

# COMPOUNDED DESTR INDEX

## - CALCULATION AND PUBLICATION RULES

01-04-2022

### BACKGROUND

Danmarks Nationalbank calculates and publishes a daily compounded index of the Denmark Short-Term Rate (DESTR).

The compounded index is intended to encourage wider use of DESTR for financial contracts and instruments. Such products may require the use of compounding and therefore benefit from the availability of a trusted source for these calculations.

The daily compounded DESTR index are based entirely on historical DESTR rates, which are publicly available.

### CALCULATION RULES

The compounded DESTR index represents the evolving daily value of a notional instrument that accrues compounded interest on an initial sum of DKK 100 starting on 1 April 2022, which is the first reference date of DESTR.

The compounded DESTR index is published for every Danish banking day and have a starting value of 100.00000000 on 1 April 2022. The index is calculated by Danmarks Nationalbank using Formula 1 below.

Formula 1:

$$\text{Compounded DESTR index on date } i = \begin{cases} 100, & \text{if } i = 0 \\ 100 \cdot \prod_{t=0}^{i-1} \left(1 + \frac{r_t \cdot n_t}{N}\right), & \text{if } i > 0 \end{cases}$$

where:

$r_t$  = Applicable DEST R fixing with reference date  $t$ ;

$n_t$  = the number of calendar days for which  $r_t$  applies, ie. assuming no Danish banking holidays  $n_t = 1$  for Mondays to Thursdays and  $n_t = 3$  for Fridays;

$t = 0$  refers to 1 April 2022.

Calculation example for the compounded DEST R index					Tabel 1
DEST R Reference Date	Publication Date	DEST R, pct. p.a.	Compounding factor	Compounded DEST R index	
1 April 2022	4 April 2022	-0.6	$1 + \left(-0,006 \cdot \frac{3}{360}\right)$	99.99500000	
4 April 2022	5 April 2022	-0.5	$1 + \left(-0,005 \cdot \frac{1}{360}\right)$	99.99361118	
5 April 2022	6 April 2022	-0.4	$1 + \left(-0,004 \cdot \frac{1}{360}\right)$	99.99250014	

Note: The reference date for the compounding DEST R index coincides with the publication date. The numbers in the table are fictive numbers to illustrate an example. The calculation assumes a starting value of DKK 100.00000000.

## PUBLICATION

Compounded DEST R index are published every Danish banking day at 10:00 CET.<sup>1</sup> The reference date for the compounded index coincides with the publication date. The first publication date is 4 April 2022.

The compounded DEST R index will be published together with the daily DEST R rate. Hence, the index can be found on Danmarks Nationalbank's website and in the statistical data warehouse. Further, the index is also published directly to market vendors.

The daily compounded DEST R index is published with eight decimal places. Standard rounding is applied.<sup>2</sup>

The daily compounded DEST R index is based on publicly available.

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<sup>1</sup> Including Central Europe Summer Time (CEST).

<sup>2</sup> No rounding takes place before publication.

Should daily compounded DESTR index be temporarily unavailable, users may decide to calculate the respective rates using formula 1.

A revised compounded index will be provided no later than 11:00 CET<sup>3</sup> in case the daily DESTR rate is revised.

### REVIEW OF THE CALCULATION RULES

Any change in the calculation rules will not result in revision of the historical data series of the compounded DESTR index.

### EXAMPLE OF THE CALCULATION OF A COMPOUNDED DESTR AVERAGE RATE USING THE INDEX

The index allows users to calculate interest rates for customised maturities or over any period of their choice simply and transparently using formula 2 below.

Formula 2:

$$\begin{aligned} & \text{Compounded DESTR average rate between date } x \text{ and date } y \\ &= \left( \frac{\text{Compounded DESTR index } y}{\text{Compounded DESTR index } x} - 1 \right) \cdot \frac{N}{d_c} \end{aligned}$$

Where:

$x, y$  = the start and end dates for calculation the compounded average for a customized period or maturity;

$N$  = the number of days in the year, i.e. 360 days in the Danish money market;

$d_c$  = the number of actual calendar days in the interest period;

Calculation example:

Calculation of compounded average rate for a customised period						Tabel 2
Start Date	Index value at start date	End Date	Index value at end date	No. of calendar days	Compounded average rate	
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<sup>3</sup> Including Central Europe Summer Time (CEST).

18 May 2022	99.99999999	10 August 2022	99.88888888	84	-0,476190
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Note: The numbers in the table are fictive numbers to illustrate an example. The compounded average rate is calculated as follows  $(99.99999999/99.88888888 - 1) \cdot 360/84 = -0.476190$  per cent

### Compounded average rates for standard tenors

Formula 2 can also be applied to calculate standard tenors such as a 1-month average rate.

Since a compounded DESTR average rates are backward-looking, the start date,  $x$ , of a tenor is established using the reference date for the rate and the Danish modified previous banking day convention. When the start date of a tenor falls on a non-banking day it is adjusted to the previous banking day provided that the latter falls within the same month as the unadjusted date; otherwise it is adjusted to the following banking day for tenors of 1-month or multiples thereof.<sup>4</sup> In line with that principle, for example:

- a one-week rate calculated with end date on Friday 29 April 2022, starts on Friday, 22 April 2022 (the standard case with no adjustment of the start date);
- a one-month rate calculated with end date on Monday 23 May 2022, starts on Friday 22 April 2022 (the start date is adjusted to the previous business day);
- a one-month rate calculated with end date on Monday 1 November 2022, starts on Friday 3 October 2022 (which is the following business day, since the previous business day falls in the previous month).

<sup>4</sup> I.e. a one-week rate will not be modified, hence standard previous banking day applies instead.