the dataset for SONIA, which is currently the most widely used of the new reference rates.

¹³ When this analysis refers to "counterparties included in the transaction dataset", it should be understood that the transactions conducted with the relevant categories of counterparty are included in the transaction dataset.

¹⁴ Sector codes in brackets refer to sector codes according to the European System of Accounts 2010 (ESA 2010). For more information on the transaction dataset, see Sveriges Riksbank (2023c).

¹⁵ The difference between the transaction dataset for the SWESTR and STIBOR reference rates is that SWESTR, in line with international practice for corresponding reference rates, does not include transactions with central banks (S121) or the public sector (S13) except for the Swedish National Debt Office. For more information on the design of STIBOR, see Swedish Financial Benchmark Facility (2022).

Table 1. Transaction dataset for various reference rates

Fully transaction-based reference rates based on unsecured transactions and administered by central banks

Country	Reference rate	Transaction type	Counterparty categories
Sweden	SWESTR	Deposits	Banks, financial corporations, non-financial corporations and the Swedish National Debt Office.
Denmark	DESTR	Deposits	Banks and financial corporations
Euro area	€STR	Deposits	Banks and financial corporations
UK	SONIA	Deposits	Banks, financial corporations and non-financial corporations
Norway	NOWA	Interbank	Interbank

Note: Definitions of the transaction dataset for SONIA include all transactions classified as *wholesale*, which includes transactions with non-financial corporations.

Source: Respective central banks.¹⁶

2.2 Analysis of transaction data

We have analysed both how the properties of reporters' transactions with the various counterparty categories differ and how SWESTR would have been affected if transactions with non-financial corporations had not been part of the transaction dataset.

Seen over the full year 2022, 11 per cent of the total transaction dataset consisted of reporting banks' transactions with non-financial corporations.¹⁷ Our review shows that companies with sector code S11 are largely well-known non-financial corporations that have professional treasury functions and are well established on the financial markets. Industrial companies are common.

Our analysis also shows that there is no reason to believe that pricing of transactions with non-financial counterparties would be affected by factors other than of the current market condition to a larger extent than pricing of transactions executed with counterparties from other sectors. There are stable customer relationships in all segments, not just between reporters and non-financial corporations. The argument that these customer relationships can affect pricing thus should be considered to have no more foundation for this counterparty category than it does for any other.

During the period with a negative deposit rate, there were indeed tendencies for non-financial counterparties to receive a slightly higher investment rate on average than other counterparty categories; see Chart 1. At the same time, this pattern continued well into the period of positive policy rates and thus should not be an effect solely of reporters not wanting to give non-financial corporations a negative deposit rate. Since late summer 2022, the average investment rate for non-financial corporations has been in line with the average rate received by counterparties in other segments. In general, the spreads *between* the average interest rates of the different counterparty

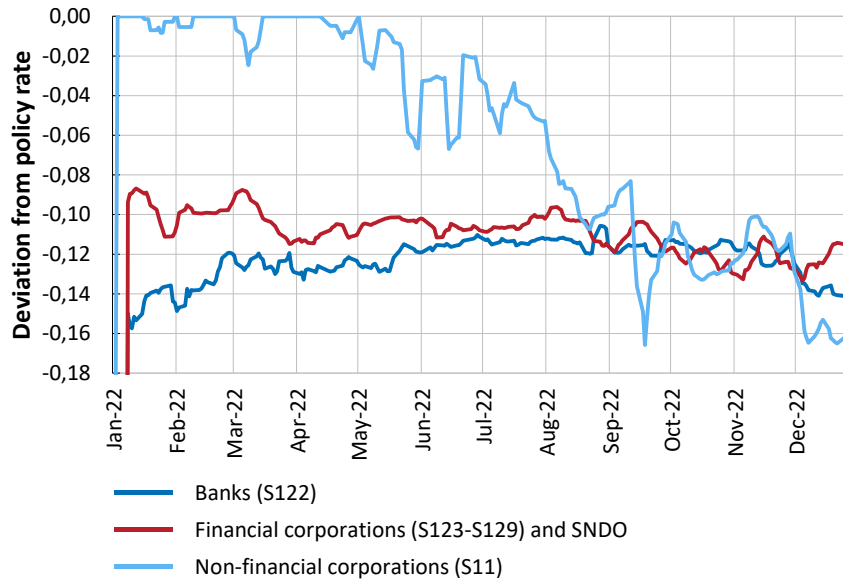
¹⁶ See Bank of England (2023), Danmarks Nationalbank (2022), European Central Bank (2021) and Norges Bank (2023).

¹⁷ For some time now, the Riksbank has provided quarterly information on the composition of the transaction dataset for SWESTR. This includes information on how the total transaction volume before trimming was distributed among the various counterparty categories over the last four quarters.

categories are also smaller than the interest rate spreads *within* categories. We do not show these data for reasons of confidentiality.

Chart 1. Investment rate for O/N investments for each category of counterparty

Average interest rate per value date and category, moving average five value dates



Note: Data refers to all transactions in the untrimmed transaction dataset and is based on the difference between each transaction’s interest rate and the Riksbank’s policy rate. Volume-weighted data series have then been calculated for all value dates and counterparty categories. Based on these series, an unweighted moving average for five value dates has been calculated. If no transactions have been made within a particular counterparty category on a particular value date, the average is based only on those days in the five-day period on which transactions were made.

Source: The Riksbank.

A question that the Riksbank has received is whether there is an overrepresentation among transactions with non-financial corporations of small transactions not priced like other money market transactions. Our analysis shows that this is not the case. On the contrary, transactions with a volume of less than SEK 100 million are *less* common in this counterparty category than in others, as shown in Table 2 below. Compared to the other categories, transactions with non-financial corporations are relatively few, but comparatively large.

Table 2. Transactions with a volume of less than SEK 100 million

Per cent and SEK million

	Entire dataset	Banks	Financial companies & the SNDO	Non-financial corporations
Share of transaction volume derived from transactions < SEK 100 million	1	2	1	0
Share of the number of transactions originating from transactions < SEK 100 million	29	31	31	5
Average size of individual transaction	955	729	1574	1433
Median size of individual transaction	300	250	359	687

Note: Shares have been rounded to whole per cent. Refers to all transactions in the untrimmed transaction dataset for the full year 2022. The table is identical to Table 5.

Source: The Riksbank.

We have also analysed what an alternative SWESTR, based on a transaction dataset without transactions with non-financial corporations, would have looked like and compared this data series with the determined values for SWESTR. As shown in Table 3 and Chart 2 below, the difference in levels is very small. On average, the absolute difference between the data series is less than 0.3 basis points.¹⁸ The standard deviations for the two data series are also very similar.

Table 3. Effect on SWESTR if transactions with non-financial corporations are not included

Determined SWESTR and alternative SWESTR excluding transactions with non-financial corporations.

	SWESTR	SWESTR without non-financial counterparties
Average level	-0.1539	-0.1554
Average level, excluding 30 December 2022	-0.1087	-0.1100
Standard deviation	0.7172	0.7195
Standard deviation, excluding 30 December 2022	0.0079	0.0075

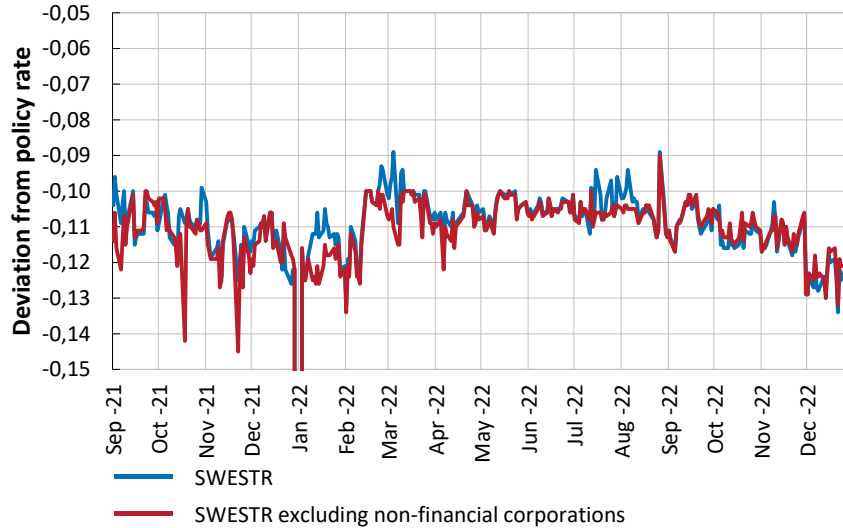
Note: Data in per cent/percentage points. The calculations have been made on the difference between the Riksbank's policy rate and SWESTR and the difference between the Riksbank's policy rate and the alternative SWESTR. Data refers to whole year 2022.

Source: The Riksbank.

¹⁸ The average absolute value difference shown in the text refers to the data series both adjusted for the outliers on 30 December 2022 and including the year-end values.

Chart 2. Effect on SWESTR if transactions with non-financial corporations are not included

Determined SWESTR and alternative SWESTR excluding transactions with non-financial corporations



Note: Percentage deviation from the Riksbank's policy rate.

Source: The Riksbank.

The effect of excluding transactions with non-financial corporations is small. This is partly due to SWESTR being determined on the basis of a trimmed transaction dataset. The purpose of trimming the transaction dataset is to reduce the impact of any extreme values on the level of SWESTR. Those transactions with non-financial corporations in which the interest rate may have deviated from the pattern of other transactions have thus been trimmed when determining SWESTR. In 2022, transactions with non-financial corporations accounted for 11 per cent of the transaction dataset before trimming, but only for 3 per cent of the calculation dataset after trimming.¹⁹

¹⁹ For the counterparty category banks, which was 55 per cent of the transaction dataset before trimming, the share after trimming was 59 per cent in 2022. For financial corporations and the Swedish National Debt Office, which was 34 per cent before trimming, the share after trimming was 38 per cent.

3 Minimum volume for the individual transactions

Whether the minimum volume for the individual transactions in the transaction dataset is 10 million or 100 million has a negligible effect on SWESTR's average level and volatility.

The transaction dataset for SWESTR includes transactions with a volume of at least SEK 10 million.²⁰ On several occasions, the Riksbank has been asked whether transactions of this size really are representative of the pricing on the unsecured overnight market or whether it would be more suitable to have a higher limit, such as SEK 100 million.²¹

SWESTR is determined as a *volume-weighted* average of the interest rates in a *trimmed* transaction dataset.²² In addition to the existence of a limit on the volume of transactions, the calculation method itself also limits the risk that transactions with low volume and perhaps anomalous interest rates will have an impact on SWESTR.

The threshold of 10 million applied for SWESTR is in line with international practice. Our analysis also shows that only a very small part of the transaction dataset comes from transactions smaller than SEK 100 million, while the interest rates on these transactions do not deviate significantly from interest rates on larger transactions. Applying a minimum volume of 100 million for the transactions included in the transaction dataset would therefore have a negligible effect on SWESTR's average level and volatility.²³

3.1 International practice

It is common for the central banks that provide transaction-based reference rates based on unsecured transactions to apply a threshold for the minimum volume of individual transactions included in the transaction dataset for the reference rate, as shown in Table 4 below.²⁴ For most reference rates, this threshold corresponds to around SEK 10 million. The threshold for the minimum volume for an individual transaction in SWESTR is thus in line with the limits that apply to most other transaction-based reference rates. The exception is the threshold applied to SONIA, which is noticeably higher than the thresholds for the other reference rates.

²⁰ See Sveriges Riksbank (2023c).

²¹ A minimum volume of SEK 100 million is applied for the STIBOR reference rate. See Swedish Financial Benchmark Facility (2022).

²² See Sveriges Riksbank (2023c).

²³ This result is also in line with the result presented by AGAR in its first consultation on the definition of the reference rate that was later developed into SWESTR; see Swedish Bankers' Association (2019).

²⁴ See Bank of England (2023), Danmarks Nationalbank (2022), European Central Bank (2021) and Norges Bank (2023).

Table 4. Minimum transaction volume for corresponding reference rates

Fully transaction-based reference rates based on unsecured transactions and administered by central banks

Country	Reference rate	Minimum transaction volume	Approximate equivalent value in SEK
Sweden	SWESTR	SEK 10 million	SEK 10 million
Denmark	DESTR	DKK 5 million	SEK 7 million
Euro area	€STR	EUR 1 million	SEK 11 million
UK	SONIA	GBP 25 million	SEK 315 million
Norway	NOWA	NOK 10 million	SEK 11 million

Note: The approximate equivalent values have been rounded to whole millions. Exchange rates as of 30 December 2022.

Source: Respective central banks.²⁵

3.2 Analysis of transaction data

As shown in Table 5, only a very small share of the total transaction volume consists of individual transactions smaller than SEK 100 million. The share is largest in the counterparty category Banks (S122), but even in this category the share is only around 2 per cent.

Table 5. Transactions with a volume of less than SEK 100 million

Per cent and SEK million

	Entire dataset	Banks	Financial corporations & SNDO	Non-financial corporations
Share of transaction volume derived from transactions < SEK 100 million	1	2	1	0
Share of the number of transactions originating from transactions < SEK 100 million	29	31	31	5
Average size of individual transaction	955	729	1574	1433
Median size of individual transaction	300	250	359	687

Note: Shares have been rounded to whole per cent. Refers to all transactions in the untrimmed transaction dataset for the full year 2022. The table is identical to Table 2.

Source: The Riksbank.

We have also analysed how SWESTR's average level and volatility would have been affected if the threshold had instead been SEK 100 million. The analysis shows that the effect on SWESTR is negligible if transactions with a lower volume are not included in

²⁵ See Sveriges Riksbank (2023c).

the transaction dataset; see Table 6 and Chart 3 below. On average, the absolute difference between the two data series is less than 0.1 basis points.²⁶ As shown in Table 6, the standard deviations are also very similar for the data series.

Table 6. Effect on SWESTR of a higher minimum volume

Determined SWESTR and alternative SWESTR with a minimum volume of 100 million

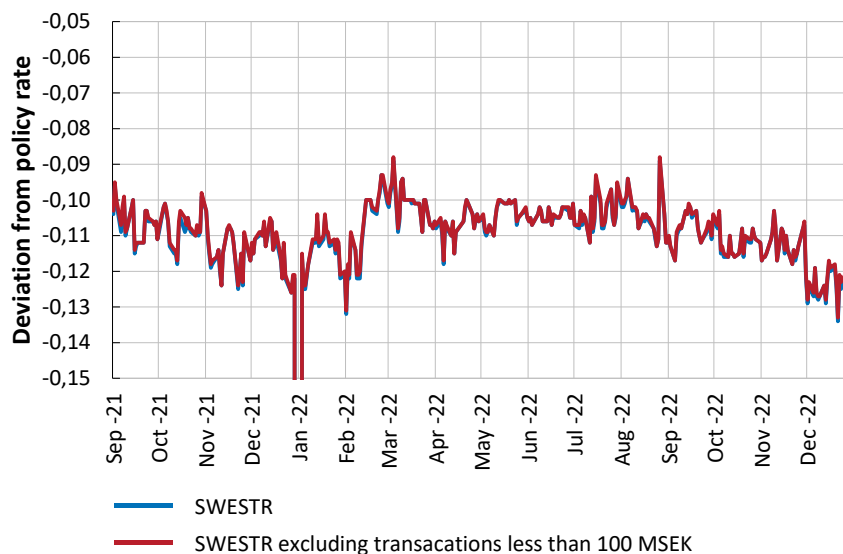
	SWESTR	SWESTR 100 million
Average level	-0.1539	-0.1532
Average level, excluding 30 December 2022	-0.1087	-0.1082
Standard deviation	0.7172	0.7146
Standard deviation, excluding 30 December 2022	0.0079	0.0078

Note: Data in per cent/percentage points. The calculations have been made on the difference between the Riksbank's policy rate and SWESTR and the difference between the Riksbank's policy rate and the alternative SWESTR. Data refers to whole year 2022.

Source: The Riksbank.

Chart 3. Effect on SWESTR of a higher minimum volume

Determined SWESTR and alternative SWESTR with a minimum volume of 100 million



Note: Percentage deviation from the Riksbank's policy rate.

Source: The Riksbank.

We cannot see any indication that transactions under SEK 100 million are priced significantly differently from larger transactions either; see Table 7 below.

²⁶ The average absolute value difference shown in the text refers to the data series both adjusted for the outliers on 30 December 2022 and including the year-end values.

Table 7. Characteristics of transactions broken down by transaction volume

Percentage points and percentage respectively

	Transaction volume < 100 million	Transaction volume ≥ 100 million
Average difference from the policy rate	-0.163	-0.139
Median difference from the policy rate	-0.150	-0.100
Percentage of the number of transactions where the interest rate deviates by a maximum of 10 basis points from the Riksbank's deposit rate.	90.6	91.3
Share of transaction volume where the interest rate deviates by a maximum of 10 basis points from the Riksbank's deposit rate.	90.7	97.3

Note: Data refers to all individual transactions included in the transaction dataset for SWESTR during the full year 2022, with the exception of transactions on 30 December 2022. This is due to the year-end effect distorting the analysis results. The data has not been volume-weighted, except for the last row. The Riksbank's deposit rate is the policy rate with a deduction of 10 basis points.

Source: The Riksbank.

4 Proportion of the transaction dataset removed by trimming

SWESTR is determined as a volume-weighted average rate after the transaction dataset has been trimmed by 25 per cent of the total volume. An alternative SWESTR based on a 50 per cent trim would on average be marginally higher. However, we believe that this difference is not significant in practice.

The Riksbank trims the transaction dataset for SWESTR by a total of 25 per cent of the transaction volume.²⁷ The 12.5 per cent with the highest and the lowest rates respectively are excluded. This means that SWESTR is determined on the basis of the volume-weighted average for the middle 75 per cent of the transaction volume. The purpose of trimming is to obtain a more homogeneous and stable transaction dataset, which is not impacted by any extreme values, meaning transactions with unusually high or unusually low interest rates. Given that the Swedish overnight market is relatively small, trimming at the 25 per cent level was also one of the recommendations from AGAR during the work that laid the foundation for SWESTR.²⁸

The Riksbank has received questions about how SWESTR would have been affected if the Riksbank had instead trimmed the transaction dataset by a total of 50 per cent of the transaction volume, which is the level of trimming that is applied for the reference rates €STR and SONIA.²⁹

Our analysis shows some difference in the average level and volatility of the reference rate depending on what proportion of the transaction dataset is trimmed. The difference between the determined SWESTR values and the values that can be calculated after 50 per cent trimming is, however, both small and stable. This means that a changed trimming level would result in an expected, but marginal, level change in the reference rate, while its other properties would be comparable. We estimate that a level change of about 0.6 basis points is something that should not affect the usability of SWESTR. Hence, the difference between the two trimming levels should be possible to disregard in practice; see below.

²⁷ See Sveriges Riksbank (2023c).

²⁸ AGAR is short for Arbetsgruppen för alternativa referensräntor, the Swedish name for the Working group on alternative reference rates. See Swedish Bankers' Association (2020).

²⁹ See Bank of England (2023) and European Central Bank (2021).

4.1 International practice

It is the practice of central banks providing transaction-based reference rates based on unsecured deposit transactions to trim the data in a symmetric way before calculation; see Table 8 below.³⁰

For the reference rates €STR and SONIA, the ECB and the BoE trim the transaction datasets by a total of 50 per cent of the transaction volume. Danmarks Nationalbank trims 25 per cent of the transaction dataset for DESTR. In contrast, Norges Bank does not trim the transaction dataset for NOWA.³¹

Table 8. Trimming for the corresponding reference rates

Fully transaction-based reference rates based on unsecured transactions and administered by central banks

Country	Reference rate	Level of trimming
Sweden	SWESTR	25
Denmark	DESTR	25
Euro area	€STR	50
UK	SONIA	50
Norway	NOWA	No trimming

Note: Refers to the total percentage of the transaction volume that is trimmed.

Source: Respective central banks.³²

4.2 Analysis of transaction data

Applying 50 per cent trimming instead of the existing trimming method would, on most days, result in a slightly higher level for SWESTR (see Table 9 and Chart 4 and 5). On average, the absolute difference between the two data series is less than 0.6 basis points.³³ The median difference between the two series in both actual and absolute terms is 0.5 basis points. However, it is worth noting that the alternative SWESTR coincides with the Riksbank's deposit rate significantly more often than the fixed SWESTR values.³⁴ In 2022, the alternative SWESTR was equal to the deposit rate just over 40 per cent of the value dates.

The alternative SWESTR values, adjusted for the deviating value on 30 December 2022, also exhibit slightly lower volatility; see Table 9. This is expected and a direct consequence of the trimming of a larger share of the transaction dataset. However,

³⁰ See Bank of England (2023), Danmarks Nationalbank (2022), European Central Bank (2021) and Norges Bank (2023).

³¹ It should be noted that NOWA is based on a different type of transaction (interbank), which is likely to imply a lower risk of outliers in the transaction data compared to other reference rates.

³² See Bank of England (2023), Danmarks Nationalbank (2022), European Central Bank (2021) and Norges Bank (2023).

³³ The average absolute value difference shown in the text refers to the data series both adjusted for the outliers on 30 December 2022 and including the year-end values.

³⁴ The deposit rate is the policy rate applicable at any particular time with a deduction of 0.10 percentage points.

difference in volatility should be seen in light of the fact that the determined SWESTR values are not particularly volatile either.

In summary, we believe that, in practice, it should be possible to ignore the difference between SWESTR and an alternative SWESTR with 50 per cent trimming. The reason for this is that the difference between the series is small and stable. As shown in Chart 5, the differences for each value date are clustered close to the median difference. Only on 39 days in 2022 was the absolute difference between SWESTR and alternative SWESTR greater than 1.0 basis points. A changed trimming level would therefore result in an expected, but marginal, level change in the reference rate, while its other properties would be comparable. We estimate that a level change of about 0.6 basis points is something that would not affect the usability of SWESTR. Consequently, the difference between 25 and 50 per cent trimming should also not have any practical relevance.

Table 9. Effect on SWESTR if trimming is done by a total of 50 per cent

Determined SWESTR and alternative SWESTR with 50 per cent trimming.

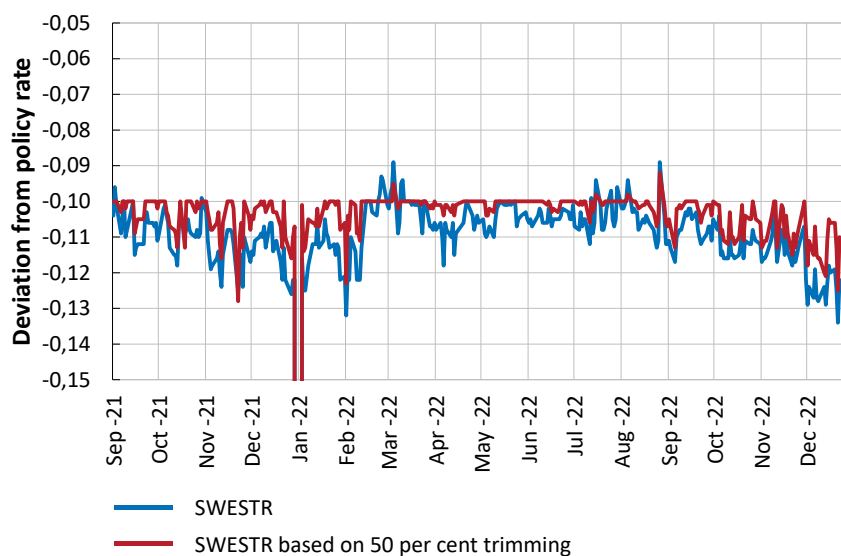
	SWESTR	SWESTR 50 per cent
Average level	-0.1539	-0.1484
Average level, excluding 30 December 2022	-0.1087	-0.1033
Standard deviation	0.7172	0.7155
Standard deviation, excluding 30 December 2022	0.0079	0.0050
Value dates on which the interest rate coincides with the Riksbank's deposit rate	15	107

Note: Data in per cent/percentage points and number. The calculations have been made on the difference between the Riksbank's policy rate and SWESTR and the difference between the Riksbank's policy rate and the alternative SWESTR. Data refers to whole year 2022. The number of value dates in 2022 was 253.

Source: The Riksbank.

Chart 4. Effect on SWESTR if trimming is done by a total of 50 per cent

Determined SWESTR and alternative SWESTR with 50 per cent trimming.

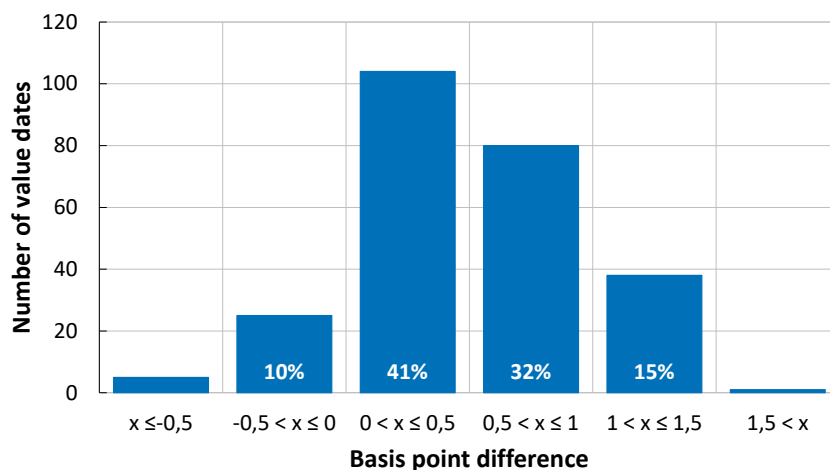


Note: Percentage deviation from the Riksbank's policy rate.

Source: The Riksbank.

Chart 5. Effect on SWESTR if trimming is done by a total of 50 per cent instead

Distribution of daily differences between alternative SWESTR with 50 per cent trimming and determined SWESTR in 2022



Note: The difference is denoted by x on the x-axis. Refers to all SWESTR values with a value date in 2022. The difference is calculated as the alternative SWESTR with 50 per cent trimming subtracted from the determined SWESTR. 1.0 basis points corresponds to 0.01 percentage points. The data labels show the percentage of the number of value dates within each range.

Source: The Riksbank.

5 Concentration risks

SWESTR is based on a relatively small overnight market dominated by a small number of major participants. It is therefore important to consider concentration risks in the transaction dataset. However, our analysis shows that these are limited.

The unsecured overnight market in Swedish kronor is relatively small from an international perspective.³⁵ It is thus important that the Riksbank takes into account the concentration risks on the market, particularly the risk that any reporter provides a share of the transaction dataset that is too large. Consequently, the Riksbank also requires that the transaction volume from the largest reporter, on the day in question, does not exceed 75 per cent of the total volume before trimming.³⁶ If this requirement is not met, the Riksbank considers that the transaction dataset is not robust enough to determine SWESTR with the normal calculation method. In this case, an alternative calculation method is used.

The Riksbank has also received questions regarding concentration risks among the reporters' counterparties.

5.1 Concentration risks among reporters

Chart 6 below presents data summarising the proportion of the transaction volume attributable to the largest reporter in 2022. The median share for all 253 value dates in 2022 was just under 39 per cent. Only on eleven value dates during the year did the largest reporter account for more than 50 per cent of the total transaction volume.

Danmarks Nationalbank publishes corresponding concentration data for DESTA, which can be compared to the data we have produced for SWESTR. The data for DESTA shows a significantly higher concentration for the largest reporter. Over the period 1 April 2022 to 31 March 2023, the largest reporter in DESTA accounted for more than half of the transaction dataset on 76 per cent of value dates.³⁷

It is also interesting to analyse the distribution of *which* of the reporting banks accounted for the largest share for each value date, meaning on how many value dates during the year each reporter has reported the largest volume. This data cannot be published for reasons of confidentiality, but we consider that distribution of which bank reported the largest volume has been satisfactory over the year.

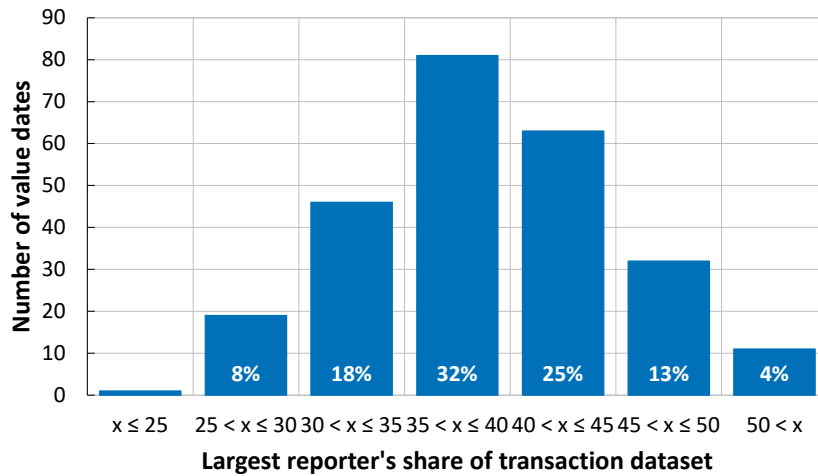
³⁵ See Sveriges Riksbank (2023d) for a comparison of the transaction dataset for SWESTR and a number of other reference rates.

³⁶ See Sveriges Riksbank (2023c).

³⁷ DESTA became available for use on 1 April 2022. For comparability, a 12-month period is used for both SWESTR and DESTA. See Danmarks Nationalbank (2023).

Chart 6. Distribution of the largest reporter's share

Number of value dates that the largest reporter's share fell within each range



Note. The share is denoted by x on the x-axis. Refers to all SWESTR values with a value date in 2022. The data labels show the percentage of the number of value dates within each range.

Source: The Riksbank.

5.2 Concentration risks among reporters' counterparties

That an individual actor is the counterparty in too large a share of the total transaction volume could, in theory, also constitute a type of concentration risk.

The participants who are active in the unsecured overnight market may have various reasons to invest their liquidity with a number of different banks and not just with one bank. One reason for this may be to distribute risks since unsecured transactions entail a counterparty risk for the investor. Another reason may be that the investor is offered a lower interest rate if they wish to invest a larger volume as opposed to a smaller one. Consequently, several reporting banks may have received deposits from the same unique counterparty.

However, our analysis of the data shows that it is very unusual for an individual counterparty to account for a large share of the total transaction dataset for SWESTR. In 85 per cent of the value dates in 2022, the largest individual counterparty had a maximum share of 30 per cent of the transaction volume. The median share was 22 per cent. It was only on six occasions during the year that a single counterparty accounted for more than 50 per cent of the transaction dataset for SWESTR. Which counterparty was the largest also varied during the year.

6 Transactions with counterparties lacking an LEI

The Riksbank uses LEIs to identify and classify counterparties. If a reporter cannot provide an LEI for its counterparty, the transaction is instead classified using the sector code that must, in this case, be provided by the reporter. Our review shows that a very small proportion of the total transaction volume consisted of transactions without an LEI.

Only reporters' deposit transactions from specific counterparty categories are included in the transaction dataset for SWESTR.³⁸ The breakdown into categories follows the ESA 2010 standard. The reporter shall report a so-called Legal Entity Identifier (LEI) for its counterparty. This code provides the Riksbank with information about the exact legal identity of the counterparty in the transaction. It is also used to retrieve information on the sector to which the counterparty belongs in a database provided by the ECB. If the reporter cannot provide an LEI, a sector code according to ESA2010 must be provided instead.³⁹ In these instances, where the Riksbank does not know the exact identity, the transaction is classified according to the sector code provided by the reporting bank.

Companies executing transactions in financial instruments, such as securities or derivatives, are legally required to have an LEI.⁴⁰ However, it is not necessary to have an LEI to make an overnight loan. The inclusion in the SWESTR transaction dataset of transactions by reporters with counterparties that do not have an LEI should therefore be seen in this light.

Nonetheless, it is common for actors who invest funds in the unsecured overnight market to have an LEI, as they almost always also have holdings in or make transactions in financial instruments. There are therefore very few transactions in the dataset for SWESTR involving counterparties without an LEI. In 2022, there were a total of just over twenty transactions with counterparties that did not have an LEI. This can be compared with a total of over fourteen thousand transactions in the dataset. The total volume of transactions with counterparties lacking an LEI amounted to just over SEK 2.4 billion over the year, which is less than 0.02 per cent of the total volume.

³⁸ See Sveriges Riksbank (2023c).

³⁹ The reporter must also provide a country code for their counterparty. See Sveriges Riksbank (2023a).

⁴⁰ The requirement that companies executing securities transactions must have an LEI follows from Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU and Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012 (MIFID II / MIFIR), while the requirement that firms executing derivatives transactions must have one follows from Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories (EMIR).

Thus, we estimate that transactions with counterparties without an LEI are not a cause for concern in relation to the determination process for SWESTR.

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APPENDIX – Demarcation problems between counterparty categories

In this appendix, we shed light on how demarcation problems between sectors affect the division into counterparty categories.

A fundamental principle for SWESTR is that its design and determination shall not be affected by calls of judgement.⁴¹ Classifications of which transactions are included in the dataset are therefore based on established definitions and sector codes according to the European System of Accounts 2010 (ESA 2010).^{42,43,44} This leaves no scope for the use of judgement by either the Riksbank or the reporting banks.

The sector codes for organisations are used for broad and varied purposes in the production of statistics. The sector codes reflect the nature of operations at an overall level for each organisation or company. They are thus *not* designed to best reflect the activity of different participants in the overnight market. In addition, within corporate groups, each subsidiary is assigned a separate sector code.

Market participants that are similar in every aspect that is pertinent to the unsecured overnight market may thus still belong to different sectors according to ESA 2010. This gives rise to demarcation problems for the definition of the eligible SWESTR counterparties.⁴⁵ This problem is particularly evident for those corporate groups that are non-financial at an overall level, for example in the manufacturing sector. It is common for such groups to have subsidiaries that are classified as both financial (mainly sub-category S127 *Captive financial institutions and money lenders*) and non-financial corporations. In addition, the organisational domicile for treasury activities varies between groups and over time, which affects the sector code of the company within the group that makes the unsecured overnight investment.

These demarcation problems can be illustrated with an example consisting of the Volvo and Scania corporate groups. The treasury activities of these groups are carried out by Volvo Treasury AB and Scania CV AB respectively. Volvo Treasury AB is classified as a financial corporation (S127) under ESA2010, while Scania CV AB is labelled as

⁴¹ For more information, see Sveriges Riksbank (2022).

⁴² For this reason, the Riksbank also obtains information on which sector code a particular LEI corresponds to from a credible source in the form of a database provided by the European Central Bank (ECB).

⁴³ In Swedish, the term ENS 2010, which stands for European System of National and Regional Accounts, is sometimes used instead of ESA 2010. For more information on sector classification, see Statistics Sweden (2014)

⁴⁴ Sector codes for Swedish companies are public information and can be accessed via Statistics Sweden or various payment services, for example.

⁴⁵ These demarcation problems were an important reason why the Riksbank cancelled trimming at the counterparty category level in the calculation method; see Sveriges Riksbank (2021a).

a non-financial corporation (S11).⁴⁶ The difference between the companies is probably connected to matters of group structure, rather than with commercial differences that justify the Riksbank treating their possible transactions on the money market differently in connection to SWESTR.

There are also cases in which companies have been reclassified between sectors for reasons that are most likely unrelated to their possible activities in the overnight market. One example of such a reclassification is the sector code for Essity Treasury AB – which carries out treasury activities for Essity AB – which was changed some time ago from non-financial (S11) to financial (S127) corporation.

⁴⁶ These examples are used to illustrate problems in demarcation. Mention of these companies should not be taken as meaning that transactions with these companies are necessarily present in the SWESTR transaction dataset.



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