

A new risk-free reference rate in Danish kroner



Executive director, Regulation, Finance Denmark, Jakob Legård Jakobsen
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How did it all begin? – not just in Denmark but everywhere

- The FSB started its work on reforming IBORs in response both to:
 - Cases of attempted manipulation
 - The decline in liquidity in key interbank unsecured funding markets.

- The FSB had 3 focus areas:

How did it all begin? – not just in Denmark but everywhere

- **IBORs:** Although LIBOR has been strengthened, authorities have warned that publication of LIBOR may cease once official sector support for the benchmark is withdrawn at end-2021.
- **Alternative reference rates:** In the markets which face the disappearance of IBORs there needs to be an orderly transition to new reference rates (RFR) that are sufficiently robust for such extensive use.
- **Enhancing contractual robustness:** Work must be done on the important task of strengthening contractual robustness to the risk of discontinuation of major interest-rate benchmarks.

Introduction to Finans Danmarks work...

Finance Denmark and the Money Market Committee have mandated a working group to develop a new risk-free reference rate in Danish kroner.

The working group was established to identify and recommend risk-free reference rates that could serve as a basis for a supplement to the current benchmarks used in the Danish kroner market.

Developing a new risk-free reference rate in Danish kroner requires sufficient and broad based turnover on a daily basis.

The annual Money Market Survey indicates slightly higher transaction volumes in the unsecured overnight market compared with the secured overnight market. Therefore the focus has been on the unsecured overnight market.

...Introduction to Finans Denmark's work

Nationalbanken did the data analysis

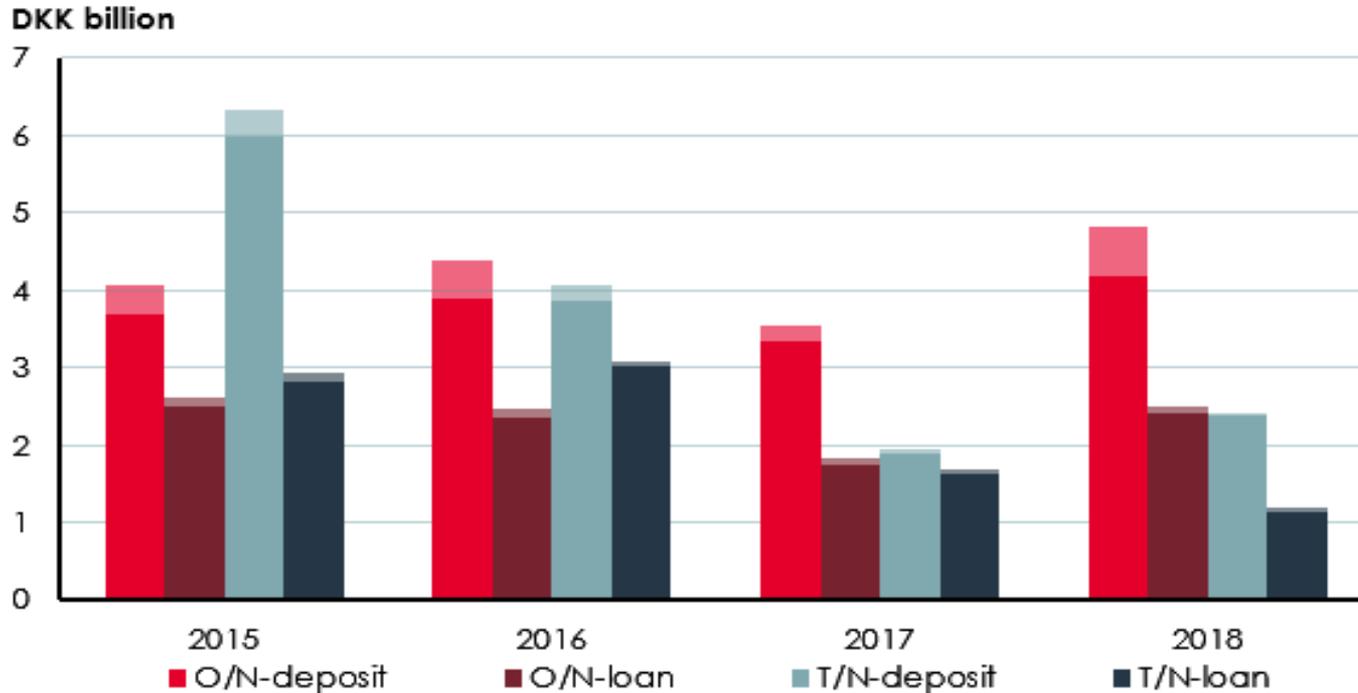
8 reporting banks – 7 reporting to T/N fixing + Danske Handelsbanken

We went through segments of the money market:

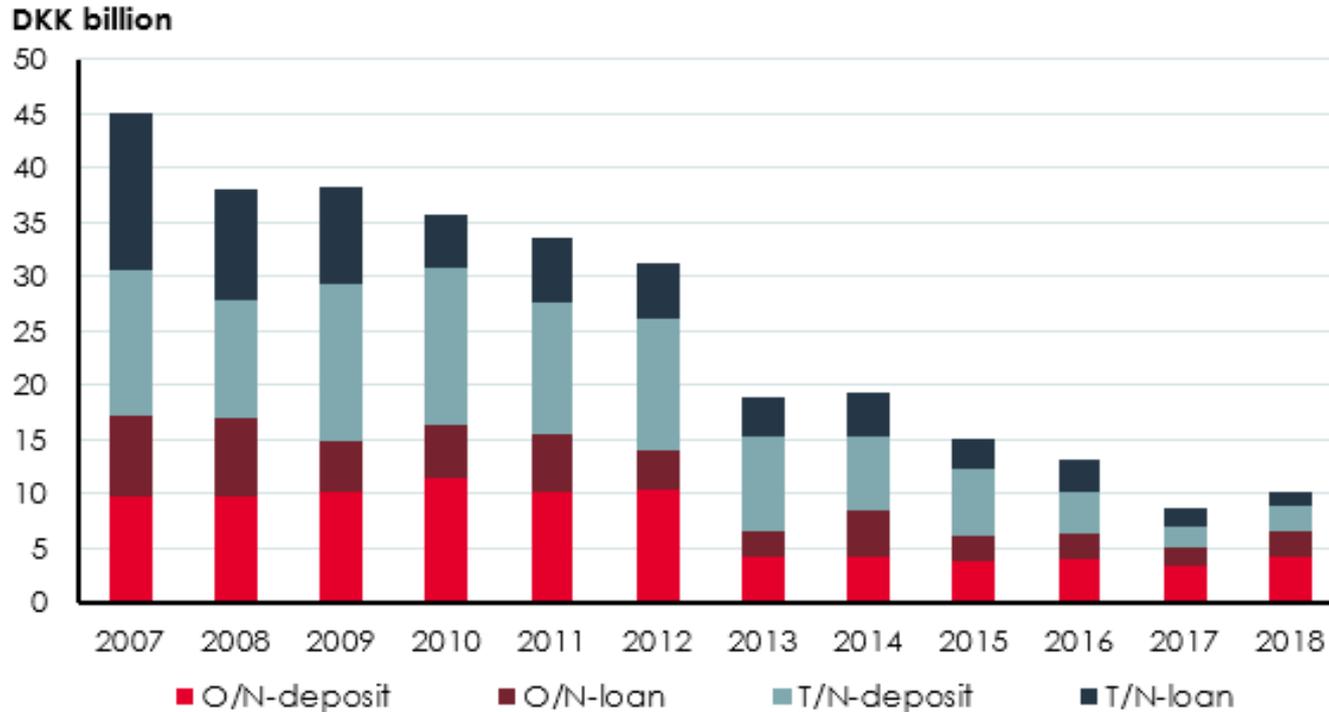
- Repos – risk free rate, but doesn't comply with the IOSCO-principals
- F/X swaps – forwards, decent turnover but pricing via USD or EUR
- Deposit – unsecured O/N, T/N – almost a risk free rate.

Conclusion: Proceed with deposit and include other financial institutions (credit institutions, insurance companies and pension funds)

Turnover in the unsecured money market segments since 2015

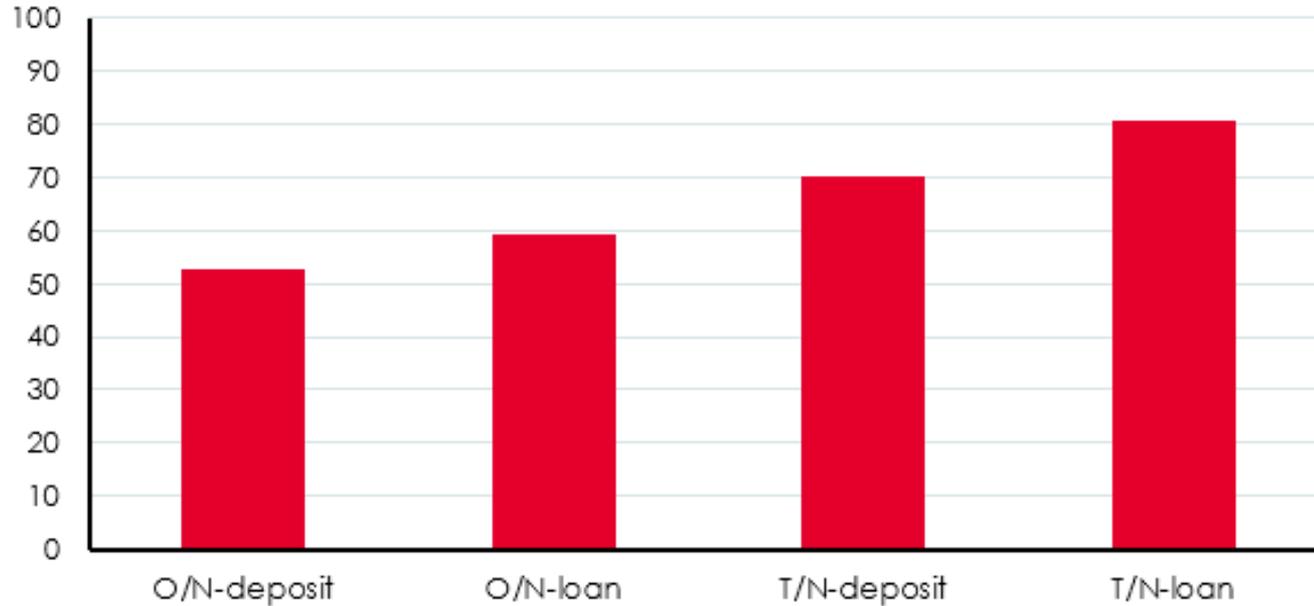


Interbank turnover in the O/N and T/N markets since 2007



Share of daily turnover provided by the biggest contributor

Per cent of daily turnover



Summary of indicators on turnover and concentration

Turnover

Turnover, DKK billion per day

Days with zero turnover, pct.

Days with turnover < DKK 1 billion, pct.

Average number of trades per day

O/N-deposit	4.2	0	0.9	11
O/N-loan	2.4	0	22	8
T/N-deposit	3.7	2.4	18	4
T/N-loan	2.2	3.9	32	3

Concentration

Banks with reported trades per day

Days with trades only from a single bank, pct.

Days with trades from at least 4 banks, pct.

Largest contributor's share of daily turnover, pct.

O/N-deposit	4.3	0.3	79	53
O/N-loan	4.0	1.5	68	59
T/N-deposit	2.6	19	24	70
T/N-loan	2.2	26	11	80

=> The working group finds O/N deposits to be a suitable candidate for a new risk-free reference rate. The daily turnover is deemed sufficient and well-distributed among reporting banks.

Calculation methodology for the new risk-free reference rate

The working group proposes to use a similar calculation methodology as ECB. It will be performed in four steps in line with the ECB procedure:

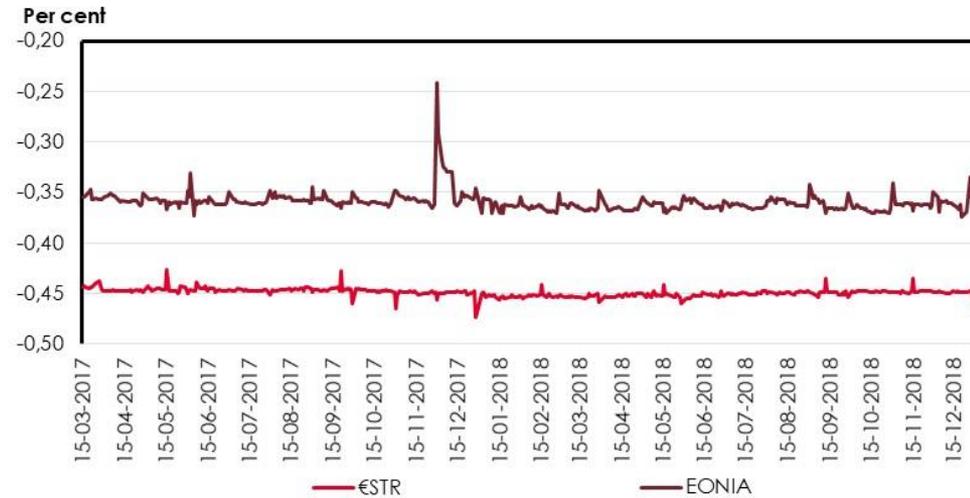
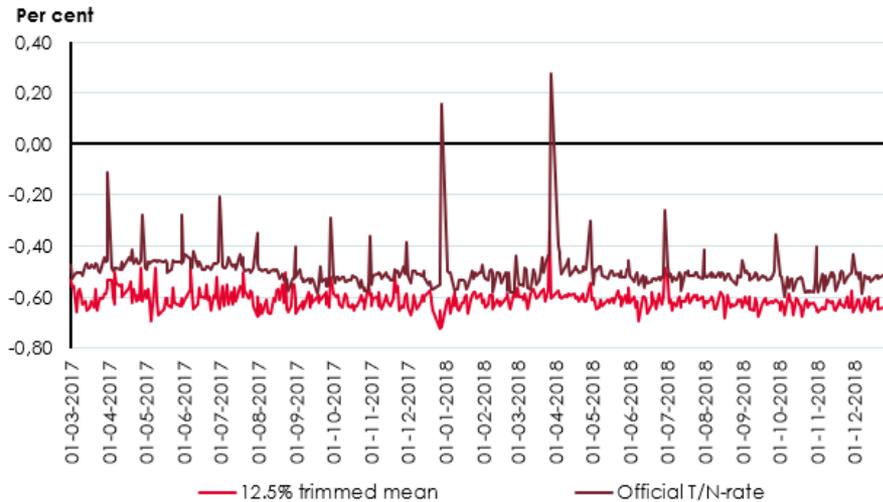
- Sort the transactions from highest to lowest rate
- Aggregate the transactions occurring at each level
- Trim x per cent of the volume with the lowest rate and x per cent with the highest rate
- Calculate the volume-weighted mean of the remaining center of the distribution.

Reference rates based on O/N-deposits with different trimming levels

	Jan. 2015 – Feb. 2017		Mar. 2017 – Dec. 2018	
	Average, per cent	Std. dev., basis points	Average, per cent	Std. dev., basis points
Volume-weighted mean (0 per cent trim)	-0,39	45	-0,61	3,6
12.5 per cent trimmed mean	-0,39	46	-0,61	3,5
25 per cent trimmed mean	-0,39	46	-0,61	3,7
Official T/N-rate	-0,26	44	-0,50	7,1

=> The working group recommends a trimming level of 12.5 % as this provides slightly more stability to the reference rate (less volatility in the most recent data period).

Comparison of O/N deposit RFR (12,5% trimming) and the official T/N rate vis a vis €STR and Eonia



Contingency procedure

- According to the IOSCO principles a reference rate should include a contingency procedure in case of insufficient or unreliable data.
- Hence, the reference rate should be based on current market transactions as long as they are expected to be a credible reflection of the underlying market.
- If the transaction volume is above the turnover threshold the contingency procedure is not activated.
- If the transaction volume is below the turnover threshold the contingency procedure is
 - Not activated if the distribution of turnover is below the concentration limit
 - Activated if the distribution of turnover is above the concentration limit.
- **Given the current market conditions the working group recommends a turnover threshold of DKK 2 billion and a concentration limit of 75 per cent.**
- **This strikes a balance between making the rate resilient to idiosyncratic factors and not triggering the contingency procedure too often.**

Number of days where the contingency procedure is activated, 2015 - 2018

1. tier: Turnover threshold, DKK billion

		1.0	1.5	2.0	3.0
2. tier: Concentration limit, largest contributor's turnover share, per cent	55	5	21	51	134
	65	3	14	30	69
	75	1	7	13	22
	85	1	6	8	11
	95	0	1	2	3

Contingency calculation methodology

The working group finds that the best contingency procedure for the Danish market is the one also used by BoE for SONIA.

The working group suggests that the reference rate on days where the contingency procedure is activated will be defined as:

- The level of central bank rate plus the mean of the spread of the reference rate to the central bank rate over the previous five publication days, excluding the days with the highest and lowest spread to the central bank rate.
- The central bank rate is defined as the average of the Certificates of deposit rate and the Lending rate of Danmarks Nationalbank.

$$\text{(Name not decided yet)} \quad X(t) = C_{spread,t} + 0,5 * (\text{Indskudsbevisrente}_t + \text{Udlånsrente}_t),$$

$C_{spread,t}$ is spread (average) between X and the policy rate the latest 5 days (calculated without min. and max. spread).

Conclusion – RFR versus TN Fixing

	RFR	TN Fixing
Product	Unsecured <u>deposit</u> O/N	Unsecured <u>loans</u> T/N
Counterparties	Interbank and other financial institutions	Interbank
Reporting banks	8 banks	7 banks
The interest rate is based on:	Only transactions	Transactions and expert judgement
Administrator	GRSS	Nasdaq
Publication	T+1	T+0
Go live	To be determined – but 2020Q1 is realistic	Exist already



Lower day-to-day fixings - 11-12 bp

- Deposit versus loans
- Trimming

RFR – more stable due to trimming and bigger turnover

Less seasonal fluctuations

The RFR complies with the IOSCO principals for benchmarks

RFR is based on the same principals/methods as other alternative rates – “€STR with a Danish touch”.

What happens from here?

Where are we now?

- We will proceed with the new risk-free reference rate based on Overnight (O/N) deposits from "Banks" and "Other financial institutions".
- Trial period launched in august 2019: The new daily reference rate will be calculated on a monthly basis and published on Finance Denmark's webpage.
- Coming tasks:
 - The new RFR is based on transactions at the very short end of the curve. How should the full curve be developed?
 - Is it possible to establish an OIS and/or a futures markets based on the new RFR?
 - Is a hybrid model the solution?

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Questions ?