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FINANCE  
DENMARK

# Memo on the potential use of forward- and backward-looking reference rates in the Danish Banking-, Mortgage- and Derivative market considering the introduction of DESTR

*Prepared by Finans Denmark's working groups on risk free rates.*

## Background and purpose

In November 2020, Danmarks Nationalbank assumed responsibility for the new reference rate Denmark Short-Term Rate (DESTR). Reference rates are used in a wide range of financial contracts, including bank loans, mortgage bonds and interest-rate swaps. Thus, it is important for the financial system in Denmark that a short-term transaction-based reference rate is introduced in Danish kroner in line with international standards.

The backdrop for this move towards a new risk-free reference rates in major jurisdictions is that they are entirely based on transactions conducted at arm's length and in competition.

In this content it is also relevant to analyze the possibilities of introducing term rates derived from overnight DESTR in the Danish market. The working group has analyzed the LIBOR phase-out because it provides important experiences and guidance, on how a transition can take place.

The purpose of this memo is to share key elements from ongoing discussions in Finans Denmark's working groups on risk free rates on the potential use of forward- and backward-looking reference rates in the Danish Banking-, Mortgage- and Derivative market considering the future launch of a new risk-free reference rate in Denmark, DESTR <sup>1</sup>.

The working group is acutely aware of the need to keep market participants well informed of ongoing discussions as changes to the landscape of reference rates in Denmark potentially has great implications across financial markets. This memo aims to share the working group's preliminary conclusion that a successful launch of DESTR and a potential phasing-out of Tomorrow Next requires the development of forward-looking term rates based on DESTR to adequately support, in particular, bond and certain loan markets.

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<sup>1</sup> <https://www.nationalbanken.dk/en/marketinfo/transaction-based%20reference%20rate/Pages/default.aspx>

The memo includes the following elements:

- describe backward-looking RFR's
- compare the advantages/disadvantages using forward- and backward-looking rates in interest calculations and settlement
- make an initial assessment of potential use of these rates in the loan-, mortgage- and derivative markets in the Danish market
- share information on the key elements from discussions in the working group on the potential use of forward- and backward-looking reference rates in the Denmark after DESTA is introduced

The scope of this memo is therefore to analyze the usefulness of forward- and backward-looking rates. Other important factors for an ideal reference rate are not covered (like the robustness, representativeness, and the fit with international principles (IOSCO) and regulation (BMR) etc.)

### **Backward-looking RFRs – an introduction**

At a first glance it may seem easy and a simplification to transition into overnight RFRs. It is however a fundamental and complex change away from many years practice in respect of interest calculations and interest settlement in contracts.

The reason is that the interest and accrued interest amount is known in advance when using forward-looking reference rates. This is not the case with backward-looking rates where the interest itself is only known day after day along that the rate is published. The consequence is that the accrued interest amount in the same way is only known day after day. And most important the lender and the borrower are left with no or a limited notice at the end of an interest period to settle the interest payment.

To have a reasonable notice to settle the interest amount it would be possible to agree upon a payment delay, where the interest amount is settled for example 5-7 banking days after the end of the interest period. Another method is to shift the observation-period backward, so that a past overnight rate is used for calculating today's accrued interest amount. This method is called the "Lookback"-method and has been recommended by the UK (and US) RFR-working groups.

The UK working group provides the following illustration:

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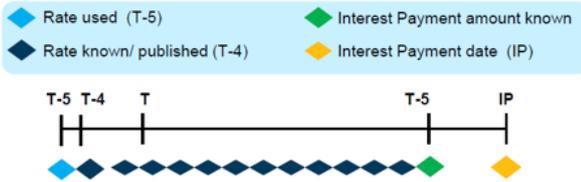
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## Lookback without Observation Shift<sup>1</sup> - Overview

Below is an illustration of 5 Banking Days Lookback rate fixing for a SONIA referencing loan.



**How does 5 banking days Lookback work?**  
Every day of the interest period, 5 banking days prior rate is used.  
For example – if a loan is drawn effective 05-Feb-19 (Tue), the applicable rate will be the rate for 29-Jan-19 (Tue) which is published on 30-Jan-19 (Wed). The same process is repeated throughout the interest/ loan period.

As seen the recommendation is to use a lookback of 5 banking day. This means that the borrower and lender now have 5 banking days to settle the interest amount.<sup>2</sup>

It may be that 5 banking days is not sufficient for the parties to settle the interest amount, and it may also be that the parties need to know the interest rate for the interest period in advance. The "last reset" method would be the solution since the interest rates in last interest period is used for the forthcoming interest period. An example would be that the observed and historical interest rates from 1/1 to 31/3 is used for the period 1/4 to 1/7 in a 3 months interest period.

The advantage with the last reset method is that the interest rate will be known in advance in the same way as with forward-looking rates. The crucial and "trade off" disadvantage is that historical interest rates are used, leaving one party in the contract with a likely economic benefit and vice versa. An adjustment spread can be agreed for using "old" rates – thereby adding complexity, which is a major challenge towards non-professional clients.

It is seen that backward-looking rates introduce new methods and potentially additional complexity for interest calculations and settlement.

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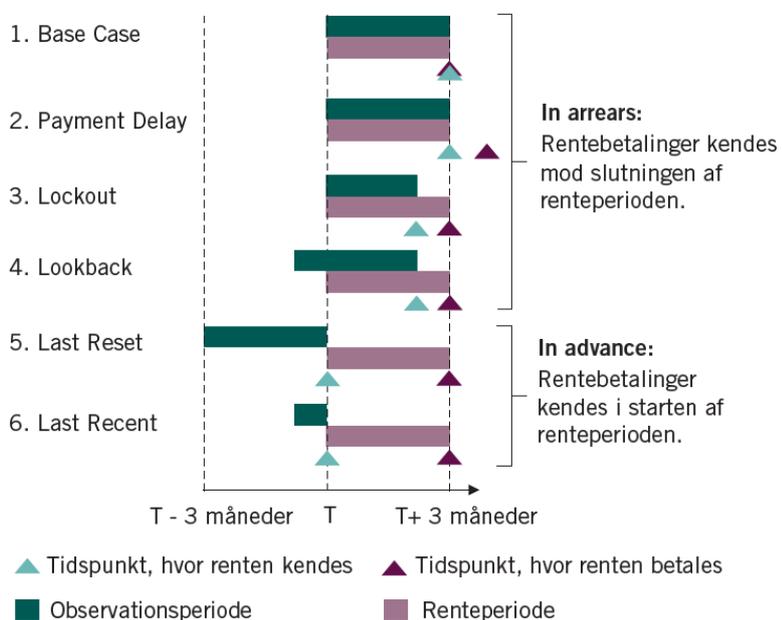
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<sup>2</sup> "Without observation shift" means that it is recommended to compound the interest based on the number of days in the interest period (and not the shifted observation period).



## Comparing advantages of forward- and backward-looking rates/methods

The 6 backward-looking methods, which are considered internationally, are illustrated in an article in Finans/Invest<sup>3</sup> as follows:



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Four of the methods were explained above (Base Case, Payment Delay, Lookback and Last Reset). The two additional methods (Lockout and Last Recent) seem less superior since interest days are missing in the observation period. This means that one party may have an economic advantage/disadvantage from interest volatility during the missing interest days.

The advantages of forward- and each of the backward-looking methods in the interest calculations and settlement are shown in the next table.

<sup>3</sup> Finans/Invest 02/2020"Udvikling af en rentekurve til den nye danske referencerente"



**Table 1.** Advantages using forward-looking and backward-looking methods

Methods	All interest day are used in the interest calculation	Known in advance	Same interest- and observation period	No or limited adjustment spread	Possibility to have prior interest notice
Forward-looking	✓	✓	✓	✓	✓
Backward-looking					
Base Case	✓		✓	✓	
Payment Delay	✓		✓	✓	✓
Lockout				✓	✓
Lookback	✓			✓	<b>Memo</b> ✓
Last Reset	✓	✓			✓
Last Recent		✓			✓

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It is seen that the forward-looking method has all the advantages in respect interest calculations and settlement<sup>4</sup>. Each backward-looking method has different advantages, which may also lead to the different and fragmented use of reference rates and methods.

#### Potential use of forward- and backward-looking reference rates

A successful adaption of DESTB requires that the necessary set of reference rates are made available – no more and no less – to accommodate the needs across products in the loan-, bond- and derivate-markets.

With reference to the international recommendations, upcoming new market standards and the above characteristics the working groups finds that it is likely that forward- and backward-looking methods could be used as follows for the different product groups:

<sup>4</sup> Forward-looking rates may however have other disadvantages in respect of robustness, BMR-compliance etc. – and as mentioned outside the scope of this analysis.



**Table 2.** The likely use of forward- and backward-looking RFRs

Methods	Deposits and overdrafts	Loans retail	Loans SME's	Syndicated loans etc.	Issued bonds	Derivatives
Forward-looking		✓	✓	✓	✓	✓
Base Case	✓		✓			✓
Payment Delay			✓			✓
Lookback			✓	✓	✓	✓
Last Reset		✓			✓	✓

Grey markings (✓) indicate that the methods could be used and become a standard (alone or one out of several)

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For deposits and overdrafts with variable outstandings the Base Case method could be a natural choice in the same way as today, where banks use various external and internal overnight rates as their reference rates. In a Danish context DESTR will hence be useful for product types with variable outstandings.

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Forward-looking rates (e.g. CIBOR) is today used for loans to retail. In a potential transition to backward-looking RFRs, it might be necessary in the Danish market to use the Last Reset method since retail clients might be entitled by law (kreditaftaleloven) to know their payment ("ydelse") in advance.

Loans to SMEs (companies without own treasury functions) might be an "in between" segment, which may be caught in considerations regarding simplicity, payment certainty and control, system capacity etc. Forward-looking rates could be used in the same way as today. SME loans could also align towards the Base Case method in the same way as deposits and overdrafts. Such solution would require that the borrower and the lender agree to give up interest notices and that the bank takes over responsibility (or through a standing instruction) to transfer the interest payment from a current account. Payment Delay could also be a solution in case the borrower wishes to be in control of the interest payments and that the bank accepts the slight additional credit risk from the delayed interest payment. Loans to SME might also align towards international recommendations, which are the Lookback method.

The syndicated loan market for IBORs will follow the recommendations from the UK Working Group and LMA (Loan Market Association) to use the Lookback method. It may be the case that the Lookback method will also be used for EUR and DKK (ESTR and DESTR respectively). The syndicated loan market may alternatively continue to use EURIBOR, CIBOR and other forward-looking rates where available (e.g. STIBOR, NIBOR etc.).



In the bond markets forward-looking rates have been used for decades (LIBOR, EURIBOR and in Denmark: CIBOR and CITA). Following the LIBOR reformation international bond-issuers have started to use backward-looking rates with the 5 days Lookback method.

Danish mortgage institutions are subject to legislation and the balance-principle, which implies a close link between the mortgage loan and the bond. The mortgage borrowers receive payment advice well in advance prior to an interest payment date, typically 45 days before a quarter-end. This means that the Lookback method will not be workable for Danish mortgage bonds. The mortgage borrower would need know the rate in advance.

This could be solved using the Last Reset method. The Last Reset method does however have the crucial disadvantage that "old" interest rates are used requiring an adjustment spread and thereby adding complexity to the rate. The Payment Delay method (and other variations) with mismatch between a mortgage institution's incoming and outgoing payments will be in conflict the balance-principle. Forward-looking rates are therefore superior in terms of interest calculations and settlement on Danish mortgage loans and bonds.

As seen internationally, the derivatives markets will likely be able to rely on backward-looking rates for most purposes. However, as some loan (e.g., mortgages) and bond markets will depend on forward-looking rates, demand for derivatives referencing those same rates is likely to arise. Generally speaking, one should expect derivatives markets to respond to client demand and thus develop products based on both forward- and backward-looking rates.

On that background the working group finds that the demand and use of forward- and backward-looking rates are very likely also to be driven by the characteristics of each method and their fit with various product groups.

### **The future use of forward- and backward-looking reference rates in the Danish market?**

The adoption of DESTR follows the international development and would be the Danish peer to EUR ESTR, USD SOFR, GBP SONIA, CHF SARON, NOK NOWA, and the new SEK O/N-rate etc.

T/N is intended to cease and DESTR is intended to be the new basis for a reformed CITA-swap market and a reformed CITA-reference rate.

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With these changes and the experience from the international reformation, the future set of Danish reference rates could likely cover the needs in the Danish loan-, bond- and derivative-market as follows:

**Table 3.** The likely use of forward- and backward-looking RFR in the Danish market

Methods	Deposits and overdrafts	Loans retail	Loans SME's	Syndicated loans etc.	Issued bonds	Derivatives
Reformed CITA		✓	✓	✓	✓	✓
CIBOR		✓	✓	✓	✓	✓
DESTR Base Case	✓		✓			✓
DESTR Lookback			✓	✓	✓ <b>Memo</b>	✓
DESTR variations		✓			✓	✓

Green markings (✓) indicate where the reference rate is used or is likely to be used in the future.

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The Danish market may become somewhat fragmented in the same way, as it is currently seen internationally and across currencies. This would increase the complexity in managing basis risk in especially the swap market. Sector work should encourage some kind of alignment and standardisation to the benefit of the users of reference rates.

### Conclusion

Most likely the financial market will fail to develop one common standard. More likely, there will be multiple standards, segmented by product types, depending on the jurisdictions and customers' needs. It is important in the development and introduction of DESTR to keep options open so that we have a full set of benchmark fixings available.

The working group therefore recommends that a forward-looking term DESTR reference rate (like the current CITA fixings which is a term rate fixing for the T/N fixing) is developed to support a widespread and successful use of DESTR.

Furthermore, the working group recommends that administrator for DESTR (Nationalbanken) provides the relevant backward looking compounded indexes and potentially period averages to be support a widespread and successful use of DESTR. This would bring the Danish market in line with the market in the euro zone where the European Central Bank (ECB) has decided to provide similar information to the market<sup>5</sup>.

<sup>5</sup> <https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210318~4835219b4b.en.html>

