

## Nykredit Total Index

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Marketing communication

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- The Nykredit Total Index contains only callable bonds
- The Nykredit Total Index forms the basis of four subindices
- The four subindices reflect typical investment strategies

*The Nykredit Total Index is a Tracker index of the Danish callable covered bond market. The selection for the Index is based on a turnover requirement rather than a requirement related to the outstanding amount of the bonds. The Nykredit Total Index has four subindices. The Index is rebalanced on a quarterly basis every second Tuesday that is a trading day in January, April, July and October. The subindices are rebalanced monthly based on the quarterly Total Index portfolio.*

The Nykredit Total Index is a Tracker index of the Danish callable mortgage bond market, and the index also forms the basis of a number of subindices. A Tracker index contains a subset of the overall market reflecting the general trends in the market. The Nykredit Total Index covers the actively traded part of the Danish callable covered bond market, and the index basis is 13 January 1998.

### Portfolio criteria

The Nykredit Total Index applies a narrow definition of covered bonds to the effect that it only includes covered bonds issued by the six mortgage banks, ie BRF, Danske Kredit, Nykredit, RD, Totalkredit and Nordea Kredit. Furthermore, the bonds must be fixed-rate, callable covered bonds of the annuity, bullet or serial type. Thus, non-callable covered bonds and Cibor-linked covered bonds are not included. Moreover, the bonds may have interest-only periods.

In the Nykredit Total Index, the portfolio is rebalanced on the second Tuesday that is a trading day in January, April, July and October. The subindices of the Nykredit Total Index are rebalanced monthly, cf Subindices below.

Eligibility for the Nykredit Total Index is not based on the outstanding amount of the bonds, but rather on the trading volume. This ensures a sufficient weighting of the underlying subindices of the Nykredit Total Index. In order to be included in the Index, the bonds must have been traded at least 15 times during the past index period as it is important that the bonds in the index portfolio are traded frequently enough to give applied prices credibility. Index performance and bond picking are computed on the basis of the official prices published by NASDAQ OMX Copenhagen.

### Subindices

The Nykredit Total Index forms the basis of a division into a number of subindices.

### Portfolio criteria of the Nykredit Total Index

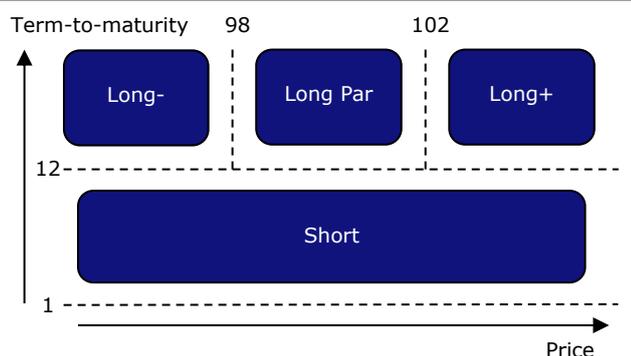
Portfolio criteria	
1	The bonds must be fixed-rate and callable.
2	Portfolio is rebalanced on the second trading Tuesday of January, April, July and October.
3	The bonds must have been traded 15 times during the past period.
4	The bonds must be issued by one of the Danish mortgage banks, currently ISIN codes starting with 20, 32, 46, 47, 92, 93, 95 or 97.
5	The bonds must be denominated in DKK.
6	The bonds must be of the annuity, bullet or serial type and may have interest-only periods.
7	The bonds must have a minimum time-to-maturity of 1 year.
8	To ensure that the Index represents bonds actually issued, Nykredit Markets may adjust the outstanding amount for eg pre-issuance or similar if explicit information in this regard is available. Alternatively, individual bonds may be excluded.

The Nykredit Total Index covers only the callable covered bonds market.

Source: Nykredit Markets

The index is divided into four subindices: A division into short-/long-dated bonds with times-to-maturity under/over 12 years, and a subdivision of long-dated bonds into three price intervals subject to the limits 98 and 102, reflecting typical investment strategies. No subdivision is made of short-dated bonds due to the aim of a certain volume in the subindices. The four subindices are called Short, Long-, Long Par and Long+, respectively. The subindices of the Nykredit Total Index are illustrated in the figure below.

## Subindices of the Nykredit Total Index



The bonds with times-to-maturity of more than 12 years are divided into three groups reflecting typical investment strategies.

Source: Nykredit Markets

The division by price level is due to an objective to have the subindices reflect different trading strategies independently of covered bond models. Therefore, price levels have been chosen as an indicator of duration, which means that the index can be reproduced independently of Nykredit Markets.

Bonds with a price below 98 are characterised by high duration, indicating that the bonds involve no prepayment risk and that the prepayment option is out-of-the-money. The price of 98 has been chosen to ensure sufficient volume in the subindex.

Bonds with a price close to par (100) typically belong to the open covered bond series in which issuance levels are the highest. This segment is characterised by high negative convexity, as the prepayment option is at-the-money. The prepayment risk is increased by the high number of speculative borrowers compared with other covered bond series, as these borrowers are concentrated in the open series. The duration therefore varies considerably in this segment, but will generally be lower than for bonds below a price of 98. The price of open series – or series with no significant prepayments as yet – seldom exceeds 102. We therefore consider the price range from 98 to 102 suitable for this segment.

Bonds traded far above par make up a highly specialised segment dominated by many, small and burnt-out covered bond series. Investing in this segment is a very technical discipline in which investors' yield and prepayment expectations are decisive to the investment decision. Liquidity in this segment is low, and trading is characterised by small transactions. We have therefore gathered these series in their own subindex defined by prices over 102.

Naturally, bonds with short times-to-maturity always have low interest rate sensitivity – irrespective of price – and other subindices are therefore stabilised when gathering the short bonds in a separate subindex. Accordingly, we have gathered all bonds maturing within 12 years in one sub-index considering the difficulties in achieving sufficient volume in three subindices with short times-to-maturity.

EFFAS generally recommends monthly re-balancing of subindices. To ensure consistency of Nykredit Markets's portfolio of covered bond indices, the subindices are rebalanced on the second Tuesday that is a trading day of each month. The time-to-maturity is determined on the rebalancing day, while the price distribution is based on the average official price quoted over the past ten trading days up to and including the rebalancing day. This ensures that the bonds do not change subindices as a result of one single, random observation. The rebalancing criteria for the subindices are listed in the table below.

### Rebalancing criteria for subindices

Rebalancing criteria	
1	Rebalancing on the second Tuesday that is a trading day of each month.
2	Division into times-to-maturity under and over 12 years from the rebalancing date.
3	Bonds with times-to-maturity over 12 years are further divided into the price ranges: price $\leq 98$ , $98 < \text{price} \leq 102$ and price $> 102$ .
4	The division into price ranges is based on the average official price quoted over the past ten trading days (incl the rebalancing date).

The outstanding amount is not updated on subindex rebalancing.

Source: Nykredit Markets

### Calculation of index value

The index value development is calculated on the basis of the change in the portfolio's market value on a daily basis. The calculation of the market value is based on the official prices quoted by NASDAQ OMX Copenhagen. This is due to the desire for transparency in the calculation of index performance so that the performance of the Nykredit Total Index can be reproduced (see formulas below). The bonds are weighted at their nominal amount from the last rebalancing.

In the calculation of index performance, redemptions are included at their redemption prices (100) on the day of trading, the value date of which is the payment date.

On index portfolio rebalancing, the calculation of index values on the rebalancing date is based exclusively on the "old" portfolio, whereupon the index is rebalanced. The day after the rebalancing, performance is calculated exclusively on the basis of the rebalanced portfolio.

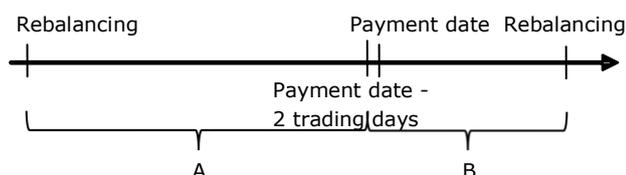
### Where to find the Nykredit Total Index

The development in the Index and its duration can be followed at Nykredit's [website](#) together with the current index composition. The Nykredit Total Index is also available at Reuters (NYKRED15) and Bloomberg (NYKRTOT Index).

### Calculation formulas

Figure 2 shows the events that impact the index portfolio.

### Important events for the Nykredit Total Index



Besides the impact from rebalancing, the index portfolio changes when the redemptions are effected.

Source: Nykredit Markets

In the period from rebalancing to the payment date (period A), the nominal amounts from rebalancing are used for calculating the index performance, described by the following formula:

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

where P is the official price quoted by NASDAQ OMX Copenhagen, A is accrued interest, and N is the nominal amount on the rebalancing date.

Redemptions and coupon interest are reinvested in the index on the day of trading for which the value date is the payment date (or the first trading day after the payment date if the payment date is not a trading day), and the nominal amounts are adjusted for redemptions:

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

where U is the amount of bond redemptions, I is the redemption price and L is the liquidity from the coupon payments.

From the payment date to rebalancing (period B), the liquidity is placed in the index, and the index performance is thus calculated by using the following formula:

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

In period A, the following formula is used to determine the index duration:

$$OABPV_{Index} = \frac{\sum_{i=1}^n N_i \cdot OABPV_i}{\sum_{i=1}^n N_i}$$

where OABPV is the duration of a bond.

The duration of period B is calculated as follows:

$$OABPV_{Index} = \frac{\sum_{i=1}^n OABPV_i (N_i - U_i)}{\sum_{i=1}^n N_i - U_i}$$

## 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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This investment research was finished and released for distribution for the first time on the date stated on the front page.

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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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