

# Danish covered bonds

## Nykredit Total Index JPY (NYKRTJPY Index)

08 February 2021 10:47

Marketing communication

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- The Nykredit Total Index is a tracker index based on the Danish callable bond market
- The Nykredit Total Index JPY shows returns in JPY on investments in the index hedged using a 1M FX forward
- The index return is calculated daily and is available on Bloomberg (Ticker: NYKRTJPY Index)

*The Nykredit Total Index JPY is based on the Nykredit Total Index, which covers most of the Danish callable bond market. The index shows daily returns in JPY on investments in the Nykredit Total Index hedged using using a 1M FX forward.*

The Nykredit Total Index JPY is a tracker index based on the Danish callable bond market, swapped and hedged into JPY. The index shows monthly returns in JPY on investments in the Nykredit Total Index hedged using a 1M FX forward.

A tracker index contains a subset of the total market that reflects general market trends. The Nykredit Total Index JPY covers the actively traded part of the Danish callable bond market, and the index basis is 30 January 2004.

The Nykredit Total Index, including portfolio criteria, rebalancing and index return calculations, is described in further detail at Nykredit's [website](#).

### Calculation of index value

The original Nykredit Total Index is denominated in DKK. We begin by defining the return of a simple FX swap (RFXS).

$$RFXS(t) = \frac{F(t,t+2B,t+2B+1M)}{S(t,t+2B)} - 1,$$

where  $t$  is the trade date,  $F$  is the 1M FX DKKJPY forward rate at trade date  $t$  and spot settlement date  $t+2B$ .  $S$  is the FX DKKJPY spot rate. We use the Danish business calendar, i.e.  $2B$  is two business days.

The value of unwinding the FX swap (URFXS) at date  $t+1$  is given by

$$URFXS(t+1B) = \frac{1}{RFXS(t+1B) \cdot d_t},$$

where  $d$  is the day count fraction of the remaining maturity (at date  $t+1$ ) of the FX swap traded at date  $t$ , which is calculated as

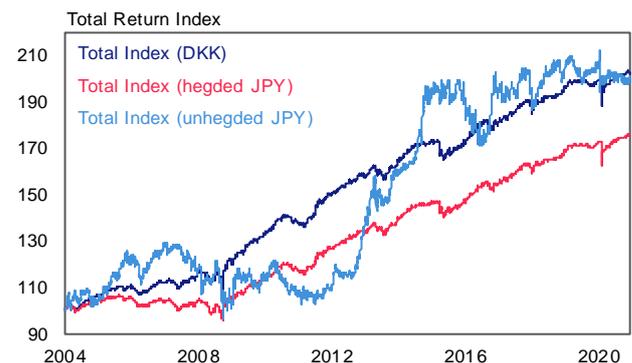
$$d_t = \frac{(t+2B+1M) - (t+1B)}{(t+2B+1M) - (t+2B)}$$

Combining the above definitions and taking into account the return of the original index, we can calculate the index value in JPY as

$$I_{t+1B}^{JPY} = \frac{I_t^{JPY}}{URFXS(t+1B)} \cdot \frac{I_{t+1}^{DKK}}{I_t^{DKK}} \cdot [1 + RFXS(t+1B)]$$

where  $I_t^{DKK}$  is the index value in DKK at date  $t$ .

### Historical returns and index development



The development of the Nykredit Total Index in DKK and JPY, hedged and unhedged, since January 2004.

Source: Nykredit Markets

Hedging is carried out daily based on 1M FX swaps. At any trade day, the value of the index is hedged going forward by entering into a 1M FX swap contract. The next trade date ( $t+1$ ), the previous 1M currency hedge is unwinded and the new value of the index including the 1 day return of the original index is hedged by a new 1M FX swap. The next trading day the process is repeated. The unwinding of the index is interpolated from the new 1M FX forward.

Hedging the index is based on the inception value of the index, as we do not know the value of the index one day going forward from the time of entry into the FX forward contract. This way, we are able to hedge everything except the development of the index for the next day ahead.

In an FX swap hedge, the FX risk of the spot transaction is offset by the forward transaction (approximately). Thus, an FX swap is exposed to an interest rate risk rather than FX risk. Here, this is a daily interest risk as measured by the 1M forward point. Obviously, this may contribute positively and negatively to the difference in the return between the Nykredit Total Index and the JPY-hedged index.

$$\Delta Index = \frac{\sum_{i=1}^n (P_i^{new} + A_i^{new})(N_i - U_i) + (I + A_i^{new})U_i + L_i}{n} - 1$$

## DISCLOSURE

This research is non-independent research prepared by Fixed Income & Nordic Research in Nykredit Markets. Non-independent research is a marketing communication and does not constitute independent, objective investment research and is thus not subject to the legal requirements applicable to independent investment research. Therefore, it is not subject to any prohibition on dealing ahead of the dissemination of the marketing communication.

### **Recommendation and risk assessment structure for government bonds and bonds issued by financial institutions, including covered bonds**

#### Bond recommendations

The research of Fixed Income & Nordic Research generally focuses on isolating relative value in bond and derivatives markets. Therefore, the interest rate and/or volatility risk of the strategy is generally hedged through other bonds or derivatives (swaps, swaptions, caps, floors, etc). In contrast to outright recommendations, our research often includes both a buy and a sell recommendation.

**BUY:** In our view, the bond is fairly inexpensive relative to comparable alternatives in either the bond or derivatives markets. We expect that the bond will offer a higher return than the alternatives on a horizon of usually three months.

**SELL:** In our view, the bond is fairly expensive relative to comparable alternatives in either bond or derivatives markets. We expect that the bond will offer a lower return than the alternatives on a horizon of usually three months.

#### Recommendations on portfolio allocation

The recommendations of Fixed Income & Nordic Research are based on a portfolio investor (long-only investor) in government bonds and bonds issued by financial institutions. Click on the following link to see a [list of all recommendations on financial instruments or issuers disseminated](#) by Fixed Income & Nordic Research in Nykredit Markets over the past 12 months.

**OVERWEIGHT:** In our view, the return on the bond segment will be higher than the return on the total Danish bond market (Danish government bonds and bonds issued by financial institutions) in the next three months.

**NEUTRAL:** In our view, the return on the bond segment will be in line with the return on the total Danish bond market (Danish government bonds and bonds issued by financial institutions) in the next three months.

**UNDERWEIGHT:** In our view, the return on the bond segment will be lower than the return on the total Danish bond market (Danish government bonds and bonds issued by financial institutions) in the next three months.

### **Distribution of recommendations**

The distribution of the direct investment recommendations from Fixed Income & Nordic Research within the past quarter is shown in Table 1 and Table 2. Proportion I is the distribution of our recommendations and it therefore sums to 100%. Proportion II is the share of issuers within each category above for which Nykredit Bank A/S has carried out major investment bank transactions in the past 12 months.

<b>Table 1: Recommendations – fixed income</b>	Proportion I	Proportion II
Buy	50	0
Sell	50	0

<b>Table 2: Recommendations – portfolio allocation</b>	Proportion I	Proportion II
Overweight	0	0
Neutral	0	0
Underweight	0	0

Source: Nykredit Markets

### **Historical returns and price developments**

To the extent that this material contains information on historical prices and/or returns, reference is made to [historical returns and prices](#) at nykredit.dk, which provides information on price developments and returns for the past five years (or the life of the instrument concerned, if less than five years) of the financial instruments for which Fixed Income & Nordic Research has made direct investment recommendations.

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Calculations and presentations are based on ordinary econometric and financial tools and methods as well as publicly available sources. Assessments of Danish callable mortgage bonds are modelled using a proprietary model consisting of a stochastic yield structure model and a statistical refinancing model calibrated to borrowers' historical prepayment behaviour. The models have been approved by the Danish Financial Supervisory Authority.

Unless otherwise specified, prices stated in this research prevailed at 15:40 CET on the trade day before the date stated on the front page.

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