EUROPEAN CENTRAL BANK

EUROSYSTEM

€STR Annual Methodology Review

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1 Introduction

The euro short-term rate (€STR)[1] was launched by the ECB on 2 October 2019. It measures the wholesale euro unsecured overnight borrowing costs of banks located in the euro area. The €STR is based entirely on daily confidential statistical information relating to money market transactions collected in compliance with the Money Market Statistical Reporting (MMSR) Regulation[2].

The €STR is becoming increasingly relevant in the transition of markets towards a wider usage of risk-free rates. The private-sector-led working group on euro risk-free rates[3] recommended the €STR as a replacement rate for the euro overnight index average (EONIA), which will be discontinued on 3 January 2022. In order to ensure smooth market implementation, a two-year transition period started in October 2019, when EONIA's methodology was reformed to align it with the €STR (plus a fixed spread of 8.5 basis points). Meanwhile, the working group on euro risk-free rates is looking into the use of €STR-based term rates in order to construct fall-back provisions for contracts linked to the euro interbank offered rate (EURIBOR). In that respect, the ECB is contemplating the launch of compounded €STRs for standard maturities together with a daily index value, which will complement the daily publication of the €STR and support market participants if they decide to make wider use of the €STR, as well as in their EURIBOR fall-back arrangements.

The provision of the €STR is regulated by the €STR Guideline[4], which, among other things, establishes the ECB's responsibility as rate administrator. Article 15 of the €STR Guideline requires the administrator to review, at least annually, whether changes in the underlying market for the €STR require changes to the €STR methodology. Therefore, this report reviews the performance of the rate and the underlying markets, and provides a first assessment on whether any changes to the methodology may be necessary for the rate to better capture the underlying interest, i.e. the overnight wholesale unsecured borrowing costs of euro area banks. This first assessment after one year of €STR publication during challenging times is therefore a particularly important check of the actual robustness of the methodological choices made in 2018, when market conditions were different.

The ability of the €STR methodology to correctly measure the defined underlying interest is first assessed against three main criteria within the €STR scope:

- rate accuracy: the rate correctly reflects the underlying market dynamics;
- data sufficiency: the rate is based on a sufficient volume of data;
- rate representativeness: the rate is unbiased.

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1 See the €STR page on the ECB website.

2 See the euro money market page on the ECB website.

3 See the working group on euro risk-free rates page on the ECB website.

4 Guideline (EU) 2019/1265 of the European Central Bank of 10 July 2019 on the euro short-term rate (€STR) (ECB/2019/19) (OJ L 199, 26.7.2019, p. 8).

This initial methodology assessment is complemented by a gap analysis using MMSR data to ensure that the defined scope is still sufficient to measure the underlying interest.

Finally, a review of the calibration of the methodology's key parameters is carried out, namely the trimming level of 25% and, given the importance of continuity for the users of the rate, the data sufficiency thresholds.

This report is structured as follows: Section 2 reviews how the methodology worked in the past year, and analyses the €STR rate volatility and developments in the underlying volume; Section 3 reviews the adequacy of the scope of the €STR and examines market developments beyond the current scope; Section 4 reviews some of the core parameters of the methodology, such as the trimming levels and data sufficiency thresholds; and Section 5 concludes the review with a final assessment.

2 Broad methodology assessment

This section presents how the €STR's main metrics behaved since 1 October 2019 in order to assess whether the methodology proved able to deliver an adequate measure of the underlying interest.

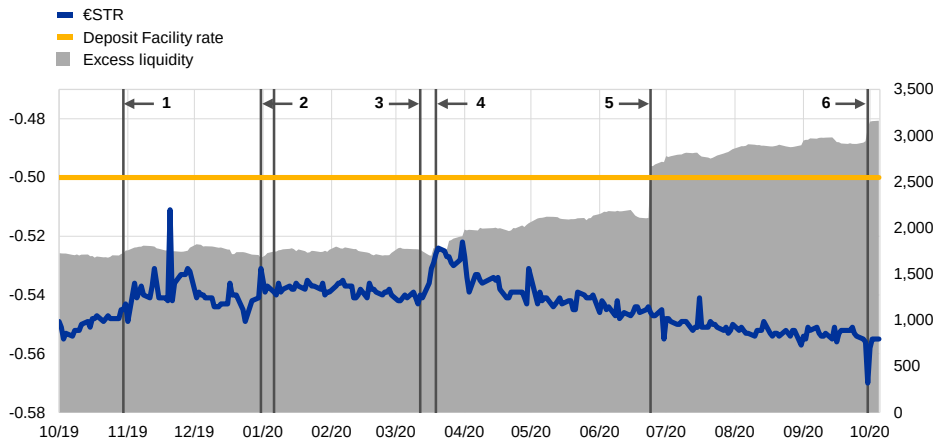
2.1 Rate behaviour and volatility: rate accuracy assessment

The €STR was fairly stable in its first year, moving between the range of -51.1 basis points (bps) and -57.0 bps (Chart 1). The stability of the rate could be largely attributed to the unchanged policy rates over the past year and the ample amounts of excess liquidity available in the banking system. However, even within this tight range, the €STR was reactive to adjustments in the ECB policy framework, for instance, the introduction of the tiering system, specific calendar days, e.g. year-end or specific market events, such as the episode of market stress related to the spread of the coronavirus (COVID-19).

Chart 1

€STR rate evolution and policy environment since 1 October 2019

(left-hand scale: bps; right-hand scale: EUR billions)



Source: ECB calculations.
Notes: 1 = start of the tiering system; 2 = year-end; 3 = coronavirus-related stress; 4 = PEPP announcement; 5 = TLTRO III; 6 = quarter-end and settlement of TLTRO III.

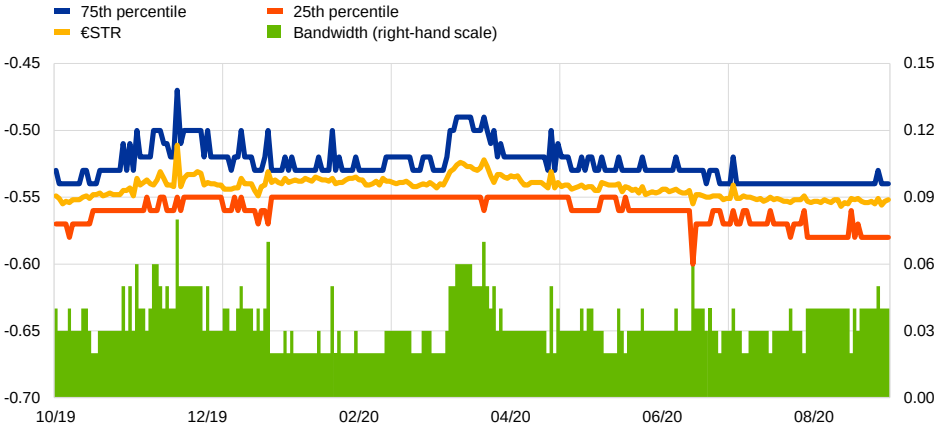
In the last quarter of 2019, the major policy change was the introduction of the two-tier system for excess reserves remuneration, which had some influence on the rate dynamics, as it changed the behaviour of some of the reporting institutions. The €STR rose by a few basis points during the first half of the seventh maintenance period as some banks borrowed more to fulfil their exempted amounts. Soon after this, the €STR returned to levels close to those prior to the two-tier system, before rising again marginally by one basis point into the year-end owing to regulatory considerations. The beginning of 2020 was marked by increased market uncertainty that followed the lockdowns amid the spread of COVID-19. The COVID-19 crisis had a limited upward

impact on the level of the €STR of around 2 bps, but it affected more the underlying volumes (as explained below), illustrating the preference to hold highly liquid deposits during the crisis. The increase in the rate was visible throughout March and persisted to some extent until mid-April 2020, and was the result of banks paying a bit more on borrowed money in order to attract funds in a context of (a) drying up commercial paper issuance a few weeks before quarter-end, (b) early redemption demands from investors for banks' commercial papers, (c) margin calls in falling equity markets, and (d) drawing of committed credit lines from corporates. Since mid-April 2020 and as excess liquidity increased further on the back of the ECB's liquidity-providing operations and bond purchases, the €STR has been on a declining trend, reaching its lowest point of 57 bps on 30 September 2020.

The rate dispersion, which is measured by the difference between the rate at the 25th and 75th percentiles, remained stable at around 2-4 bps for most of the year in a context of stable rate and pricing behaviour of various reporting agents, with only a few episodes of increased dispersion (Chart 2).

Chart 2

€STR and rates at 25th and 75th percentiles



Source: ECB calculations.

The dispersion between the rates at the 25th and 75th percentiles was higher at 6-7 bps on all regulatory reporting dates, i.e. quarter-ends, including the 2019 year-end. Dispersion also rose in the first weeks of the two-tier system in 2019 at around 5-8 bps owing to a diversified market reaction by reporting agents on these days. Finally, somewhat higher dispersion was also present in the second half of March 2020, when it reached 6 bps on the back of the COVID-19 developments. The rate at the 25th percentile remained stable throughout the coronavirus episode, while the rate at the 75th percentile reached -49 bps, indicating more competition between reporting agents to source overnight liquidity in times of heightened uncertainty. The decline in stress in the markets, combined with the policy measures that increased excess liquidity within the system, contributed to lowering the dispersion from May onwards.

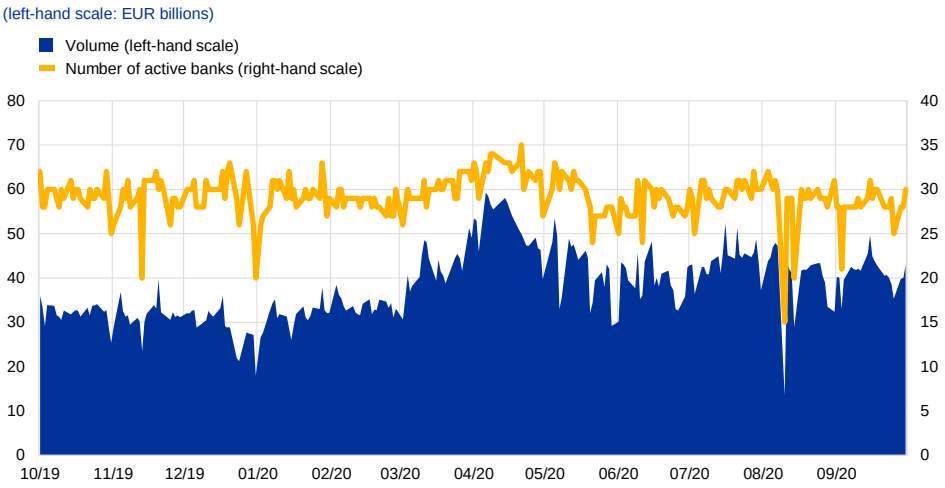
The €STR development in the past year was therefore consistent with market trends, whereby short-term money market rates remained compressed close to the rate of the ECB's deposit facility in view of the increasing excess liquidity in the banking system. However, the €STR remained sensitive to factors affecting day-to-day money market liquidity and trading patterns, such as reporting dates, changes in ECB liquidity measures and episodes of market stress.

2.2 Volume analysis: reporting dates and COVID-19

While the €STR was stable overall during its first year, the underlying volumes were more volatile, reflecting changing trading patterns, reporting dates, local holidays and liquidity shifts in the months of coronavirus-related market stress (Chart 3).

Chart 3

€STR volume and number of active banks



Source: ECB calculations.

The €STR volumes hovered around €30-35 billion throughout 2019 and the first two months of 2020. The more notable exceptions were the TARGET2 days within the Christmas holiday period, when €STR volumes decreased to around €21 billion, and at year-end when the €STR was backed by some €18 billion of volume. These all resulted from the seasonal decline in trading activity as many market participants were closing their books.

In March and April 2020, €STR volumes spiked and reached a record high of over €59 billion. In the midst of the coronavirus-related market stress, many bank counterparties preferred to shorten their liquidity horizon and transform it into overnight deposits. As a result, the MMSR banks reported a steady increase in their overnight borrowing transactions. €STR volumes declined somewhat in the following

months, but stayed higher than the pre-COVID-19 period at around €40 billion, with only very few exceptions. In May and June 2020, the €STR was published for the first time across a number of bank holidays across Europe. Overall the impact on the rate was not observable, though volumes were much lower than usual, e.g. on Ascension Day and Pentecost. However, the reduction in volumes did not trigger contingency thresholds, as contraction in activity in one country was either offset by increases elsewhere, or the decline was widely distributed, as clients throughout Europe were less active on these days.

On 10 August 2020 the €STR registered both its lowest volume since its existence at €13 billion and its lowest number of active banks (15), triggering a contingency computation according to the €STR methodology. On this occasion, the contingency methodology worked as expected, preventing a rate publication based on insufficient information. The contingency publication also contributed to maintaining the day-to-day rate volatility within its usual low ranges, in the absence of significant changes in market conditions.

While €STR volumes were fairly volatile during the first year of the rate, market activity underpinning the rate remained sufficient. Contingency computation to address insufficient data input had to be triggered once to address a technical issue rather than market illiquidity.

2.3 Rate representativeness

The volume share of the **largest five banks** decreased slightly over the year, suggesting a better distribution of the reported business.

The bank names appear to be relatively well distributed, with 14 reporting agents being within the five most active names for at least one day in the period 1 October 2018 to 30 September 2019. This number increased to 16 starting from October 2019, indicating a larger participation throughout the period.

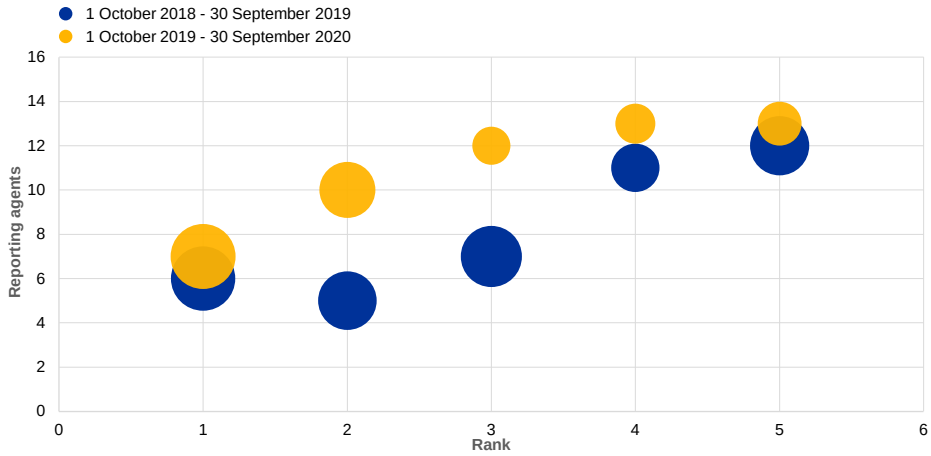
Chart 4 indicates the abovementioned participation of reporting agents. While the number of banks in ranks one and five increased slightly in the 2019-2020 period, it doubled in rank two and almost doubled in rank three, suggesting more frequent changes in rankings compared with the 2018-2019 period. This could be related to the larger turnover recorded in the €STR since the start of the COVID-19 crisis, requiring diversification in a higher number of banks.

Furthermore, Chart 4 also uses the size of the data markers to illustrate the concentration of the top three reporting agents in each rank. For instance, for 91% of the days, one of the top three reporting agents held the first rank in the 2018-2019 period. This increased by one percentage point during the following period. While the first rank had the highest concentration, rank four had the lowest in 2018-2019, as one

of the top three reporting agents held the fourth rank for 68% of the days, decreasing to 54% in the following period. Similarly, the fifth rank's concentration decreased from 84% to 62%, suggesting that more reporting agents held this rank for more days, making the top three more diluted.

Chart 4

Participation indicator of reporting agents

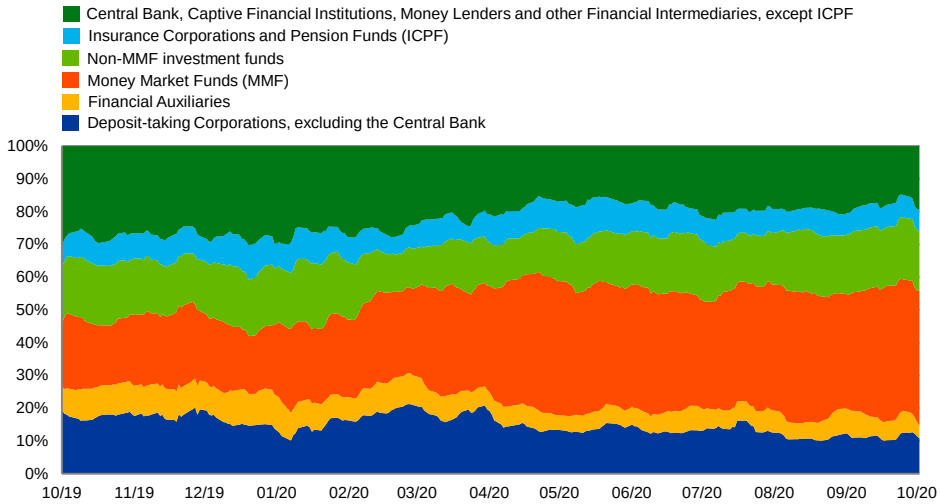


Source: ECB calculations.
Notes: The figure illustrates the concentration of the top three reporting agents in each rank using the size of the data markers. The top is compiled in each rank using the three reporting agents present for the most days throughout each period (2018-2019 and 2019-2020). A larger data marker for a given rank implies a higher proportion of days in a period when at least one of the top three reporting agents held that respective rank.

In terms of the **counterparty sectors**, the share of money market funds and investment funds increased substantially in the first year of the €STR compared with the period 2016-2018 (Chart 5). This development has accelerated since March 2020, in relation to the COVID-19 crisis.

Chart 5

Volume split by counterparty sector since October 2019, 5-day moving average



Source: ECB calculations

Overall, the €STR is now more dependent on large French and German banks, as they gather a substantial share of activity generated by money market funds. This takes place in more active overnight markets in the context of the COVID-19 crisis, as funds continue to hold larger buffers in the form of overnight deposits parked with large banks for reasons of diversification. As pricing remains relatively homogeneous across sectors and large reporting agents, the change in the volume share of these actors did not have a significant impact on the €STR.

3 Scope assessment

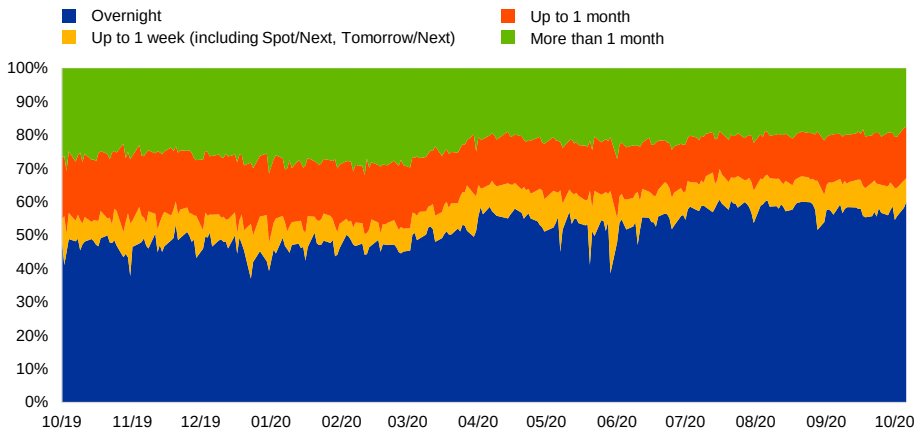
This section aims at identifying whether liquidity may have moved to sectors other than those currently defined as eligible for the €STR, i.e. overnight trades conducted with financial firms using deposit instruments. If such gaps were to appear, the ability of the €STR to adequately measure the underlying interest could be at risk. For this analysis, a wider dataset than the one underpinning the €STR is required, and MMSR data are therefore used.

3.1 Maturity analysis

An examination of other maturities of trade within the unsecured money market as captured in the MMSR data reveals that liquidity did not flow out of the overnight trades into longer maturities during the past year (Chart 6). The share of overnight liquidity in the MMSR data moved from around 50% to almost 60% at the end of 2020. The change occurred during the COVID-19 market stress period when a number of market participants liquidated assets and transferred the available liquidity into overnight deposits. In absolute numbers, the MMSR data show that activity in longer tenors remained broadly stable, while overnight volumes increased significantly. This explains the relative decline in the share of longer tenors. This pattern has not been reversed yet, owing to relatively high persisting market uncertainty.

Chart 6

Percentage of volumes per maturity since 1 October 2019



Source: MMSR data.
Note: Only borrowing transactions, all instrument types, all rate types and all counterparty sectors are shown.

The overnight maturity concentrates a high level of liquidity in the unsecured segment and therefore robustly anchors the rate on a rich pool of daily transactions.

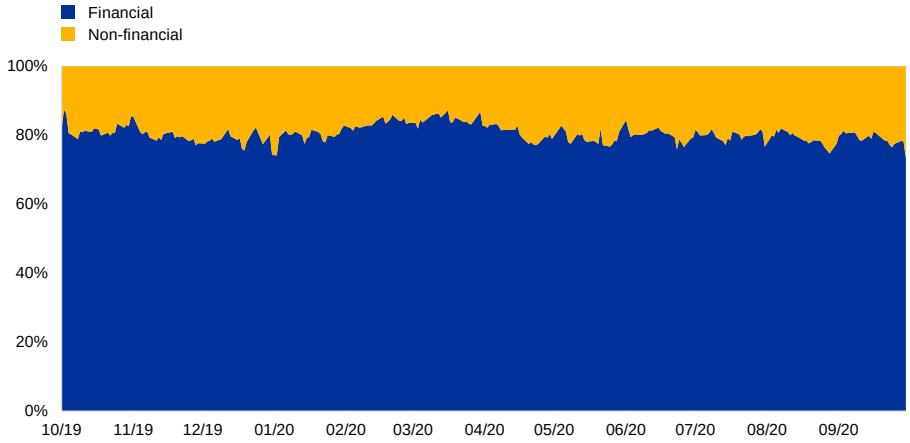
3.2 Sectoral analysis

Overnight liquidity continues to be mostly exchanged with financial firms. Their share in the overnight volume increased to 86% at the peak of the COVID-19 crisis in spring 2020 before returning to previous levels of around 80% (Chart 7). Non-financial counterparties (corporates and governments) represent a relatively stable share of 20%.

The price differentiation between financial and non-financial entities narrowed from around 25 bps to around 13 bps since the COVID-19 crisis and the resulting significant liquidity provision by the ECB. Yet, this price differentiation remains significant, suggesting ongoing different pricing dynamics in transactions with non-financial firms. Therefore the trades with non-financial entities cannot meaningfully add up to the market activity underpinning the €STR computation.

Chart 7

Percentage of volumes per broad counterparty sector since 1 October 2019



Source: MMSR data.
Note: Only overnight borrowing transactions, all instrument types, all rate types and all counterparty sectors are shown.

Overall the counterparty analysis shows that liquidity remains largely within the sectoral scope of €STR-eligible counterparties.

3.3 Scope of €STR-eligible instruments

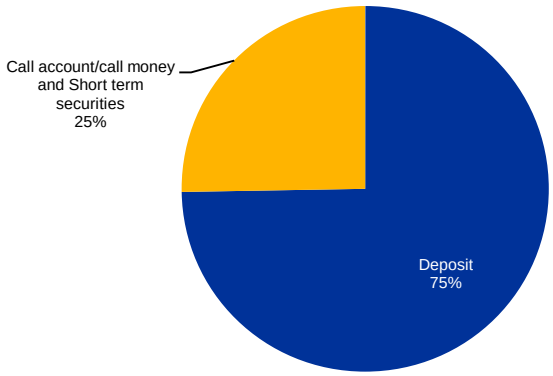
Finally, the share of liquidity exchanged through deposits remained stable throughout the first year of the €STR (Chart 8). No instrument substitution took place between deposits and call accounts, confirming the relevance of the choice of deposits. Pricing divergences between deposits and call accounts have narrowed. This is similar to what was observed for non-financial counterparties in the wake of the significant liquidity injections by the ECB since spring 2020. Pricing behaviour was unchanged,

with rate levels for call accounts often remaining very static over extended periods of time. Therefore, pricing behaviour of call accounts did not reflect market volatility in the same way as deposit transactions.

The issuance of short-term securities remained very limited.

Chart 8

Percentage of volumes per instrument since 1 October 2019



Source: MMSR data.
Note: Only overnight borrowing transactions, all rate types, all instrument types and all counterparty sectors are shown.

The analysis shows that overall, liquidity remains within the scope of €STR-eligible instruments.

3.4 General scope assessment

The gap analysis shows that the €STR scope remains appropriate:

- liquidity remains abundant in the overnight maturity segment and even increased, both in absolute and relative terms;
- liquidity is still predominantly exchanged with the counterparties and instruments that were initially identified as being the most active and appropriate for measuring the €STR's underlying interest;
- beyond the liquidity distribution, pricing dynamics and behaviour remained stable and continue to justify the exclusion of non-financials and instruments other than deposits from the €STR scope.

4 Analysing the calibration of parameters

In addition to the scope, the computation parameters need to be reassessed. This includes the trimming level of 25% applied in the daily computation of the €STR, and the data sufficiency thresholds (contingency thresholds) that define whether the standard or the contingency methodology for the computation should be used.

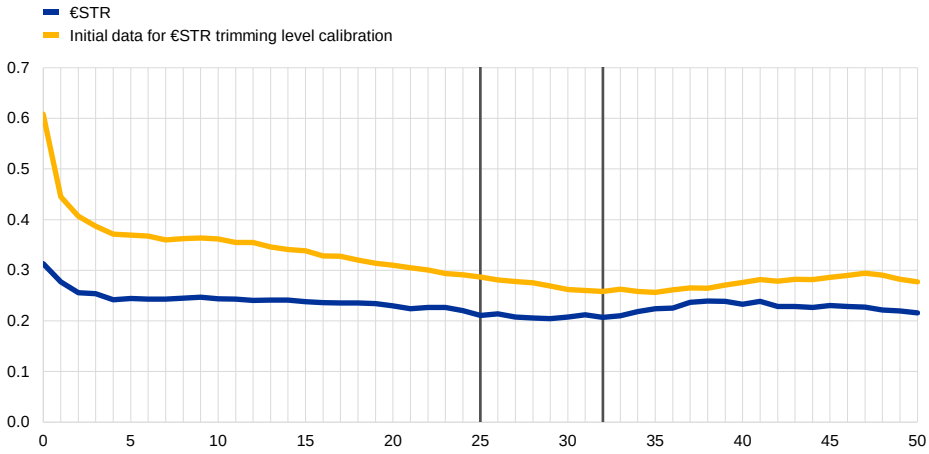
4.1 Testing the trimming level of 25%

The trimming level is one of the key features of the methodology as it helps to limit volatility that could stem from idiosyncratic factors. When the methodology was originally devised, a level of 25% was deemed appropriate.

The impact on volatility of the trimming level (the trimming smile) was re-tested using €STR data from 1 October 2019 onwards. Compared with the findings for the period 2016-2018, the data do not suggest a need for change, as the results are rather similar to previous years' findings (Chart 9), whereby a trimming level of 25% achieves an acceptable level of volatility in the €STR.

Chart 9

The trimming smile (day-to-day rate volatility relative to the trimming level)



Source: MMSR data, ECB calculations.
Notes: Trimming level in percentages (x-axis); average absolute day-to-day changes in basis points (y-axis). The red bars indicate the suggested trimming level (25%) and the trimming level associated with the minimum average absolute day-to-day changes (32%). €STR refers to the period from 1 October 2019 until 14 September 2020, while initial data for €STR trimming level calibration refers to the period from 1 August 2016 to 15 January 2018.

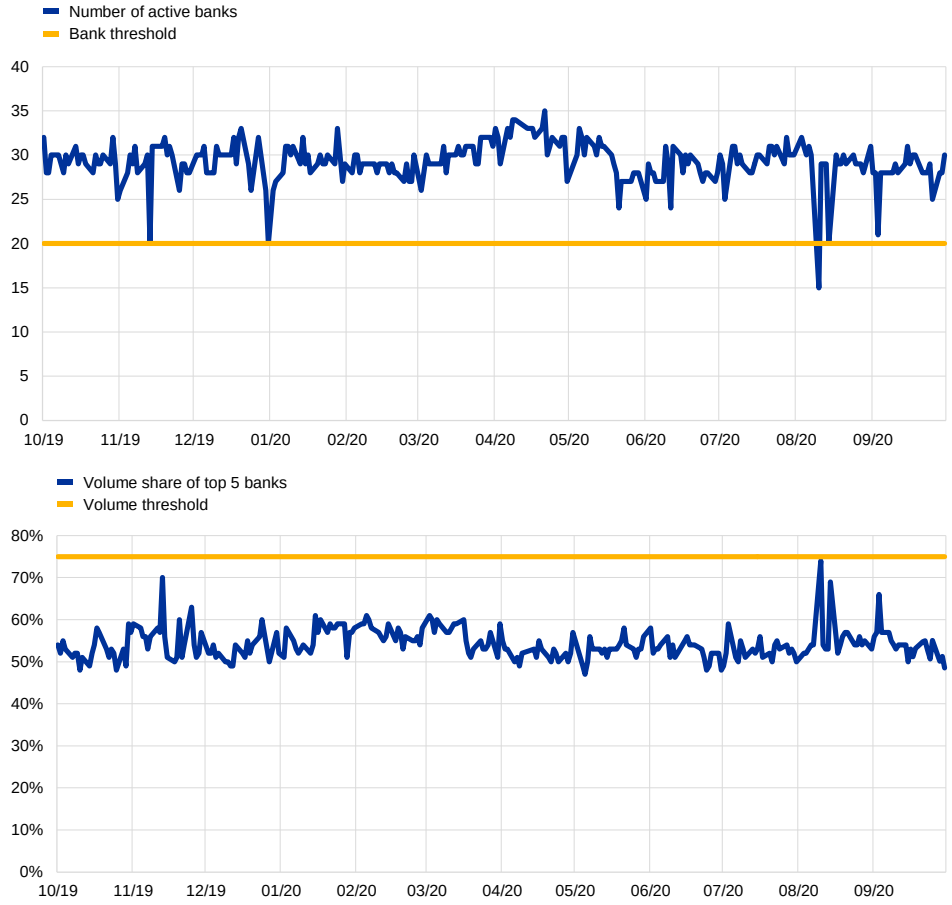
The trimming level of 25% remains adequate, as the impact on the rate volatility is similar to the results of the initial calibration.

4.2 Testing the contingency thresholds

The contingency policy aims at ensuring the continuity of €STR publication when (a) there are not enough banks sending data (less than 20) or (b) when the share of the largest contributors goes beyond certain levels (five banks represent 75% or more of the turnover). These safeguards protect the rate from the risk of bias in case of insufficient data, while taking an agnostic approach to the source of data insufficiency and/or excessive concentration. Indeed, data insufficiency can be caused either by a genuine lack of market activity or by system breakdown (Chart 10).

Chart 10

Contingency monitoring



Since the start of the €STR, activity has been relatively stable regarding the average number of active banks and transactions compared with the period 2016-2018. The drop to 15 as the lowest number of active banks (versus 24 as the lowest daily number in 2016-2018) corresponds to the contingency situation of August 2020 (Table 1).

Excluding the contingency situation of August 2020 (see Section 2 above), the lowest number of active banks since the start of the €STR is 20, and the average number of active banks is 30.

The most notable change is the significant increase in the average daily volume from €29.8 billion to €38.9 billion (+26%), and in the number of transactions from 438 to 550 (+25%).

Table 1

Activity metrics

Measure	1 Aug 16 – 15 Jan 18	Production	MMSR full scope
		1 Oct-19 – 30 Sep 20	1 Oct 19 – 30 Sep 20
Average number of banks	31	29	30
Lowest number of banks	24	15	20
Average number of countries	9	9	9
Lowest number of countries	7	6	6
Average number of transactions	438	463	550
Lowest number of transactions	158	192	216
Average daily volume (EUR billions)	29.8	38.2	39.0
Lowest daily volume (EUR billions)	6.7	13.5	18.0

Note: the column “Production” refers to actual published values of the €STR, while the column “MMSR full scope” refers to the complete dataset using corrected and complete MMSR data using the same eligible data universe as the €STR methodology.

When the contingency thresholds were defined, the lowest number of banks reporting transactions was 24 in August 2016 (start of the MMSR data collections). Year-ends 2016 and 2017 recorded 25 and 28 active banks respectively, and 25 banks on Corpus Christi (5 June 2017).

The low participation at year-end 2019 has to be seen in the context of abundant excess liquidity and regulatory constraints which tend to reduce the ability of banks to expand the balance sheet over this period. Since the end of 2019, two offsetting factors have changed, namely excess liquidity has continued to rise, while €STR volumes have been generally higher with daily participation remaining fairly stable or even accelerating.

Therefore, the contingency parameters will be kept unchanged as they appear adequate, even in the current market circumstances. However, they will be carefully monitored, especially around the upcoming year-end.

5 Synthetic assessment

The various elements presented in this annual methodology review cover the key aspects of the €STR methodology: data sufficiency, rate accuracy, rate representativeness, and contingency thresholds. The main findings are summarised in Table 2 below.

Table 2
Summary of main findings

Item	Analysis	Conclusion
Data sufficiency	Scope confirmed by gap analysis, contingency thresholds remain adequate	√
Rate accuracy	Rate in line with market developments, and trimming level protects the rate from idiosyncratic factors	√
Rate representativeness	Number of banks, contribution and concentration analysis confirm an absence of bias	√

These findings allow the administrator to conclude that no changes in the €STR methodology are necessary.

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For specific terminology please refer to the ECB glossary (available in English only).