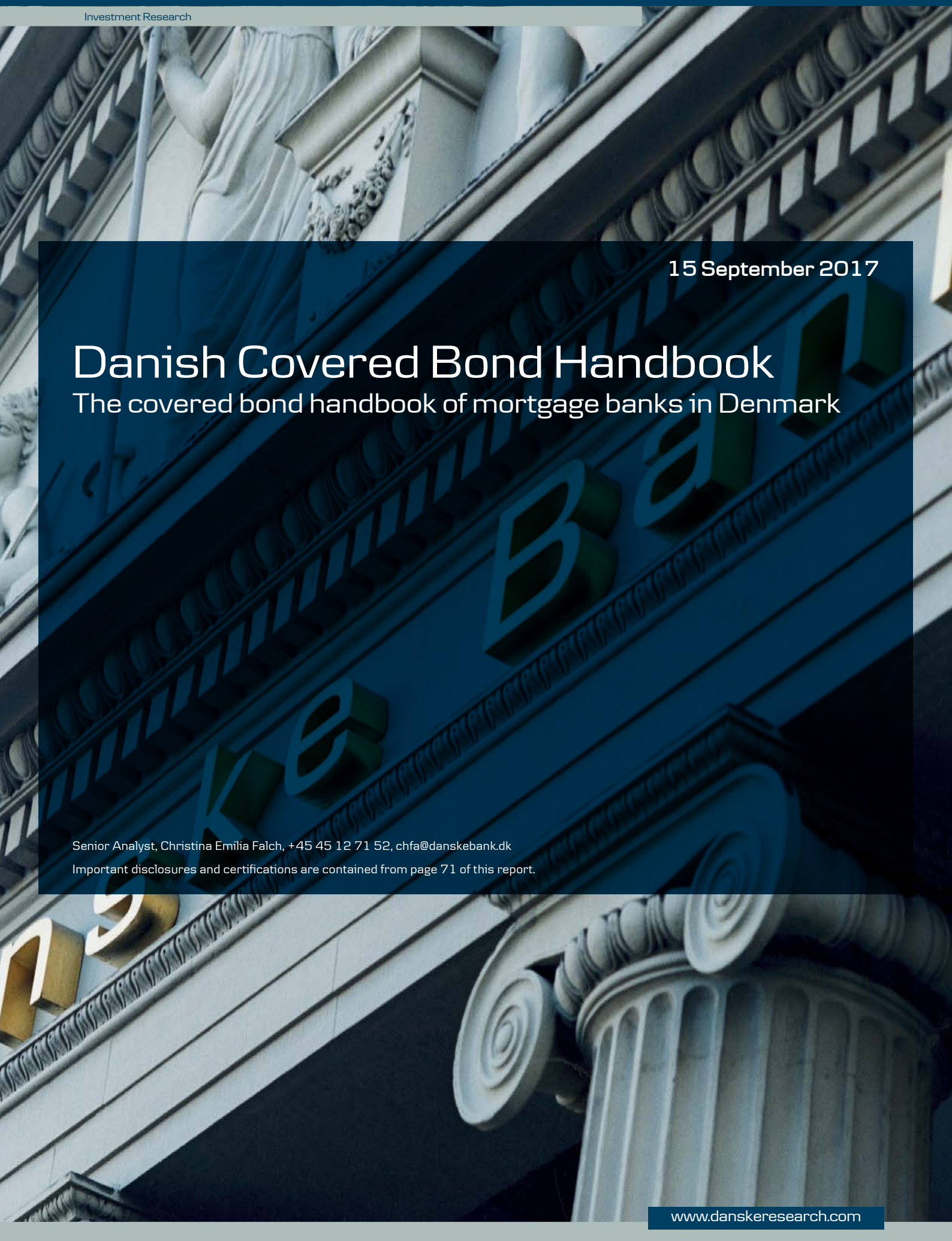
Danske Bank

Investment Research

15 September 2017

Danish Covered Bond Handbook

The covered bond handbook of mortgage banks in Denmark



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Important disclosures and certifications are contained from page 71 of this report.

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Danish Covered Bond Handbook 2017

This document provides an overview of the Danish covered bond market and its pass-through bonds, including details of the securities underlying the bonds. Until 2007, issuance of Danish covered bonds (mortgage bonds) in Denmark was through specialist mortgage banks, of which the general feature was a pass-through product. However, a significant revision of the law in 2007 paved the way for non-specialist banks to issue covered bonds.

Covered bonds issued out of Denmark fall into two categories: traditional Danish mortgage bonds (the pure pass-through product) and euro-style covered bonds in a jumbo format (similar to what exists in euroland). The pass-through products are tapped on a daily basis in the domestic market and comprise one of the largest residential covered bond markets in Europe. Currently, only Danske Bank has established a euro medium-term note (EMTN) covered bond programme and issues euro-style covered bonds similar to those in Germany, the Netherlands, Sweden, Norway, etc.

Chapter 1 briefly outlines why Danish covered bonds are an interesting asset class. Chapter 2 explains the legal framework of the Danish mortgage credit system and the security aspects of Danish covered bonds.

Chapter 3 describes the Danish mortgage banks and Chapter 4 provides an overview of the current ratings of each institution and their rated capital centres. Chapter 5 gives a detailed description of the characteristics of Danish covered bonds and Chapter 6 describes the primary and secondary markets.

Moving on to prepayments, Chapter 7 explains how covered bonds can be refinanced and shows different types of remortgaging strategies. Chapter 8 explains how to estimate prepayment rates for callable covered bonds.

Chapter 9 gives an overview of investor distribution. Chapter 10 presents different ways of measuring the yield pickup of Danish covered bonds and introduces option-adjusted figures for yield spreads (OAS) and durations.

In Chapter 11, we describe bond futures on Danish covered bonds. Finally, Chapter 12 summarises the available data on Danish covered bonds.

For more information on the euro-style Danish covered bond, see the Danske Bank publication *Nordic Covered Bond Handbook: The handbook of the Nordic covered bond markets and issuers*, 1 September 2017.

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1. Why are Danish covered bonds an interesting asset class?

Danish covered bonds are an interesting asset class for various reasons. The bonds are issued under a strong mortgage act and the more than 200-year old Danish credit system has gone through a number of stages and survived several occasions of economic and political turmoil. The level of repossessed dwellings and loans in arrears has been very low – even in periods of significantly falling house prices. Danish covered bonds are rated 'AAA' by S&P and offer a pickup relative to other European 'AAA' rated covered bonds. The liquidity of the short-dated, non-callable covered bonds is good and at times better than the liquidity of Danish government bonds.

The following sections detail why Danish covered bonds are an interesting asset class.

The more than 200-year old Danish credit system has survived several occasions of economic and political turmoil

In 1795, a very large fire in Copenhagen burned one in four houses in the city to the ground. Funding was needed to rebuild the city but provision of credit was scarce. Lenders formed a mortgage association to provide loans secured by mortgages on real property on the basis of joint and several liability to enhance credit quality.

To fund the loans, the first Danish mortgage bonds were issued and thus a more than 200-year tradition of mortgage bond issuance in Denmark commenced.

Over the past 200-plus years, the Danish mortgage credit system has gone through a number of stages and survived several occasions of economic and political turmoil, including the bankruptcy of the Kingdom of Denmark in the early 19th century and the depression of the 1930s. Every single issued bond has been repaid in full to the investors.

This unblemished record is attributable mainly to the strong legislative framework, which from an early stage in the development of the market has put great emphasis on the protection of the mortgage bond investor by imposing strict limits on risk taking by mortgage banks. In 1850, a long tradition of strict regulation of the activities of mortgage banks commenced with the passing of the first Mortgage Bond Act. The legal framework has been amended several times. However, guiding principles such as the balance and investor protection principles have remained unchallenged (Chapter 2 describes the present Mortgage Credit Act in detail).

In its first 100 years, the Danish mortgage credit sector consisted of many mortgage credit associations, where mutuality was in focus. However, mutuality contributed to a very restricted lending policy, as the most important duty of a mortgage credit association was to safeguard the interests of its members.

At the end of the 1950s, the Danish government took the initiative to establish independent mortgage banks. Commitment to mutuality gradually disappeared and institutions with independent means were established. This resulted in a more liberal lending policy.

Since 1970, Denmark's mortgage credit legislation has seen several reforms. In search of economies of scale, the mortgage credit reform in 1970 introduced a provision for the approval of future new mortgage banks only if there was an apparent need. The number of mortgage banks fell from 24 to seven. Another important change in 1970 was the switch from a three- to a two-tier system – ordinary and special mortgage credit loans. This led to the 1980 reform, which introduced the use of only one tier known as the 'unity' mortgage credit system. In 1989, deregulation resulting from EU directives enabled commercial and savings banks to establish mortgage banks – formed as limited companies. Traditional mortgage banks were allowed to convert into limited companies. New lenders entered the market and fierce competition ensued, resulting in consolidation within the sector.

Since 2000, the merger of Danske Kredit, BG Kredit and Realkredit Danmark and that of Nykredit and Totalkredit has intensified competition even further to form the market today.

Today, Danish covered bonds (mortgage bonds) are issued by a comparatively small number of mortgage banks (MCIs) – at present seven – adding to the liquidity of the bonds issued. Furthermore, market concentration is high, with Nykredit/Totalkredit and Realkredit Danmark accounting for 68.5% of all Danish krone covered bonds issued and 57.5% of all Danish euro covered bonds issues.

Table 1. Volumes and market shares of Danish MCIs, End-June 2017

	DKK bonds		EUR bonds		Total volume	
MCI	Volume (EURbn)	Share (%)	Volume (EURbn)	Share (%)	Volume (EURbn)	Share (%)
Nykredit/Totalkredit	149.5	41.2%	15.4	49.6%	168.1	41.5%
Realkredit Danmark	99.1	27.3%	2.5	7.9%	104.0	25.7%
Nordea Kredit	52.9	14.6%	1.9	6.1%	54.8	13.5%
BRFkredit	38.7	10.7%	0.0	0.1%	41.3	10.2%
DLR	18.6	5.1%	1.8	5.8%	20.4	5.0%
Danske Bank	1.1	0.3%	9.5	30.6%	13.7	3.4%
LRF	2.5	0.7%	0.0	0.0%	2.5	0.6%
Total	**362.5**	**100.0%**	**31.1**	**100.0%**	**404.8**	**100.0%**

Source: Danske Bank

Danish covered bonds are issued under a strong mortgage act

Danish covered bonds are issued under the Danish mortgage act. One of the central elements in the Danish mortgage act is the balance principle. The balance principle requires that there is a match between the inflow and the outflow of a mortgage bank and limits the amount of risk (interest rate, volatility, FX and liquidity) that a Danish mortgage bank can undertake. See Chapter 2 for more details on the Danish mortgage credit system.

In addition, Danish mortgage banks must observe capital requirements as defined in applicable EU Directives, i.e. the capital base of mortgage banks must be a minimum of 8% of risk-weighted assets.

Another key feature of the Danish system is very well-defined property rights through a general register of all properties in Denmark. This is called the Danish title number and land registration systems and efficient compulsory sale procedures. The title and land registration systems ensure that ownership and encumbrances on individual properties are easily identified and that the information is available to the public. Furthermore, if a borrower defaults on a payment, the mortgage bank can take over the house and the compulsory sale procedure would ensure that a mortgage bank could sell the house in the real estate market or through a forced sale. The period from default to a forced sale being completed may be as short as six months. Hence, the Danish title number and land registration systems add investor protection.

Danish covered bonds are rated 'AAA' by Standard & Poor's

Danish covered bonds issued by the major Danish mortgage banks' most traded capital centres are rated 'AAA' by Standard & Poor's (S&P). Each mortgage bank has a range of capital centres and S&P rates the covered bonds depending on capital centres and bond type (SDO/SDRO/RO and JCB). The table in the margin shows the current rating for the covered bonds issued by Realkredit Danmark, Danske Bank, Nykredit Realkredit, Nordea Kredit, BRFkredit and DLR.

Nordea Kredit's covered bonds issued out of capital centres 1 and 2 also have an 'Aaa' rating from Moody's. In addition, covered bonds issued out of Realkredit Danmark's capital centres S and T are rated 'AAA' and 'AA+', respectively, by Fitch.

Table 2. Ratings from S&P

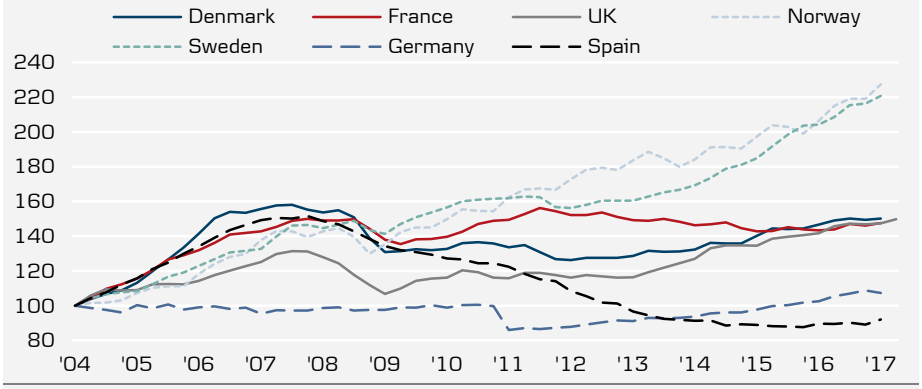
Capital centre	Type	Rating
Realkredit Danmark		A
General capital centre	RO	AAA
Capital centre S and T	SDRO	AAA
Danske Bank		A
Register C, D and I	SDO	AAA
Nykredit Realkredit		A
General capital centre	RO	AAA
Capital centre C, D, G and I	RO	AAA
Capital centre E and H	SDO	AAA
Totalkredit CC C	RO	AAA
Nordea Kredit		AA-
Capital centre 1	RO	AAA
Capital centre 2	SDRO	AAA
BRFkredit		A-
General capital centre	RO	AAA
Capital centre B	RO	AAA
Capital centre E	SDO	AAA
DLR Kredit A/S		A-
General capital centre	RO	AAA
Capital centre B	SDO	AAA

Source: S&P, Danske Bank.

Low level of repossessed dwellings and loans in arrears

House prices in Denmark experienced a gradual increase over the decades leading up to the beginning of the financial crisis in 2007. During the financial crisis, house prices fell quite significantly until the beginning of 2009, when we saw a stabilisation in prices (see chart below).

Chart 1. House prices in selected countries 2004-17 Q1 (index 100= 2004Q1)

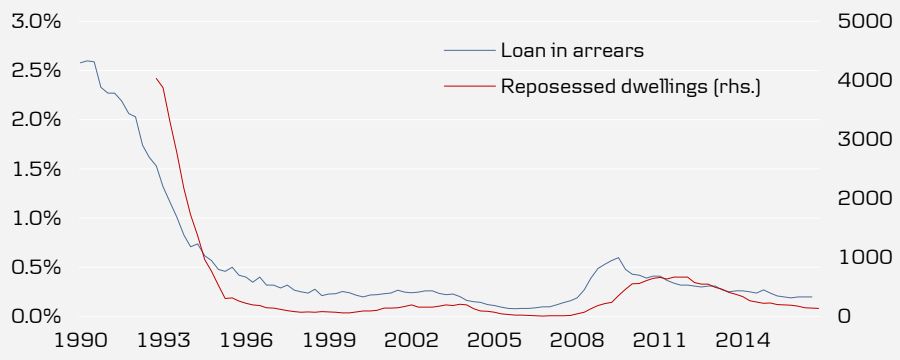


Source: Macrobond Financial, Danske Bank.

Between the peak in 2007 and Q3 12, house prices in Denmark declined by almost 20%. Over the same period, house prices in Norway and Sweden increased by 24.7% and 9.8%; in Spain and the UK house prices declined by 32.6% and 11.5%, respectively, over this period.

Despite the significant fall in house prices during the financial crisis, the level of repossessed dwellings and loans in arrears has been very low. This is due to the low unemployment rate in Denmark and the strong mortgage legislation.

Chart 2. Repossessed dwellings and loans in arrears



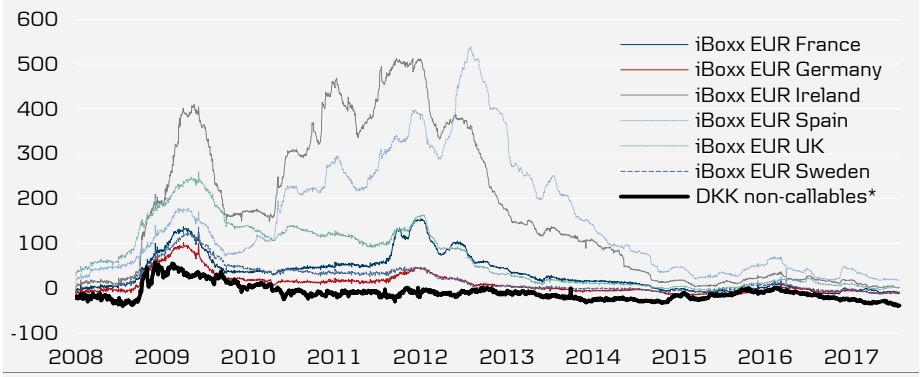
Source: Finance Denmark, Danske Bank.

Low spread volatility of Danish covered bonds compared with other European covered bond markets

Over the past few decades, the spread volatility of Danish covered bonds has generally been quite low compared with other European covered bond markets. Spreads on Danish covered bonds widened quite significantly in autumn 2008 due to the increased risk aversion in the market but compared with other European covered bond bonds, the spread widening in Denmark in 2008 was moderate. Also, the Danish bond market was unaffected by the European debt crisis, as investors used the Danish bond market as a 'safe haven'.

Since 2012, we have seen a significant tightening of (local) asset swap (ASW) spreads on European covered bonds driven partly by the ECB's covered bond buyback programmes (CBPP). Over the same period, the spreads on Danish covered bonds traded in a relatively stable range until 2015, when we saw a temporary widening of spreads. The drivers of the spread widening in 2015 were uncertainty about the impact of regulation (for example, the implementation of the liquidity coverage requirement [LCR] as of 1 October 2015, uncertainty regarding the leverage ratio and risk weights) and increased volatility in the financial markets. After the spread tightening in 2015, the spread tightening on Danish covered bonds continued and the spreads are currently at historically low levels.

Chart 3. Covered bond ASW spreads (bp, mid)

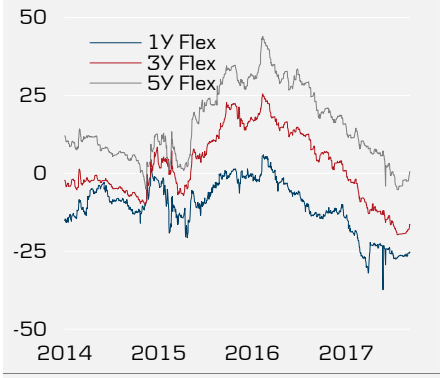


Source: iBoxx, Danske Bank

Danish covered bonds offer an excess pickup

Looking at the current (as of 7 September 2017) spread levels for Danish and other European covered bonds, Danish covered bonds currently trade close to the spread levels on European covered bonds if we look at the spreads versus local swap (DKK and EUR swaps, respectively). However, if the (local) ASW spread against CIBOR is basis swapped into EURIBOR (or alternatively buying a Danish bond in combination with an FX hedge), Danish covered bonds offer an excess pickup relative to other European 'AAA' rated covered bonds. The spreads between Danish covered bonds and EUR covered bonds have decreased in recent years because of general tightening of the spread against DKK swaps in combination with negative cross-currency basis swap spreads between DKK and EUR. See the charts below. However, the basis swaps still generates an excess pickup when CIBOR is basis swapped into EURIBOR.

Chart 4. ASW DKK3M

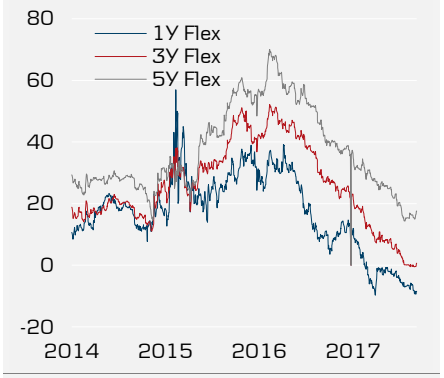


Source: Danske Bank

Chart 5. Cross-currency swap – DKK3M EUR3M

Source: Danske Bank

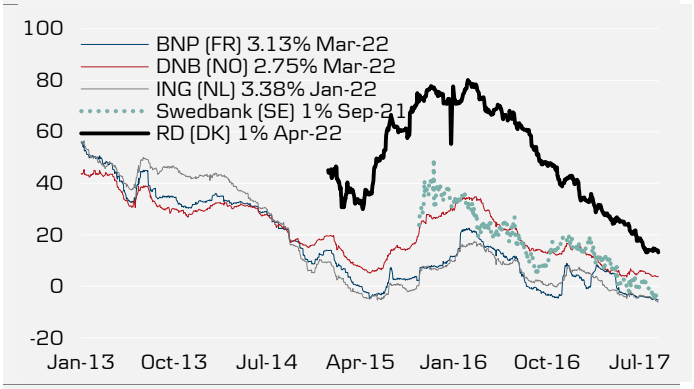
Chart 6. ASW EUR3M (basis swapped ASW DKK3M)



Source: Danske Bank

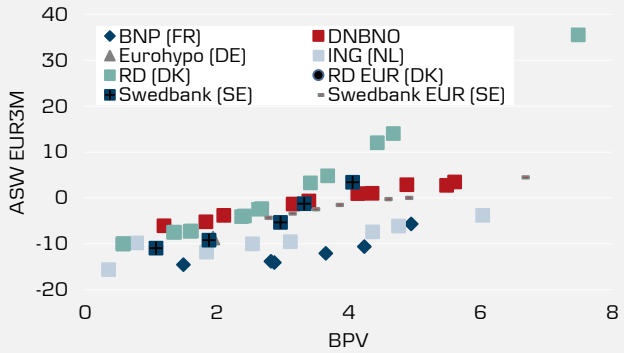
Danish non-callable bullet bonds basis swapped from CIBOR to EURIBOR trade at a significant pickup to other European covered bonds. Hence, Danish non-callable interest-reset bonds are attractive alternatives to EUR-covered bonds. See the charts below. Basis-swapped Danish covered bonds (or alternatively buying Danish covered bonds in combination with an FX hedge) also offer an excess pickup relative to USD, GBP, SEK and NOK fixed income assets.

Chart 7. ASW EUR3M for a small selection of European covered bonds with maturity in 2021/22



Source: Danske Bank

Chart 8. ASW EUR3M relative to BPV for a selection of European covered bonds as of 25 August 2017



Source: Danske Bank

Good liquidity in short-dated, non-callable covered bonds

The liquidity of short-dated non-callable covered bonds is relatively high and at times higher than the liquidity of Danish government bonds. The Danish mortgage banks have – despite periods with very low liquidity (for example, during the financial turmoil in 2008-09) – been able to issue and sell bonds in the market.

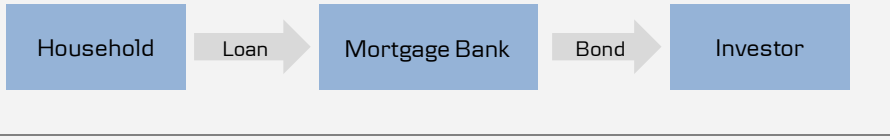
2. The mortgage credit system

Danish mortgage banks provide mortgage lending at a very competitive cost. This has led to persistent demand for mortgage lending from property owners (residential, commercial and public sector real estate) in Denmark and makes the Danish covered bond market the largest in the world compared with GDP and the largest in Europe in absolute terms.

Until 1 July 2007, the Danish mortgage market was characterised by two main features.

- Only specialist mortgage banks (MCIs) were allowed to issue Realkreditobligationer (covered bonds).
- All MCIs followed a strict balance principle, where the loan to the household was matched exactly by the bond bought by the investor. A pure pass-through system as shown below, where the MCI did not take interest rate, volatility, FX or liquidity risks.

Chart 9. Pass-through system



Source: Danske Bank

On 1 July 2007, an amendment to the legal framework came into force. The purpose of the amendment was twofold:

- To render the Danish covered bond system compliant with the covered bond criteria in the EU Capital Requirement Directive (CRD).
- To give Danish universal banks access to covered bond funding of eligible assets.

To meet its purpose the amendment introduced different bond types, three of which could be called covered bonds as they fulfilled UCITS and CRD.

- SDO – særligt dækkede obligationer.
- SDRO – særligt dækkede realkreditobligationer.
- Realkreditobligationer issued before 31 December 2007.

SDO, SDRO and Realkreditobligationer issued before 31 December 2007 are all classified as covered bonds and are CRD compliant and thus carry low risk weights. The single difference between the SDOs and SDROs is that SDROs may be issued by specialist mortgage banks only, whereas SDOs may be issued by both universal banks and specialist mortgage banks.

Finally, the amendments allowed the MCIs to issue Realkreditobligationer but Realkreditobligationer issued after 31 December 2007 are not CRD compliant and high-risk weights apply for these bonds relative to SDOs/SDROs. Furthermore, the amendments gave the MCIs as well as the universal banks the possibility to issue under two different balance principles:

- The specific balance principle, which is very close to the old balance principle.
- The general balance principle, which is more in line with what we see in Euroland.

Below we illustrate how issuers in the Danish market have positioned themselves with regard to the type of covered bond and the type of balance principle. A more thorough description of the two balance principles is found in the section titled *Balance principle*.

The two specialised mortgage banks Nordea Kredit and Realkredit Danmark, which are owned by the two large banks Nordea and Danske Bank, respectively, are the only ones that issue covered bonds in the SDRO format and adhere to the specific balance principle. The specialist agricultural mortgage bank DLR Kredit also adheres to the specific balance principle. The message from these issuers is therefore clear: they are sticking to their traditional pass-through mortgage business.

Table 3. Danish issuer positions

Issuer	Type	Balance principle	Main issuing principle
BRFkredit	SDO	General principle	Pass through, tap or auction
Danske Bank	SDO	General principle	Euro style, syndication
DLR Kredit	SDO	Specific principle	Pass through, tap or auction
Nordea Kredit	SDRO	Specific principle	Pass through, tap or auction
Nykredit/Totalkredit	SDO	General principle	Pass through, tap or auction
Realkredit Danmark	SDRO	Specific principle	Pass through, tap or auction

Source: Danske Bank

BRFkredit and Nykredit/Totalkredit have opted for the general balance principle and issue covered bonds in the SDO format – as does DLR Kredit. The primary reasons for doing this are to have the option to carry out joint funding, to benefit from the slightly more flexible balance principle and to have the option to include a broader range of collateral in the cover pool. In addition, BRFkredit uses the flexibility under the general balance principle to finance DKK mortgage loans by issuing syndicated non-callable EUR benchmark covered bonds, using derivatives to hedge market risks.

Not being a specialised mortgage bank, Danske Bank is allowed to issue only covered bonds in the form of SDOs and, being a universal bank, the general balance principle within the ALM suits it best. So far, as we see it, Danske Bank is the only bank issuing covered bonds in Euroland through syndicated deals in EUR among the Danish covered bond issuers. The traditional Danish mortgage banks still rely on daily tap issuance as well as two to four refinancing auctions per year.

Legislation

Danish mortgage banking is supported by restrictive and detailed regulations designed to protect covered bond investors. Mortgage banking in Denmark is regulated subject to the general Financial Business Act, the specific Mortgage-Credit Loans and Mortgage-Credit Bonds Act and a number of Ministerial Orders.

Key elements of the regulation are as follows:

- Specialist mortgage banks must operate subject to the balance principle limiting the market risk exposure of the issuer to a minimum.
- Bonds issued and collateral must be assigned to specific capital centres within the specialist mortgage banks.
- Each capital centre is regulated subject to a balance principle – either the general or the specific principle – at the decision of the issuer.
- Mortgage loans and securities serving as collateral must meet restrictive eligibility criteria, including loan-to-value (LTV) limits and valuation of property requirements.

- Investors have a privileged position in the case of bankruptcy, rendering covered bond bankruptcy remote.
- The mandatory overcollateralisation of the cover pool is subject to the selection of either the general or the specific balance principle.
- Mortgage banks are closely supervised by the Danish FSA.
- Mortgage collateral will observe LTV limits at single loan levels at all times.

Property registration and the compulsory sale system

A key feature of the Danish system is very well defined property rights through a general register of all properties in Denmark. This consists of the Danish title number and land registration systems and efficient compulsory sale procedures. The title and land registration systems ensure that ownership and encumbrances on individual properties are easily identified and that the information is available to the public. Furthermore, if a borrower defaults on a payment, the mortgage bank can take over the house and the compulsory sale procedure ensures that a mortgage bank can sell the house in the real estate market or through a forced sale. The period from default to a forced sale being completed may be as short as six months. Hence, the Danish title number and land registration systems add investor protection.

Balance principle

The balance principle is a guiding principle of Danish mortgage banking, which restrictively regulates the market risk exposure of Danish covered bond issuers. The principle imposes a number of tests, which must be passed at all times and the mortgage bank must choose to adhere to one of two balance principles: the general balance principle or the specific balance principle.

Table 4. Balance principles

	General principle	Specific principle
Payments definition	Payment may include margins	Payments excluding margins
Interest risk	Risk limit 1%[1] +2%[2] of OC: +/-100bp parallel shift Risk limit 5%[1]+10%[2] of OC: +/-100bp twist and +/-250bp shift 50% offset of EUR interest rate risk	Risk limit 1% of OC: +/-100bp parallel shift and twist No offset of EUR interest rate risk
Exchange rate risk	Risk limit 10% of OC: +/-10% shift in EU currencies +/-50% shift in other currencies	Risk limit 0.1% of OC Currency indicator II
Option risk	Risk limit 0.5%[1]+1%[2] of OC: +/-100bp shift in volatility (vega)	Perfect hedge required
Liquidity risk	Deficits in interest payments may not exceed OC within 12M NPV surplus of all future payments	Deficits in total payments limited to: - 25% of OC in year 1-3 - 50% of OC in year 4-10 - 100% of OC from year 11

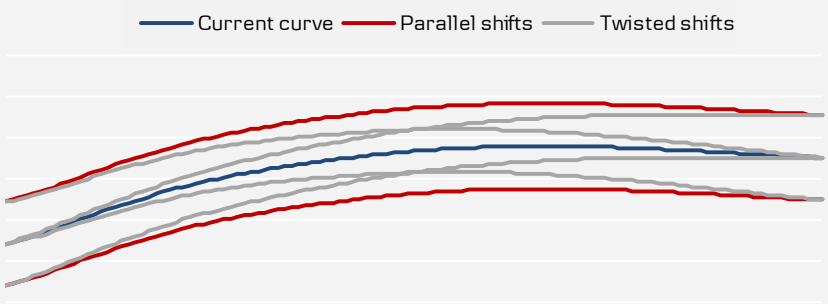
1. Percentage of the capital adequacy requirement, 2. Percentage of the additional excess cover for mortgage banks, Note: OC = overcollateralisation
Source: The Danish FSA, Danske Bank

The balance principle is enforced by the Danish FSA. If a mortgage bank does not pass the tests, the FSA must be informed immediately. In addition, mortgage banks must report their market risk exposure to the FSA on a quarterly basis.

Interest rate risk test

Interest rate risk is tested in scenarios of both yield curve shifts and yield curve twists. The diversity of scenarios implies that duration matching of a loan and funding portfolio will not be sufficient to pass the test.

Chart 10. Shifting the yield curve



Source: Danske Bank

Currency rate test

Currency risk is tested in scenarios of shifts in the currencies in which the bonds have been issued to comply with the general principle.

Currency risk is tested employing an empirical measure of the greatest loss suffered within a 10-day period with a 0.99 probability (Currency Indicator II) to comply with the specific principle. The measure is calculated by the Danish FSA.

Option risk

Option risk is tested in scenarios of shifts in the volatility (vega) to comply with the general principle.

Liquidity risk

The cover of future payments to covered bond investors is tested to limit the liquidity and funding risk of mortgage banks. In passing this test, mortgage banks will have sufficient liquidity to meet future payments on mortgages.

Specialist bank principle

The specialist bank principle confines the activities of mortgage banks to mortgage lending based on the issuance of covered bonds.

The principle implies that mortgage banks are prohibited from granting loans that do not meet the eligibility criteria imposed by legislation. Similarly, the sources of funding are confined to issuing covered bonds, i.e. collecting deposits is not an applicable source of funding for Danish mortgage banks.

The principle implies that mortgage banks operate as monoline businesses, which adds to the transparency of investing in covered bonds.

Asset eligibility criteria

Mortgage loans eligibility criteria

Mortgage loans and securities serving as collateral must meet restrictive eligibility criteria including LTV limits and valuation of property requirements laid down in the legislation.

Eligibility criteria for mortgage loans are subject to the type of bond issued.

Table 5. Eligibility criteria for mortgage loans

	RO	SDO/SDRO
Collateral assets	Real property, public loans	Real property, public loans, derivatives and substitutions assets
LTV calculations	At time of granting the loan	Frequency to comply with FSA recommendations

Source: The Danish FSA, Danske Bank

Table 6. Eligibility criteria for mortgage loans – maximum LTV

Property type	RO	SDO/SDRO
Private residential property	80%	80% (75%*)
Residential rental property	80%	80% (75%*)
Office and shop property	60%	60% (70%**)
Industrial property	60%	60% (70%**)
Agricultural property	70%	60% (70%**)
Loans covered by municipal guarantee	80-100%	80%
Holiday homes	75%	75%
Land	40%	40%

** The maximum LTV is 75%, if the loan has a 30Y interest-only period*
*** The maximum LTV can be raised to 70%, if supplementary collateral is provided of no less than 10% for the part of the loan that exceeds 60% of the value of the property*
Source: The Danish FSA, Danske Bank

Ships are not eligible for SDROs under the specific Mortgage-Credit Loans and Mortgage-Credit Bonds Act. Ships are funded by Danish Ship Finance under the Act on a ship finance institute.

Eligibility criteria for realkreditobligationer (RO) are as follows:

- Terms may not exceed 35 years for mortgage loans guaranteed by municipalities and 30 years for all other mortgage loans.
- Private residential and leisure home mortgages may not be repaid more slowly than a 30-year annuity with an option for interest-only periods of a maximum of 10 years.

The eligibility criterion for all bond types is as follows:

- Market value of pledged property must be assessed by the mortgage bank.

In general, the pledged property must be valued subject to an inspection of the property by a valuation officer of the mortgage bank. However, the majority of the Danish mortgage banks, including Realkredit Danmark, Nykredit/Totalkredit, BRFkredit and Nordea Kredit, have developed a valuation model based on extensive data on property prices in Denmark. The Danish FSA has reviewed the reliability of the models. Based on this, the FSA can in some cases grant an exemption from the inspection requirement for properties meeting certain criteria.

Mortgage banks must provide supplementary security to bond investors if the value of mortgaged properties decreases and LTV ratios of the loans exceed the stipulated LTV limits. This requirement applies on a permanent basis to SDOs/SDROs but not to ROs. Because of the SDO/SDRO legislation, mortgage banks therefore have to issue junior covered bonds, using the proceeds to provide security for loans secured on properties that are subject to considerable price declines.

Securities eligibility criteria

Securities may only serve as collateral temporarily. Proceeds from issuing covered bonds must be invested in mortgage loans within 90 days of the issue. Similarly, proceeds from borrower payments exceeding payments to covered bond investors must be invested in mortgage loans or be used to redeem circulating covered bonds within 12 months. Hence, covered bonds are primarily collateralised by mortgages on real property.

Eligible securities are as follows:

- Government bonds and deposits with central banks issued by OECD member states.
- Covered bonds issued by mortgage banks in OECD member states.
- Deposits in commercial banks with a maximum term of 12 months.

Bankruptcy regulation

Chances of bankruptcy remote

Covered bond investors are awarded a privileged position in a bankruptcy scenario. The privileged position ensures that covered bond investors will only be affected in a bankruptcy scenario in exceptional cases, rendering the chances of covered bond bankruptcy remote.

The bankruptcy regulation specifies detailed guidelines, which must be observed in a bankruptcy scenario. Key points of the guidelines are as follows:

- A trustee will be appointed by the Danish FSA to manage all financial transactions of the mortgage bank.
- The trustee will be instructed to meet all payment obligations on covered bonds issued in due time notwithstanding a suspension of payments of the mortgage bank.
- All new lending activities of the mortgage bank will cease.
- The trustee has the option of issuing refinancing bonds for the refinancing of maturing covered bond debt. Refinancing debt will be comprised by the bankruptcy privilege on equal terms with covered bond debt. The trustee has the further option of issuing unsecured debt.
- Payments on loans will not be accelerated. Hence, payments from borrowers will fall due according to the original payment scheme.
- The trustee may not pay other creditors before all payment obligations on issued covered bonds have been met in full.
- The guidelines have been thoroughly investigated by Moody's and Standard & Poor's. They have concluded that the guidelines provide for sufficient protection of covered bond investors in a bankruptcy scenario and therefore the chances of a Danish covered bond bankruptcy are remote.

Mandatory overcollateralisation

Mortgage banks must observe capital requirements as defined in applicable EU directives, i.e. the capital base of mortgage banks must be a minimum of 8% of risk exposure amount (REA). In addition, the Common Equity Tier 1 capital (CET1) and the Tier 1 (T1) must be at least 4.5% and 6%, respectively, of the risk exposure amount.

The mandatory overcollateralisation of mortgage banks falls within the scope of the privileged position of covered bond investors in a bankruptcy scenario. The trustee will be instructed to employ the mandatory overcollateralisation exclusively to meet the payment obligations on covered bonds issued. The mandatory overcollateralisation may not be employed for any other purpose.

Capital buffer requirements

The Danish mortgage banks must also comply with the three following capital buffer requirements:

- **Capital conservation capital buffer** equal to 2.5% of the risk exposure amount.
- **Discretionary counter-cyclical capital buffer** of up to 2.5% of the risk exposure amount during periods of high credit growth. The discretionary counter-cyclical capital buffer is 0% in Denmark.
- **Systemic capital buffer** applies only to SIFIs (systemically important financial institution) and is set according to the degree of systemic importance for the different financial institutions. The table below shows the systemic capital buffers for Danish SIFIs from 2015 to 2019 when the systemic capital buffer is fully implemented.

Table 7. Systemic capital buffer for Danish SIFIs from 2015 to 2019

Institution	2015	2016	2017	2018	2019
DLR Kredit A/S Sydbank A/S	0.2%	0.4%	0.6%	0.8%	1.0%
Jyske Bank A/S	0.3%	0.6%	0.9%	1.2%	1.5%
Nordea Bank Danmark A/S Nykredit Realkredit A/S	0.4%	0.8%	1.2%	1.6%	2.0%
Danske Bank A/S	0.6%	1.2%	1.8%	2.4%	3.0%

The two specialist mortgage banks, Nordea Kredit and Realkredit Danmark, are owned by the two large banks Nordea and Danske Bank, respectively. BRFkredit is owned by Jyske Bank A/S.
Source: Danish FSA, Danske Bank

Mandatory debt buffer of 2%

Danish mortgage banks are required to establish a debt buffer equal to 2% of their total (unweighted) mortgage lending. This buffer must represent an extra buffer on top of current capital requirements and capital buffers. The buffer may consist of excess capital relative to current capital requirements and capital buffers. In addition, the banks may use senior (unsecured) debt or, put another way, a new form of senior debt with terms different from current JCBs/senior debt. The capital instruments must have an original maturity of at least two years and appropriate maturity diversification.

The debt buffer requirement is based on, among other things, the BRRD (Bank Recovery and Resolution Directive, which deals with the resolution of distressed banks at the EU level), which stipulates a bail-in requirement for European banks. The mortgage banks are exempt from this requirement but the new bill would impose requirements for a similar capital buffer to facilitate a more flexible resolution process by establishing a bridge institution.

At least 60% of the debt buffer requirement (2% of lending) had be met by 2017. The requirement gradually increases until 2020 (see table below).

Table 8. Debt buffer to be implemented gradually

	15 June 2016	2017	2018	2019	2020
Requirements	30%	60%	80%	90%	100%

Source: Danske Bank, EVM

Regulations regarding the placement and liquidity of funds

Under Danish mortgage credit legislation, excess funds from an issue of mortgage bonds may be placed in low-risk and marketable securities according to paragraph 153 and 154 in the Danish Mortgage Act (see below). Banks that have been granted a licence to issue covered bonds may be placed in the asset types mentioned in Article 129(1) of Regulation (EU) no. 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms.

Paragraphs 153 and 154 of the Danish Mortgage Act (Financial Business Act)

Special regulations for mortgage-credit institutions regarding the placement and liquidity of funds

153.-(1) A mortgage-credit institution shall place funds corresponding to no less than 60% of the capital base requirement of the mortgage-credit institution, with the addition of funds in series with a duty of repayment that are not included in the capital base, in the assets listed below:

1) Deposits in central banks in Zone A.

2) Bonds and instruments of debt issued by or guaranteed by the governments or regional authorities in Zone A.

3) Mortgage-credit bonds and other bonds issued by a credit institution in a Member State of the European Union or a country with which the Union has entered into an agreement for the financial area which carries equivalent collateral.

4) Bonds, admitted to trading on a regulated market, issued by international organisations with a membership of no less than one Member State of the European Union.

(2) In exceptional circumstances, the Danish FSA may allow exemption from the limit mentioned in subsection (1), if the mortgage-credit institution is in the same group as another mortgage-credit institution.

(3) The Danish FSA may, in addition to the requirements in subsection (1), stipulate further specific liquidity requirements for a mortgage-credit institution or a group of mortgage-credit institutions with similar risk profiles taking into account special liquidity risks in the mortgage-credit institution or groups of mortgage-credit institutions and systemic liquidity risks.

154.-(1) Funds in series may not be paid in as Additional Tier 1 capital or subordinate loan capital in other series or in the mortgage-credit institution in general.

(2) Funds in the mortgage-credit institution in general may not be paid in series as Additional Tier 1 capital or subordinate loan capital unless Additional Tier 1 capital or subordinate loan capital for no less than a corresponding amount has been taken up in the mortgage-credit institution in general.

Source: Danish FSA

New legislation addressing refinancing risk

On 1 April 2014, a new law aimed at reducing refinancing risk for borrowers and mortgage banks came into force. Initially it covered loans where the refinancing period of the underlying bonds is up to 12 months (FlexLån® F1 loan). For loans where the refinancing period of the underlying bonds is more than 12 months, the law came into force from 1 January 2015. The law applies to non-callable bullets, short- and medium-term capped floaters and floaters.

The new law transfers the refinancing risk from the borrowers/mortgage banks to the investor. The law is centred on the two following main triggers.

Interest rate trigger

- **Interest-rate trigger.** If the yield at a refinancing auction increases by more than 500bp within a period of one year and the underlying bonds have a maturity of up to two years after refinancing, the maturity will be extended by one year. The yield of the extended bond will be the yield level on a corresponding bond traded 11-14 months earlier plus 500bp. A maturity extension triggered by a rise in the yield level of 500bp is limited to one year. For floating-rate bonds, the interest rate at the refinancing of a mortgage loan cannot be fixed at a rate more than 500bp above the most recently fixed interest rate. The interest rate must remain unchanged for 12 months or up to the next refinancing unless a lower interest rate is fixed within the said 12 months or before the next refinancing. The 'Interest-rate trigger' element only applies to loans where the refinancing period of the underlying bonds is 24 months or less.

- **Failed auction trigger.** If a mortgage bank is unable to sell its bonds at a refinancing auction, the maturity of the underlying bond will be extended by one year. If the mortgage bank is still unable to sell the bonds the following year, the maturity of the bond will be extended by one year every year until the mortgage bank is able to sell the bonds in the market or the loans mature. If a mortgage bank is unable to sell its bonds at a refinancing auction and the maturity is extended by one year, the yield of the maturity-extended bond will be the yield on:
  - A corresponding bond traded 11-14 months earlier plus 500bp if the maturity is less than or equal to 24 months.
  - A corresponding bond with a maturity of 11-14 months traded 11-14 months earlier plus 500bp if the maturity is more than 24 months.

  If the mortgage bank is still unable to sell the bonds in the market after the first maturity extension, the yield will remain unchanged. Applying the yield level on a corresponding bond with a maturity of 11-14 months traded 11-14 months earlier enables the mortgage bank to reuse the bond series up until the time to maturity of the bond falls below 24 months. This is an important feature, as it significantly improves the liquidity for bonds with maturity of more than 24 months.

Failed auction trigger

If a mortgage bank is under resolution and the maturity is extended under the failed auction trigger, the coupon is fixed at a variable reference rate (for example 12M Cita) plus up to 500bp, for one year at a time. However, if the Trustee is still able to issue bonds there will be no activation of the triggers.

The maturity on capped floaters and floaters can be extended due to the failed auction trigger or interest rate trigger (only for bonds with an original maturity of less than 24 months). If the maturity is extended due to the failed auction trigger, the coupon rate after the extension will be the coupon rate at the last fixing plus 500bp. This new rate is fixed for 12 months.

If the maturity is extended due to the interest rate trigger – where the interest rate increases by more than 500bp relative to the last fixing - the coupon after the extension will be the coupon rate at the last fixing plus 500bp. This new rate is fixed for 12 months, unless the yield falls to a lower level at a new fixing within the 12 months.

The transferring of the refinancing risk to the investors means investors have to price in both the risk of a pronounced rise in yields and the risk of a 'failed' auction.

Banks' issuance of covered bonds must have a maturity of more than 24 months

The interest rate trigger and failed auction trigger as described in the above only apply to covered bonds issued by a mortgage bank. To ensure that retail banks do not have a competitive advantage by being able to issue covered bonds without the interest rate trigger, retail banks' issuance of covered bonds must have a maturity of more than 24 months. Hence, as of 1 January 2015, retail banks e.g. Danske Bank can only issue covered bonds with a minimum maturity of 24 months.

In the event that a retail bank is unable to replace covered bonds at maturity with a new issue of covered bonds, it will be possible for the bank to repay the principal of the matured bonds from other sources of funding, e.g. deposits. Hence, the refinancing risk for banks is primarily relevant in a winding up situation where there is no access to other sources of funding. In this case, there will be a maturity extension of one year at a time.

FSA supervision

The risk profile of mortgage banks is closely monitored by the Danish FSA.

Property valuations are reported directly to the FSA for control purposes. If the value of a pledged property is set too high, the FSA will carry out a second valuation. If the second valuation confirms that the value is set too high, the FSA will instruct the mortgage bank to reduce the size of the loan to observe the maximum LTV ratio.

Property valuations are reported to the FSA

Reports to the FSA are prepared on a quarterly basis on the following:

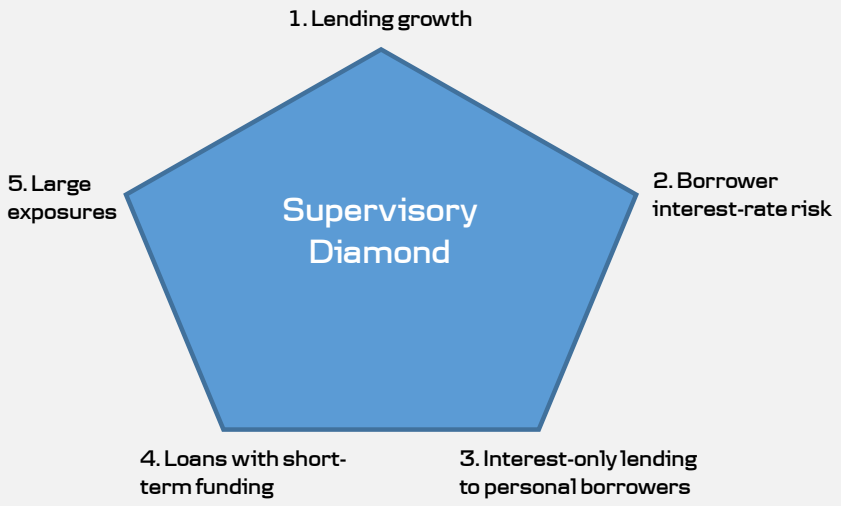
- Credit risk exposures
- Market risk exposures
- Solvency

Inspections of mortgage banks by the FSA are performed on a regular basis. During inspections, the FSA will monitor if risk-mitigating procedures are sufficient and adhered to.

The Danish FSA's 'Supervisory Diamond' for mortgage-credit institutions (MCIs) will be implemented in 2018/2020. The Diamond contains five indicators with corresponding limits on risk of the mortgage banks. The five indicators are as follows.

Supervisory Diamond to be implemented in 2018/2020

Chart 11. Supervisory Diamond for Danish mortgage-credit institutions



Source: Danish FSA and Danske Bank

- **Lending growth.** Growth in lending to individual customer segments should not exceed 15% per year. The four customer segments are private homeowners, rental property, agriculture and other corporates.
- **Borrower interest-rate risk.** Share of lending where loan-to-value (LTV) exceeds 75% of the lending limit for MCIs and where the interest rate is only fixed for up to two years should be less than 25%. Applies only to loans to private homeowners and rental property. Loans hedged by interest rate swaps and the like are excluded.
- **Interest-only lending to personal borrowers.** The share of interest-only loans in the LTV band above 75% of the lending limit should not exceed 10% of total lending. Interest-only loans are included regardless of position in order of priority.

- **Loans with short-term funding.** The share of lending to be refinanced should be less than 12.5% of the total loan portfolio per quarter and less than 25% of the loan portfolio annually.
- **Large exposures.** Sum of the 20 largest exposures should be less than the institution's CET 1 (core equity tier 1 capital).

The benchmarks for interest-only lending (point 3) and loans with short-term funding (point 4) will apply from 2020, while the other benchmarks will apply from 2018.

Our general assessment is that the Supervisory Diamond will prompt the mortgage-credit institutions to maintain their focus on reducing the proportion of interest-only loans and loans with annual refinancing and on spreading out the auctions.

Additional criteria for lending

Along with the Supervisory Diamond, the FSA launched two initiatives intended to counter the risk of price bubbles in the real estate market. These initiatives will be implemented via changes to existing executive orders:

- Requirement that private homebuyers should in general provide a 5% deposit.
- Rental properties should generally be able to generate positive liquidity before they can be mortgaged.

Further requirements apply to borrowers seeking a mortgage in so-called growth areas. The guidance defines growth areas as the largest cities and towns with more significantly appreciating prices on owner-occupied property and where prices of apartments and single-family homes are considerably higher than in the rest of the country. At present, this applies to Copenhagen and surrounding districts and Aarhus.

A key point in this guidance applies to mortgages on residential property in growth areas where the customer opts for an adjustable rate loan. In this instance the mortgage bank's assessment of whether disposable income is sufficient at the time of granting the loan should generally be based on a fixed interest rate that is 1 percentage point higher than the current fixed interest rate, though at least 4%, and with a repayment period of a maximum of 30 years.

Majority of Danish covered bonds qualify as Level 1B assets

The EU Commission's delegated act on the Capital Requirements Regulation (CRR) includes the rules for the Liquidity Coverage Ratio (LCR) – which has long been an important theme for Danish mortgage bonds.

Level 1B and Level 2A classes are relevant for Danish mortgage bonds and the main features are as follows.

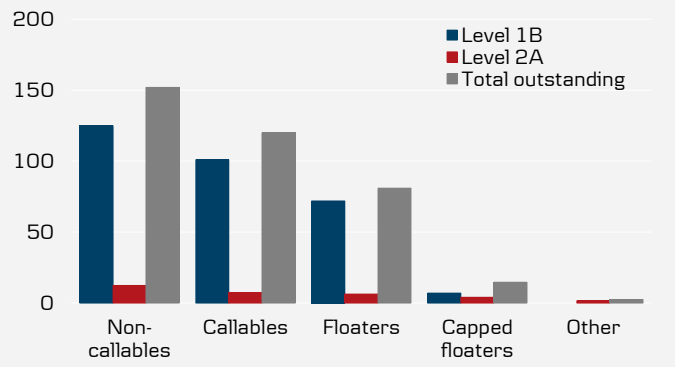
- **Level 1B.** Covered bonds (CRD- or UCITS-compliant mortgage bonds) with a minimum rating of AA- and an outstanding volume of at least EUR500m may account for up to 70% of the liquidity buffer after a haircut. The haircut is 7% (i.e. only 93% of the market value can be included in the liquidity buffer). There is an OC requirement of 2% in the capital centres from which the mortgage bonds are issued.
- **Level 2A.** Covered bonds (CRD- or UCITS-compliant mortgage bonds) with a minimum rating of A- and an outstanding volume of at least EUR250m may account for up to 40% of the liquidity buffer. The haircut is 15%. There is an OC requirement of 7% in the capital centres from which the mortgage bonds are issued. For covered bonds that do not meet the liquidity requirement of EUR500m but meet all other requirements for Level 1B the OC requirement is 2%.

Grandfathered ROs and new ROs are on a par with SDO/SDRO in the EU Commission's delegated act, as they are all UCITS-compliant. Junior Covered Bonds cannot be included in LCR.

All the mortgage-credit institutions have an AAA rating from S&P for their most used capital centres (see ratings table in Chapter 4), while mortgage bonds issued out of Realkredit Danmark's capital centres S and T have a rating from Fitch and mortgage bonds issued out of Nordea Kredit's capital centres 1 and 2 still have a rating from Moody's. If a capital centre is rated by two or more rating institutions, the second highest rating will be used. All rated Danish covered bonds meet the rating requirement of at least AA-.

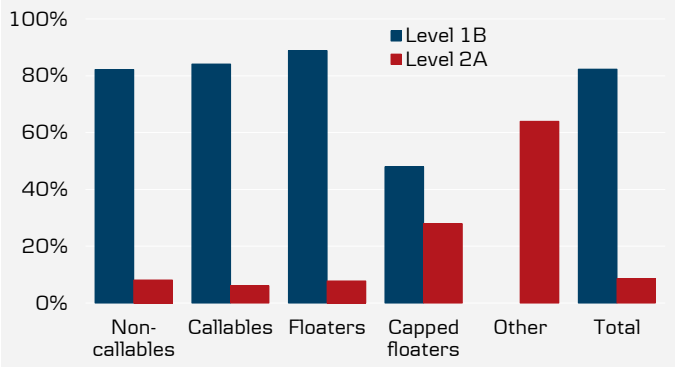
Based on the outstanding volumes for Danish mortgage bonds as of July 2017, we estimate that around 80% of the total outstanding volume of mortgage bonds has an outstanding volume of more than EUR500m, while around 10% has an outstanding volume of between EUR250m and EUR500m (see charts below). As can be seen from the charts, there is a relatively high share of Level 1B assets in the non-callable bullet segments.

Chart 12. Total outstanding volumes (EURbn) of LCR eligible Danish covered bonds



Source: Danske Bank

Chart 13. Share of Level 1B and 2A assets



Source: Danske Bank

Central bank eligibility

Danish covered bonds in EUR and DKK are repo eligible at Danmarks Nationalbank and some are repo eligible at Sveriges Riksbank, Norges Bank and the Swiss central bank.

EUR-denominated Danish covered bonds repo eligible in ECB

Realkredit Danmark, Nykredit, Nordea Kredit, BRF and DLR have issued EUR-denominated covered bonds – non-callables and floaters – through a Luxembourg-based central securities depositary (VP Luxembourg). The bonds are listed for quotation on the Nasdaq Nordic Exchange. The issuance of bonds via VP Luxembourg does not limit investor capability to use Værdipapircentralen A/S for custody services.

Bonds issued out of Luxembourg have LU isin codes and some are ECB eligible. Some EUR-denominated DK isin codes are also ECB eligible.

3. Mortgage banks

In this chapter, we focus exclusively on mortgage banks. The specialist bank principle confines the activity of mortgage banks to mortgage lending funded by the issuance of covered bonds (mortgage bonds). Activities not directly linked to mortgage lending and mortgage bond funding are prohibited.

In return, mortgage banks are awarded the privilege of issuing covered bonds. Entities that are not licensed as mortgage banks do not have access to covered bond funding.

Mortgage banking market

Persistent demand for housing finance in Denmark has made the Danish covered bond market the largest in the world.

Table 9. Volume of covered bonds outstanding in selected countries (EURm) - 2016

Public	Public sector	Mortgage	Ships	Others	Mixed assets	Total
Australia	-	70,796	-	-	-	70,796
Austria	17,155	30,894	-	-	-	48,049
Belgium	2,300	16,700	-	-	-	19,000
Canada	-	100,830	-	-	-	100,830
Cyprus	-	650	-	-	-	650
Czech Republic	-	13,060	-	-	-	13,060
Denmark	-	386,323	4,744	-	-	391,067
Finland	-	33,822	-	-	-	33,822
France	64,228	177,813	-	-	66,587	308,627
Germany	161,871	207,338	3,551	1,006	-	373,766
Greece	-	4,485	-	-	-	4,485
Hungary	-	2,189	-	-	-	2,189
Iceland	-	1,902	-	-	-	1,902
Ireland	6,757	17,062	-	-	-	23,819
Italy	7,575	138,977	-	-	-	146,552
Latvia	-	-	-	-	-	-
Luxembourg	7,864	-	-	-	-	7,864
The Netherlands	-	67,604	-	-	-	67,604
New Zealand	-	10,677	-	-	-	10,677
Norway	2,199	113,051	-	-	-	115,251
Panama	-	80	-	-	-	80
Poland	-	2,216	-	-	-	2,216
Portugal	500	32,970	-	-	-	33,470
Singapore	-	1,963	-	-	-	1,963
Slovakia	-	4,197	-	-	-	4,197
South Korea	-	2,490	-	-	-	2,490
Spain	26,887	232,456	-	-	-	259,344
Sweden	-	222,444	-	-	-	222,444
Switzerland	-	117,564	-	-	-	117,564
Turkey	-	500	-	-	-	500
United Kingdom	4,894	97,127	-	-	-	102,021
United States	-	2,000	-	-	-	2,000
Total	302,231	2,110,179	8,295	1,006	66,587	2,488,299

Source: ECBC European Covered Bond Fact Book 2017

Measured as a percentage of GDP, the Danish covered bond market is by far the largest covered bond market in Europe.

Table 10. Overview of residential mortgage markets 2016

	Total outstanding covered bonds, backed by mortgages (EURm)	Total outstanding covered bonds, backed by mortgages (% of GDP)	Total outstanding residential, loans to GDP ratio (%)	Total outstanding Residential mortgage Loans per capita (EUR)
Austria	30,894	8.8	27.6	13,427
Belgium	16,700	4	51.5	24,091
Bulgaria			7.8	620
Croatia			15.2	2,017
Cyprus	650	3.6	64	16,870
Czech Republic	13,060	7.5	20	4,036
Denmark	386,323	139.6	88	53,656
Estonia			31.8	6,231
Finland	33,822	15.8	43.9	21,307
France	211,106	9.5	44.8	19,214
Germany	207,338	6.6	42.3	19,272
Greece	4,485	2.5	34.9	6,893
Hungary	2,189	1.9	12.5	1,728
Ireland	17,062	6.4	32.4	24,548
Italy	138,977	8.3	22	7,268
Latvia		0	17.6	2,729
Lithuania			17	2,778
Luxembourg		0	52.2	61,324
Malta			42.5	11,713
Netherlands	67,604	9.7	95.3	48,989
Poland	2,216	0.5	21.7	2,957
Portugal	32,970	17.8	51.6	11,169
Romania			7.6	804
Slovakia	4,197	5.2	27.8	5,085
Slovenia			14.4	3,359
Spain	232,456	20.9	48.9	14,292
Sweden	222,444	48.1	83.6	49,388
UK	97,127*	4.1*	65.3	29,950
EURO area 19			43.1	16,714
EU 28			47.1	16,838
Australia	70,796	6.2	60.7	
Iceland	1,902	10.5	65.4	47,726
Japan			34.2	
Norway	113,051	33.7	81.9	68,284
Russia			5.7	
Turkey	500	0	5.4	1,280
USA		0	55.4	39,104

*Source: EMF Hypostat 2017. *: UK (regulated).*

Covered bonds in circulation by issuer

Danish covered bonds are issued by a total of seven mortgage banks, of which two specialise in commercial lending (DLR Kredit and LRF). The fairly low number of issuers adds to the liquidity of the bonds issued.

In addition, market concentration is high, with Nykredit/Totalkredit and Realkredit Danmark accounting for 68.5 % of all Danish krone covered bonds issued and 57.5% of all Danish euro covered bond issues.

Table 11. Volumes and market shares of Danish MCIs, end-June 2017

	DKK bonds		EUR bonds		Total volume	
MCI	Volume (EURbn)	Share (%)	Volume (EURbn)	Share (%)	Volume (EURbn)	Share (%)
Nykredit/Totalkredit	149.5	41.2%	15.4	49.6%	168.1	41.5%
Realkredit Danmark	99.1	27.3%	2.5	7.9%	104.0	25.7%
Nordea Kredit	52.9	14.6%	1.9	6.1%	54.8	13.5%
BRFkredit	38.7	10.7%	0.0	0.1%	41.3	10.2%
DLR Kredit	18.6	5.1%	1.8	5.8%	20.4	5.0%
Danske Bank	1.1	0.3%	9.5	30.6%	13.7	3.4%
LRF	2.5	0.7%	0.0	0.0%	2.5	0.6%
Total	**362.5**	**100.0%**	**31.1**	**100.0%**	**404.8**	**100.0%**

Source: Danske Bank

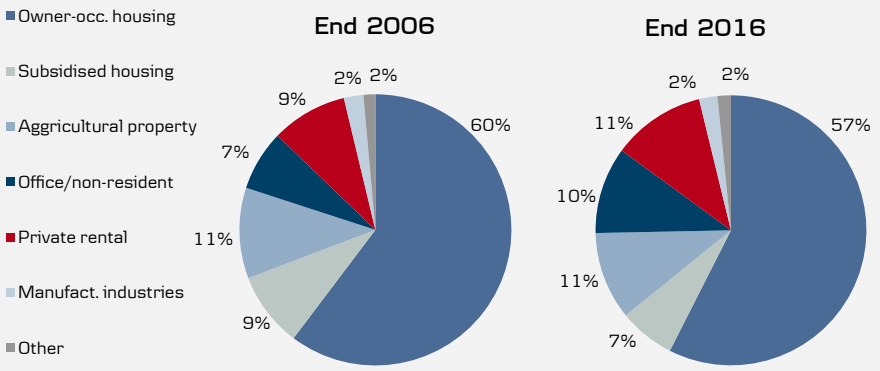
Portfolio segmentation

Residential property mortgages dominate collateral pools

Mortgages on a variety of categories of real estate are eligible as collateral for mortgage bonds. However, mortgages on residential property dominate most collateral pools.

Mortgages on residential property dominate the Danish mortgage market and there have been only minor changes in the borrower composition over the past decade. In 2016, loans secured by mortgages on residential property accounted for 57% of total net new lending.

Chart 14. Lending segments by property category as of end-2006 and end-2016



Source: Finance Denmark, Danske Bank

Realkredit Danmark

Company profile

Realkredit Danmark (RD) is a wholly owned subsidiary of Danske Bank, the largest financial institution in Denmark. Danske was founded in 1871. Today, Danske Bank is a global bank with activities in northern Europe and the Baltic region under various brands. Its main business areas are retail banking, corporate banking, asset management, life insurance and pensions and mortgage finance.

RD was established in 1851 under the name Østifternes Kreditforening. In 2001, RD merged with Danske Kredit A/S and BG Kredit A/S following the merger of Danske Bank A/S and RealDanmark A/S. RD is the continuing mortgage credit arm of the Danske Bank Group and the second-largest specialist mortgage bank in Denmark, with a market share of 28%.

RD's covered bonds issued out of Capital Centre S and T and the General Capital Centre are rated 'AAA' by Standard & Poor's. Capital Centre S is rated 'AAA' and Capital Centre T is rated 'AA+' by Fitch.

Financial performance

Realkredit Danmark reported an operating profit of DKK5.4bn in 2016, an increase from DKK5.1bn in 2015. Net interest income decreased from DKK7.1bn to DKK6.9bn. The cost/income ratio was at 12.5% – unchanged from 2015. Loan losses and provisions fell from DKK0.4bn to DKK0.2bn.

The core capital ratio decreased from 38.3% as of 31 December 2015 to 29.6% as of 31 December 2016 and the total capital ratio decreased from 38.8% to 30.1%. The arrears rate (90 days) for RD decreased marginally from 0.59% as at end-2015 to 0.58% as at end-2016. The number of repossessed properties decreased from 58 to 51.

Business model and funding profile

RD is a specialist mortgage bank subject to supervision by the Danish FSA. RD's objective is to carry out business as a mortgage bank, including any kind of business permitted by the Danish Mortgage Act. RD's principal market is Denmark, but Realkredit Danmark's geographical business area also includes mortgage lending to selected business customers in Sweden and Norway.

RD's core markets in Denmark are residential housing – defined as lending for the financing of owner-occupied housing and holiday homes – and the corporate market, which comprises loans to customers with property in urban trade, agriculture and residential rental property.

All mortgages included in the cover pool are distributed through the branch networks of Danske Bank, RD Large Real Estate and the wholly owned real estate agent 'Home' in Denmark. Realkredit Danmark also offers customers online and self-service solutions through the rd.dk and danskebank.dk websites and Home Direct serves customers over the telephone during extended opening hours.

Table 12. Ratings (M/S/F) – RD

Covered bond rating – CC S	WR/AAA/AAA
Covered bond rating – CC T	WR/AAA/AA+
Issuer rating	-/-/A

Source: Moody's, Standard & Poor's, Fitch, Danske Bank

Table 13. Financial information

DKKm	2016	2015
Net interest income	6,860	7,065
Fees and commissions	-611	-509
Net gains/losses	6,249	6,557
Pre-provision income	5,539	5,524
Loan impairment charges	182	432
Operating profit	5,357	5,092
Cost/income ratio	12.5%	12.5%
Core capital ratio	29.6%	38.3%
Total capital ratio	30.1%	38.8%
Arrears rate	0.58%	0.59%
Repossessed properties	51	58

Source: Realkredit Danmark, Danske Bank

Table 14. Further information

Bond ticker	RDKRE
Websites	www.danskebank.com www.rd.dk

Source: Danske Bank

A management agreement exists between RD and Danske Bank, stating the following.

- The branch that originated the mortgages is responsible for all handling of customers.
- Danske Bank covers all losses (with an LTV of 60-80%) on mortgages originated at Danske Bank branches.
- RD receives all payments directly from customers. In turn, RD pays provisions to Danske Bank.

As at the end of 2016, loss guarantees issued by Danske Bank amounted to DKK59bn.

All mortgages are transparent (pass-through), which means that consumers have a delivery option on the underlying bonds. Interest-reset loans are funded by a portfolio of fixed-rate non-callable bonds, while other types of mortgages are funded individually by issuing bonds with exactly the same characteristics as the mortgages.

Mortgages backing covered bonds issued by RD are divided into different cover registers (capital centres). According to the revised Mortgage Act, new SDROs must be issued out of separate capital centres. Therefore, since July 2007, SDROs have been issued out of Capital Centre S. Existing RO series in the General Capital Centre have been closed since the end of 2007 and are grandfathered according to the CRD. Since 2011, RD has issued all new interest-reset loans (ARMs) out of Capital Centre T and a large part of the interest-reset loans in Capital Centre S has been refinanced into the new Capital Centre T, starting from the refinancing auctions set for December 2011. Today, the majority of the total mortgage book is included in Capital Centre S and Capital Centre T.

Realkredit opened a RO bond (*Realkreditobligationer*) issued out of the 'General Capital Centre' in 2015. This bond does not comply with the CRD and hence does not get preferential treatment in terms of risk weighting.

Cover pool and asset quality

As at end-Q1 17, the cover pools for Capital Centre S and Capital Centre T totalled DKK241bn and DKK478bn, respectively. These are secured on private (67% and 55%, respectively), rental residential (21% and 16%, respectively) and commercial mortgages (9% and 21%, respectively). Of the assets in Capital Centre S, 93% carry a fixed interest rate, while the assets in Capital Centre T consist only of ARM and floating-rate loans. Interest-only loans in Capital Centre S and Capital Centre T amount to 25% and 58%, respectively. Geographically, the pools are well diversified across Denmark, with 41% and 39%, respectively, of the loan portfolios located in the Metropolitan area. As of the end of Q1 17, the average LTV ratio for Capital Centre S and Capital Centre T was 61 and 62%, respectively.

Table 15. Cover pool info – Capital Centre S

Capital Centre S	DKK241bn
Junior covered bonds	DKK2bn
WA Indexed LTV	61% LTV
Over-collateralisation	6.8%
Interest-only mortgages	25%
Fixed-rate loans	93%
Geography	Primarily Denmark
- Metropolitan area	41%
- Other Zealand	17%
- Western region	24%
- Southern region	18%
- Other area	0%
Asset type	
- Private	67%
- Rental residential	21%
- Commercial	9%
- Agriculture	3%

Source: Risk report Q1 17 from Realkredit Danmark

Table 16. Cover pool info – Capital Centre T

Capital Centre T	DKK478bn
Junior covered bonds	DKK9bn
WA Indexed LTV	62% LTV
Over-collateralisation	8.5%
IO-mortgages	58%
Fixed-rate loans	0%
Geography	Primarily Denmark
- Metropolitan area	39%
- Other Zealand	16%
- Western region	23%
- Southern region	18%
- Other area	4%
Asset type	
- Private	55%
- Rental residential	16%
- Commercial	21%
- Agriculture	8%

Source: Risk report Q1 17 from Realkredit Danmark

Danske Bank

Company profile

Danske Bank A/S (Danske Bank) is part of the Danske Bank Group, which also includes the wholly-owned subsidiaries Realkredit Danmark (one of the largest Danish mortgage credit institutions) and Danica Pension (a leading Danish life insurance company).

Danske Bank is the largest bank in Denmark, where it operates 100 branches and holds market shares in deposits and lending of 29% and 27%, respectively (Q2 17 figures). However, the group also has a significant international presence, operating in 15 countries. In addition to Denmark, Danske Bank is one of the largest banks in Northern Ireland (lending market share as of Q2 17 19%) and Finland (10%) and has challenger positions in Sweden (5%), Norway (6%), Estonia (7%), Lithuania (4%) and Latvia (2%).

Danske Bank provides a wide range of banking products and services to retail, corporate and institutional clients. It has four main operating units: Personal Banking, Business Banking, Corporates & Institutions and Wealth Management. The group also reports its business activities in Northern Ireland as a separate unit, as well as a non-core division (consisting mainly of the portfolio of non-core Irish exposures, which are being wound up) and other activities (group treasury, group support functions and eliminations).

As of Q2 17, Danske Bank reported total lending of DKK1,728bn before loan impairment charges. Of this amount, Personal Banking and Business Banking exposures in Denmark accounted for 51%, followed by Personal Banking and Business Banking exposures in Sweden (12%) and C&I (12%). Total credit exposures amounted to DKK2,668bn, of which personal customers accounted for 34%, followed by public institutions (17%), commercial property (11%) and non-profit/associations (6%).

Danske Bank's issuer ratings from Moody's, S&P and Fitch are 'A1' (positive), 'A' (stable) and 'A' (stable), respectively. Most recently, Moody's upgraded the bank's issuer rating by one notch, while retaining the positive outlook. The upgrade is due to an upgrade in the bank's standalone baseline credit assessment and reflects the continuing strengthening of Danske Bank's assets quality, capitalisation and profitability. Danske Bank's covered bonds issued out of cover pools D, I and C are rated AAA by S&P and Fitch.

Table 17. Ratings (Moody's/S&P/Fitch)

Covered bond rating	-/AAA/AAA (D/I/C)
Issuer rating	A1(p) / A / A
S&P unused notches	3 / 3 / 0

Source: Moody's, Standard & Poor's, Fitch, Danske Bank

Table 18. Financial information (group)

DKKm	2016	2015
Net interest income	22,028	21,402
Fees & commissions	14,183	15,018
Net trading income	8,607	6,848
Loan impair. charges	-3	4,601
Profit before tax	25,357	17,762
Cost/income ratio	47.2%	61.0%
CET 1 capital ratio	16.3%	16.1%
Total capital ratio	21.8%	21.0%

Source: Danske Bank Annual Report 2016

Table 19. More information

Bond ticker	DANBNK
Website	www.danskebank.com/ir

Source: Danske Bank

Financial performance

In 2016, Danske Bank Group posted pre-tax profits from core activities of DKK25.3bn, an increase of 43% from the level in 2015. Total income amounted to DKK48.0bn, up 5% from the level in 2015, driven mainly by higher net trading income and other income. Net interest income totalled DKK22.0bn and was 3% higher than in 2015. Lending growth and lower funding costs offset the competitive pressure on margins. Operating expenses amounted to DKK22.6bn and were reduced 3% from the level in 2015. At the end of 2016, the total capital ratio was 21.8% (2015 21.0%) and the CET 1 capital ratio was 16.3% (2015 16.1%). Danske Bank has set two capital targets: a total capital ratio of around 19% and a CET1 capital ratio target range of 14-15%. Danske Bank has met these targets since the end of 2012.

Business model and funding profile

Danske Bank is a universal bank subject to supervision by the Danish FSA. The group has a well-diversified funding platform including a solid deposit base. Much of the lending consists of Danish mortgages, financed by Realkredit Danmark (RD) pass-through covered bonds. However, the group also issues covered bonds under the Danske Bank name in SDO format under the Danish Covered Bond Act. In addition, Danske Bank issues covered bonds through its Finnish subsidiary Danske Bank Plc and, with the establishment of Danske Hypotek, the group will also be issuing covered bonds under Swedish legislation in the future (see *Nordic Covered Bond Handbook: The handbook of the Nordic covered bond markets and issuers*, 1 September 2017).

Within its EUR30bn SDO covered bond programme, Danske Bank has three active cover pools, which it uses to issue covered bonds directly on its balance sheet. Cover Pool D ('domestic') comprises 100% Danish residential mortgages, while Cover Pool I ('international') and C ('combined') include Norwegian and Swedish mortgages originated by Danske Bank. Cover Pool I is purely residential but is undergoing a structural change, as Swedish mortgages are being migrated into the cover pool of Danske Hypotek, and the cover pool will thus over time comprise purely Norwegian assets. Cover Pool C contains a mix of residential and commercial mortgages, originating from both Sweden and Norway. According to the issuer, eligible Swedish assets may migrate into the Danske Hypotek cover pool after 2020.

Danske Bank issues covered bonds in EUR benchmark format out of Cover Pool I and Cover Pool C. The issuer expects to continue doing so on a regular basis, although Cover Pool I will be partly dedicated to NOK funding.

Cover pool and asset quality

As of 31 March 2016, Cover Pool D totalled DKK33.8bn and consisted exclusively of Prioritet Plus mortgage loans, which offer the borrower the flexibility to draw down partially or repay amounts held in a dedicated savings account. In a bank's default scenario, the borrower cannot set off the deposit account against its loan account, thus protecting bondholders against set-off risk. The underlying assets are residential properties in Denmark (92% primary homes, 8% secondary homes). All the mortgages in Cover Pool D are floating rate. The average indexed LTV ratio in Cover Pool D is 55.0%. The pool has overcollateralisation of 14.0%.

Cover Pool I amounted to DKK116.7bn and comprised 63% Norwegian and 37% Swedish mortgages. The underlying properties are mostly owner occupied (78%), as well as some co-operative housing (17%) and a small proportion of holiday homes (4%). The majority of mortgages are floating rate (83%) and 48% are non-amortising. Overcollateralisation was 12.2%.

Cover Pool C stood at DKK61.4bn and comprised Swedish and Norwegian floating-rate mortgage assets – consisting mainly of offices (41%), rental housing (26%) and properties used for manufacturing industries (15%). The 6,259 loans in the cover Pool C, which corresponds to an average loan size of DKK9.8m, reflects the more business-oriented nature of the pool.

Loans in arrears (over 90 days) are not allowed in any of the cover pools. Furthermore, Danske Bank commits to a voluntary minimum overcollateralisation of 2% (agreed with the Danish FSA). Approval of mortgages by Danske Bank is based on a strict credit policy, identical to that of Realkredit Danmark.

Table 20. Funding sources (Q1 17, excl. RD pass-through covered bonds)

Deposits	54%
Covered bonds	13%
Senior unsecured	9%
Interbank deposits	9%
CD & CP	7%
Repos (net)	-2%
Subordinated debt	2%
Equity	9%

Source: Danske Bank Debt Investor Update Q1 17

Table 21. Cover pool info (D, I, C)

Cover Pool D	**DKK33.8bn**
- Mortgage loans	100%
Average loan size	561,000
Overcollateralisation (committed)	14.0% (2%)
WA indexed LTV	55.0%
Arrears (>90 days)	None
Floating rate	100%
Interest-only loans	86%
Geography	100% Denmark
- Greater Copenhagen	36%
- South Denmark	24%
- Eastern Jutland	20%
- Remaining Zealand	13%
- North Jutland	6%
Asset type	100% residential
- Primary home	92%
- Secondary home	8%

Cover Pool I	**DKK116.7bn**
- Res. mtg. loans	100%
Avg. loan size	1,034,000
Overcollateralisation (committed)	12.2% (2%)
WA indexed LTV	53.0%
Arrears (>90 days)	None
Floating rate	83%
Interest-only mortgages	48%
Geography	
- Norway	63%
- Sweden	37%
Asset type	
- Owner-occupied	78%
- Co-operative housing	17%
- Holiday homes	4%

Cover Pool C	**DKK61.4bn**
- Res. mtg. loans (R)	30%
- Com. mtg. loans (C)	70%
Avg. loan size (R/C)	DKK12m/DKK9m
Overcollateralisation (committed)	27.2% (2%)
WA indexed LTV (R/C)	54%/53%
Arrears (>90 days)	None
Floating rate (R/C)	100%/100%
Interest-rate only (R/C)	40%/25%
Geography	
- Sweden (R/C)	84%/64%
- Norway (R/C)	16%/36%
Property type	
- Offices and businesses	41%
- Private rental	26%
- Manufacturing industries	15%
- Agriculture	8%
- Social and cultural purp.	4%
- Co-operative housing	4%
- Other	4%

Source: Danske Bank ECBC template, Mar 2016

Nykredit/Totalkredit

Company profile

Nykredit Realkredit (NYK) is a wholly-owned subsidiary of Nykredit Holding. Nykredit Holding is an unlisted holding company owned by Foreningen Nykredit (90%), Industriens Fond (5%), Øststifternes f.m.b.a. (3%) and PRAS (2%). As a mortgage association, Nykredit Realkredit originated in 1851. Today, besides mortgage finance, it is active in retail and corporate banking, asset management, insurance and real estate. Mortgage finance is the most important business area. Forenet Kredit and Nykredit's Board of Directors have decided to prepare for a stock listing of Nykredit A/S (formerly Nykredit Holding A/S) in order to ensure greater capital flexibility.

In 2003, Nykredit Realkredit acquired Totalkredit (TOT), which is currently a wholly-owned subsidiary of Nykredit Realkredit. Following the acquisition of Totalkredit, Nykredit Realkredit became the largest specialist mortgage bank in Denmark, with a current market share based on outstanding mortgages of 41.1% at Q1 17. There are nearly 60 partner banks in the Totalkredit corporation network, making it crucial for the distribution of Nykredit Realkredit mortgages. Nykredit Realkredit and both local and regional banks are competitors in agricultural mortgage and non-mortgage markets. In 2008, Nykredit Realkredit acquired Forstædernes Bank, which increased Nykredit Realkredit's market share within banking to 5.2%. Forstædernes Bank subsequently merged with Nykredit Bank and the market share as of Q1 17 was 6.7%.

Nykredit's covered bonds issued out of Capital Centre E and H are rated 'AAA' by S&P. Nykredit has an 'A' long-term rating from S&P and Fitch.

Table 22. Ratings (M/S/F)

Covered bond rating – CC E:	WR/AAA/-
Covered bond rating – CC H	WR/AAA/-
Issuer rating:	Baa1u/A/A

Source: Moody's, Standard & Poor's, Fitch, Danske Bank

Table 23. Financial information

DKKm	2016	2015
Net interest income	11,470	11,877
Fees and commissions	-296	-199
Net gain/losses	11,281	11,783
Loan impairment charges	680	920
Operating profit	6,708	4,685
Cost/income ratio	43%	42%
Core capital ratio	18.8%	19.4%
Total capital ratio	23.0%	23.9%
Arrears rate	0.37%	0.38%
Repossessed properties	114	159

Source: Nykredit, Danske Bank.

Table 24. More info

Bond ticker	NYKRE
Website	www.nykredit.com

Source: Nykredit, Danske Bank.

Financial performance

Nykredit Group reported operating profit of DKK6.7bn in 2016 – an increase from the 2015 level of DK4.7bn. Net interest income decreased from DKK11.9bn to DKK11.5bn and loan losses and provisions decreased from DKK0.9bn to DKK0.7bn.

The core capital ratio decreased from 19.4% as of end-2015 to 18.8% as of end-16 and the total capital ratio decreased from 23.9% to 23.0% over the same period. The arrears rate (75 days) as of December 2016 was 0.37% – a slight fall from the 2015 level. The number of repossessed properties decreased from 159 to 114 from 2015 to 2016.

Business model and funding profile

Nykredit Realkredit is a specialist mortgage bank subject to supervision by the Danish FSA. Banking, asset management and insurance activities are carried out by wholly owned separate subsidiaries. As mentioned above, Totalkredit is also a wholly owned subsidiary of Nykredit Realkredit. Retail and commercial customers are offered mortgages through Nykredit's distribution channels, which include 43 full-service customer centres, Nykredit.dk, mobile app downloads, a central customer services centre and the real estate agencies of the Nybolig and Estate chains.

In 1994, local and regional banks in Denmark established Totalkredit as a joint mortgage bank. Since the acquisition of Totalkredit in 2003, Nykredit Realkredit has developed a partnership with over around 60 Danish local and regional banks (including Nykredit Bank) with substantial distribution networks. These local and regional banks sell mortgage products under the Totalkredit brand. They also deliver the large majority of growth in mortgage lending.

Denmark is the largest market for Nykredit Realkredit and Totalkredit. In addition, Nykredit Realkredit provides loans secured by residential property in France and Spain and loans secured on commercial property in Germany and Sweden. Totalkredit offers only mortgages secured on residential property, while Nykredit Realkredit's core markets in Denmark are in residential housing and commercial properties, which comprise loans to customers for urban trade, agriculture and residential rental properties.

A management agreement exists between Nykredit Realkredit/Totalkredit and the local and regional banks. The agreement states the following.

- The branch that originated the mortgage is responsible for all handling of customers.
- The bank that originated the mortgages covers all losses (LTV between 60% and 80%) on mortgages originated by said bank.
- Totalkredit receives all payments directly from customers. In turn, it pays provisions to the banks.

From 2006, Nykredit Realkredit and Totalkredit have been jointly funded, and until 2008 all mortgages originated by Nykredit Realkredit or Totalkredit were funded by covered bonds issued out of Nykredit Realkredit Capital Centre D. According to the revised Mortgage Act, new SDOs must be issued out of separate capital centres. Therefore, since 1 January 2008, Nykredit Realkredit/Totalkredit has issued SDOs out of a Capital Centre E, with existing series in Capital Centre D closed at the end of 2007. The series in Capital Centre D was grandfathered according to the CRD. Nykredit announced in June 2011 that existing interest-reset and floating-rate loans – issued out of Capital Centre E – would be refinanced into the new Capital Centre H starting from the refinancing auction in September 2011. Hence, since then joint funding has been carried out from Capital Centre E for fixed-rate loans and from Capital Centre H for interest-reset and floating-rate loans.

Nykredit introduced two-tier mortgaging for commercial borrowers (in 2009) and residential borrowers (in Q2 12), with all new loans funded using SDO covered bonds up to an LTV of 45% for commercial real estate and 60% for residential real estate, while the top 15% and 20%, respectively, were funded using RO bonds issued out of capital centres G and I. Furthermore, the top loan had to be amortising. Since mid-2014, Nykredit once again offers one-tier mortgaging for residential loans with an LTV up to 80%.

Cover pool and asset quality

As at the end of Q1 17, Nykredit Realkredit's capital centres E and H totalled DKK369bn and DKK585bn, respectively, of which 99% and 92%, respectively, was Danish-based mortgages. These are secured on residential (75% and 59%, respectively), agricultural (3% and 8%, respectively) and commercial properties (4% and 14%, respectively). The cover pools have a weighted-average LTV of 63% and 61%, respectively. Of all mortgages in Capital Centre E, 91% carry a fixed rate, while Capital Centre H consists of 100% ARMs.

Table 25. Cover pool info – Capital Centre E

Capital Centre E	DKK369bn
Junior covered bonds	DKK0bn
WA LTV	63%
Fixed-rate loans	91%
Interest-only loans	35%
Geography	
- Copenhagen area	24%
- Remaining Zealand	12%
- Northern & Eastern Jutland	40%
- Southern Jutland & Funen	22%
- International	1%
Asset type	
- Owner-occupied	75%
- Private rental	3%
- Non-profit housing	7%
- Commercial	4%
- Agriculture	3%
- Other	8%

Source: Risk report Q1 17 from Nykredit, Danske Bank.

Table 26. Cover pool info – Capital Centre H

Capital Centre H	DKK585bn
Junior covered bonds	DKK11bn
WA LTV	61%
Fixed-rate loans	0%
Interest-only mortgages	68%
Geography	
- Copenhagen area	25%
- Remaining Zealand	12%
- Northern & Eastern Jutland	36%
- Southern Jutland & Funen	19%
- International	8%
Asset type	
- Owner-occupied	59%
- Private rental	9%
- Non-profit housing	4%
- Commercial	14%
- Agriculture	8%
- Other	7%

Source: Risk report Q1 17 from Nykredit, Danske Bank

Nordea Kredit

Company profile

Nordea Kredit Realkreditaktieselskab (NDA) is a wholly-owned subsidiary of Nordea Bank Danmark, which is part of the Nordea Group. In 1997, Sweden's Nordbanken merged with Finnish Merita Bank to form MeritaNordbanken. In 2000, Denmark's Unibank merged with MeritaNordbanken, which, at the same time, changed its name to Nordea. Later in 2000, Norway-based Christiania Bank joined the newly formed Scandinavian banking group. Today Nordea is the largest bank in Scandinavia, with activities in Scandinavia, the Baltic region and Russia.

Nordea's main business areas include retail banking, corporate banking, asset management, life insurance, pensions and mortgage finance.

NDA began its mortgage activities in September 1993. Initially, it provided lending only for residential properties and holiday homes but it now offers mortgage loans for most types of property. NDA's share of the domestic mortgage market as at Q1 17 was 14.6% (mortgage loans at nominal value as a share of all Danish mortgage bank loans).

Nordea's long-term issuer ratings from Moody's, S&P and Fitch are 'A1', 'AA-' (negative outlook) and 'AA-', respectively. Covered bonds issued by NDA have 'Aaa' and 'AAA' ratings from Moody's and S&P, respectively.

Financial performance

Nordea Kredit reported operating profit of DKK2.2bn for 2016, an increase from the 2015 level of DKK1.9bn. Net interest income increased from DKK2.8bn to DKK3.0bn and loan losses and provisions increased from DKK223m to DKK414m. The core capital ratio and the total capital ratio increased from 29.7% as of 31 December 2015 to 31.8% and 35.3%, respectively, as of 31. December 2016.

The arrears rate (3.5 months) for residential properties and holiday homes for Nordea Kredit was 0.17% as at end-2016, unchanged from end-2015. The number of repossessed properties fell from 35 to 25.

Business model and funding profile

NDA is a specialist mortgage bank subject to supervision by the Danish FSA. Its objective is to carry on business as a mortgage bank, including any kind of business permitted pursuant to the Danish Mortgage Act. NDA has mortgage credit activities only in Denmark, while all mortgages in the cover pool are secured on properties situated in Denmark. All mortgages included in the cover pool are distributed through Nordea's branch network and that of the real estate chain DanBolig.

A management agreement exists between NDA and Nordea Bank Danmark. It states the following: Nordea Bank Danmark A/S provides a guarantee for the upper 25% of mortgage loans originated by the bank. For loans granted for non-profit housing, youth housing and housing for the elderly, there is only a 10% guarantee. For loans for all-year dwellings, co-operative housing, private rental housing, non-profit rental housing and properties for social, cultural and educational purposes, the guarantee covers that part of the mortgage loan that exceeds 60% of the valuation made in conjunction with the loan origination process. For loans granted to agricultural properties, the guarantee covers that part of the mortgage loan that exceeds 55% of the valuation made in conjunction with the loan origination process.

Table 27. Ratings (M/S/F)

Covered bond rating	Aaa/AAA/-
Issuer rating	Aa3/AA-/AA-

Source: Moody's, *Standard & Poor's, Fitch, Danske Bank.*

Table 28. Financial info

DKKm	2016	2015
Net interest income	2,992	2,791
Fees and commissions	-414	-223
Net gain/losses	2,578	2,568
Pre-provision income	2,290	2,027
Loan impairment charges	138	114
Operating profit	2,152	1,913
Cost/income ratio	11.3%	10.6%
Core capital ratio*	31.8%	29.7%
Total capital ratio*	35.3%	29.7%
Arrears rate**	0.17%	0.17%
Repossessed properties	25	35

** Excluding Basel I floor*
*** Residential properties and holiday homes*
Source: Nordea Kredit, Danske Bank

Table 29. More info

Bond ticker	NDASS
Website	www.nordea.com

Source: Nordea, Danske Bank

For loans granted to recreational dwellings, industrial and craftsmen's properties, office and retail properties and collective energy supply plants, the guarantee covers that part of the loan that exceeds 45% of the valuation made in conjunction with the loan origination process.

The guarantee periods begins when the loan is disbursed or remortgaged. The former guarantee period of 10 years or five years for loans granted to owner-occupied, all-year and recreational dwellings changed to the lifetime of the loan on 9 December 2013.

As at the end of 2016, guarantees from Nordea Bank Danmark A/S covered loans worth DKK364bn, of which guarantees amounted to DKK104bn.

The management agreement between NDA and Nordea Bank Denmark also includes the following.

- The branch that originated the mortgage is responsible for all customer handling.
- NDA receives all payments from customers directly. In turn, NDA pays provisions to Nordea Bank Denmark.

The mortgages backing the covered bonds issued by NDA are divided into different cover pools (capital centres). According to the revised Mortgage Act, new SDROs must be issued out of separate capital centres. Therefore, at the end of 2007, NDA closed the RO Capital Centre 1 and subsequently grandfathered the existing series according to the CRD and new SDROs have been issued out of Capital Centre 2. Capital Centre 2 holds 96% of the total mortgage book.

Cover pool and asset quality

As at Q1 17 Capital Centre 2 totalled DKK394bn and consisted entirely of Danish-based mortgages. These are secured mainly on residential (65%) mortgages, followed by agricultural (12%) and commercial (10%) mortgages. Of all mortgages, 40% carry a fixed rate and 48% are interest-reset loans. The average indexed LTV ratio in NDA's Capital Centre 2 is 62%.

Table 30. Cover pool info – Capital Centre 2

Capital Centre 2	DKK394bn
WA LTV	62%
Over-collateralisation	9.8%
Fixed-rate loans	40%
Interest-only loans	48%
Geography	Denmark
- Copenhagen area	39%
- Zealand	18%
- Southern Jutland & Funen	16%
- Northern & Eastern Jutland	27%
Asset type	
- Owner-occupied	65%
- Rental	4%
- Commercial	10%
- Agriculture	12%
- Other	10%

Source: Risk report Q1 17 from Nordea Kredit, Danske Bank

BRFkredit

Company profile

BRFkredit (BRF) was established in 1959 as an independent business foundation authorised to grant third-lien mortgages. Originally, it was intended that BRFkredit grant mortgage loans for specific purposes. Until 30 April 2014, BRFkredit was an independent specialist mortgage bank providing customers with financial solutions and other services connected with real estate and was wholly owned by BRFfonden, an independent business foundation, through the holding company BRFholding. On 30 April 2014, a merger between BRFkredit and Jyske Bank A/S came into effect and today BRFkredit is owned by Jyske Bank A/S through the holding company BRFholding A/S. BRFkredit continues as a subsidiary subject to Danish mortgage finance legislation. Today, Jyske Bank plus BRFkredit is the fourth largest financial institution in Denmark and BRFkredit has an 11% share of the total Danish mortgage market.

BRFkredit issues SDO covered bonds in the form of traditional pass-through callable bonds and bullet bonds. In addition, BRFkredit adheres to the general balance principle.

In October 2011, S&P assigned BRFkredit long-term issuer ratings of 'A-' and 'AAA' for covered bonds issued out of capital centres B and E, respectively. BRFkredit's covered bonds issued out of the General Capital Centre received an 'AAA' rating from S&P in December 2013.

Table 31. Ratings (M/S/F)

Covered bond rating	WR/AAA/-
Issuer rating	WR/A-/-

Source: Moody's, Standard & Poor's, Danske Bank.

Table 32. Financial information – BRF

DKKm	2016	2015
Net interest income	1,913	1,979
Fees and commissions	215	265
Net gain/losses	-72	-354
Pre-provision income	1,263	1,012
Loan impair. charges	-32	103
Operating profit	1,295	909
Core capital ratio	19.0%	18.9%
Total capital ratio	19.0%	19.1%
Arrears rate	0.4%	0.3%
Repossessed properties	33	41

Source: BRFkredit, Danske Bank

Table 33. More info

Bond ticker	BRF
Website	www.brf.dk

Source: BRFkredit, Danske Bank

Financial performance

BRFkredit Group reported an operating profit of DKK1.3bn in 2016, an increase from the 2015 level of DKK909m. Net interest income decreased marginally from DKK1.98bn to DKK1.91bn. Loan losses and provisions decreased from DKK103m to DKK-32m. The core capital ratio increased from 18.9% as of 31 December 2015 to 19.0% as of 31 December 2016.

The arrears rate (90 days) was 0.4% as at end-September 2016, up from 0.3% in 2015. The number of repossessed properties decreased from 41 to 33.

Business model and funding profile

BRFkredit is a specialist mortgage bank subject to supervision by the Danish FSA. It offers mortgages through Jyske Bank A/S and several partnerships. For example, BRFkredit has entered into agreements with a range of independent real estate agencies and financial institutions. In 2012, BRFkredit entered into a range of referral agreements with enterprises that meet the customers before a financing requirement arises, for instance estate agents and companies operating in energy renovation and large consumer durables. BRFkredit also distributes mortgages through its website (*www.brf.dk*), mobile apps (*Bedste Lån* and *Bedste Bolig*, launched in 2016) and directly from its headquarters.

BRFkredit offers mortgages secured on properties in Denmark, specialising in those used for residential properties and office and shop premises. Loans for residential properties, including owner-occupied homes, co-operative homes, rental homes and publicly subsidised housing projects, comprise most of the total mortgage book. BRFkredit's main lending segments are owner-occupied dwellings and vacation homes (53%), private rentals (17%) and subsidised housing (17%). BRFkredit offers interest-reset loans (53%), fixed-rate callable loans (35%), floaters 12% and a small share of other types of loans (5%).

Mortgage-backed covered bonds issued by BRFkredit are divided into different cover registers (capital centres). Bonds issued prior to 31 December 2007 were issued out of

capital centre B and are grandfathered to the CRD. New ROs (*Realkreditobligationer*) are also issued from Capital Centre B but they do not comply with the CRD and hence do not get preferential treatment in terms of risk weighting. According to the revised Mortgage Act, any new SDOs must be issued out of separate capital centres and new SDOs are issued out of Capital Centre E.

BRFkredit first entered into a joint funding agreement with Jyske Bank in February 2012. Since then, more banks (among other Ringkjøbing Landbobank) joined. The Danish FSA approved the joint funding model in 2012 and it enables financial institutions to fund private residential mortgage loans through BRFkredit for a fee. The mortgages are funded through BRFkredit's SDO covered bond programme and must comply with the requirements of Danish mortgage finance legislation. Furthermore, the underwriting standards must comply with BRFkredit's policies. Following the merger in April 2014, the joint funding agreements with Jyske Bank and Ringkjøbing Landbobank have continued.

Since 2016, BRFkredit has financed part of the mortgage loans under the joint funding agreements with bonds denominated in EUR. The currency and interest-rate risks between the loans denominated in DKK and the bonds in EUR are fully hedged through swaps. As of August 2017, BRF has issued four EUR-denominated SDO bonds. See table below.

Table 34. EUR-denominated SDO bonds

ISIN	Name	Outstanding amount	Issue date
XS1385173734	BRF 0.25 01APR2021	500,000,000	23-Mar-2016
XS1435774903	BRF 0.25 01JUL2023	750,000,000	22-Jun-2016
XS1514010310	BRF 0.50 01OCT2026	750,000,000	03-Nov-2016
XS1669866300	BRF 0.375 01JUL2024	500,000,000	30-Aug-2017

Source: BRFkredit, Danske Bank

Cover pool and asset quality

At end-Q1 17, BRFkredit's capital centre E stood at DKK262bn, made up of 99% Danish-based loans. The average LTV ratio is 62%. Loans are well diversified; however, the majority of the properties (47%) are located in the Copenhagen area. Of the cover pool, 56% is residential property and 12% is commercial. Fixed-rate assets constitute 33% of the pool.

Table 35. Cover pool info – Capital Centre E

Capital Centre E	DKK262bn
WA LTV	62%
Over-collateralisation	6.6%
Fixed-rate loans	33%
Interest-only loans	47%
Geography	Denmark
- Copenhagen area	47%
- Zealand & Bornholm	12%
- Northern Jutland	7%
- Eastern Jutland	20%
- Southern Jutland & Funen	14%
Asset type	
- Residential	56%
- Subsidised	15%
- Private rental housing	16%
- Commercial	12%
- Other	1%

Source: Investor Report Q1 17 from BRF, Danske Bank

DLR Kredit

Company profile

Dansk Landbrugs Realkreditfond (DLR) is a Danish mortgage lender, specialised in agricultural and commercial mortgages. DLR was founded in 1960 on the initiative of the banks and savings banks associations (now the Danish Bankers Association). DLR's formation was driven by farmers' requirements for long-term capital in the 1950s, which were covered only partially by first- and second-lien mortgage banks. Lack of funding resulting from the hesitant lending policies of first- and second-lien mortgage banks led in part to the establishment of DLR, which was allowed to operate with a loan-to-value ratio of 70% of DLR's valuation of the mortgaged property.

Between its establishment in 1960 and 1 July 2000, DLR operated on its own individual legal basis pursuant to the DLR Act. DLR's exclusive right to grant loans based on an LTV ratio of 45-70% was abandoned from 1 January 1999. It became subject to the Mortgage Credit Act as of 1 July 2000 and in 2001 it became a company limited by shares.

Shares in DLR are held by 60 local and regional banks and savings banks. DLR does not disclose a detailed owner structure, but as of end-April 2017 member banks of Lokale pengeinstituter (The Association of Local Banks in Denmark, Savings Banks and Cooperative Banks in Denmark) owned 39.9% and member banks of Landsdækkende Banker (National Banks) together with Jyske Bank owned 37.2%, while Nykredit Realkredit owned 12.1%, PRAS 6.8% and DLR 3.7%.

DLR's market share was 5.3% as at the end of 2016. For DLR's main lending areas (agriculture, office and business properties, private rental housing properties and private co-operative housing properties), the market share was 15.6%. As well as providing mortgage loans, DLR has managed the loan portfolio of LR Realkredit (majority owned by Nordea Bank Danmark, Danske Bank, Jyske Bank, SEB and Arbejdernes Landsbank) since 1994. DLR takes no credit risk on this portfolio.

DLR has a 'BBB+' issuer rating from Standard & Poor's and an 'AAA' covered bond rating (Capital Centre B and General Capital Centre).

Table 36. Ratings (M/S/F)

Covered bond rating:	WR/AAA/-
Issuer rating:	WR/BBB+/-

Source: Moody's, Standard & Poor's, Danske Bank.

Table 37. Financial info

DKKm	2016	2015
Net interest income	1,701	1,724
Fees and commissions	-234	-217
Net gain/losses	-88	-330
Pre-provision income	1,149	969
Loan impair. charges	110	94
Operating profit	1.039	875
Core capital ratio	12.7%	11.5%
Total capital ratio	14.3%	12.9%
Arrears rate	1.11%	1.24%
Repossessed properties	27	26

Source: DLR Kredit, Danske Bank

Table 38. More info

Bond ticker	DLRKRE
Website	www.dlr.dk

Source: DLR and Danske Bank

Financial performance

DLR Kredit A/S reported 2016 operating profit of DKK1.0bn – an increase from DKK875m in 2015. Net interest income decreased marginally from DKK1.724bn to DKK1.701bn. Loan losses and provisions increased from DKK94m to DKK110m. The core capital ratio increased from 11.5% to 12.7%.

The arrears rate (3.5 months) as of mid-January 2017 was 1.11%, down from 1.24% as at mid-January 2016. The number of repossessed properties increased marginally from 26 as of end-2015 to 27 as of end-2016.

Business model and funding profile

DLR is a specialist mortgage bank subject to supervision by the Danish FSA. It provides mortgages through the branch networks of its shareholder banks. In order to support the customer advisory services of the banks in connection with mortgage loans, DLR has developed an electronic communications system – DLRxperten. DLR has no branches itself.

DLR offers only mortgages secured on properties in Denmark. It focuses on mortgages on agricultural and commercial properties as well as co-operative homes, rental homes and publicly subsidised housing projects. The bank offers interest-reset loans (47%), fixed-rate

callable loans (18%) and floating-rate loans (35%). All mortgages are based on the pass-through principle, meaning that consumers have a delivery option on underlying bonds. Interest-reset loans are funded by issuing a portfolio of fixed-rate, non-callable bonds, while other types of mortgages are funded individually by issuing bonds with exactly the same characteristics as the mortgages.

DLR has a management agreement with all shareholder banks, which requires loan-providing banks to put up an individual loan loss guarantee covering the most risky part of each mortgage. The agreement includes all commercial properties.

As a result, DLR's risk of losses arising from the granting of loans for the property types mentioned is very limited. Loans for agricultural properties are also protected by a collective guarantee scheme set up between DLR and the loan-providing banks, which comes into force in the event that the losses suffered by DLR within a given financial year exceed a given level. The guarantee scheme means that DLR's risk of losses arising from the granting of loans for agricultural properties is relatively limited. As at the end of 2016, the guarantee scheme covered around 94% of DLR's total loan portfolio. Around 30% was covered by a universal guarantee scheme, which came into effect on 1 January 2015. Loans distributed before the implementation of the universal guarantee scheme are covered largely by either the 'Cooperative agreement' (agricultural lending) or individual loss guarantees (urban trade property lending).

Mortgage-backed covered bonds issued by DLR are divided into different cover registers (capital centres). According to the revised Mortgage Act, any new SDOs must be issued out of separate capital centres. By the end of 2007, DLR had closed and subsequently grandfathered the existing series in General Capital Centre, according to the CRD, with new SDOs issued out of Capital Centre B.

Cover pool and asset quality

As of Q1 17, DLR's Capital Centre B totalled DKK137bn and consisted mainly of Danish-based assets, distributed as 61% in agricultural assets and 19% in commercial assets. All assets are geographically well diversified with a slight tendency to be concentrated in Jutland.

Approval of mortgages by DLR is based on a strict credit policy. Only mortgages on properties stated in the Mortgage Act are allowed in the cover pool. The LTV ratio on each mortgage is monitored on an ongoing basis, while the borrower's ability to pay is reviewed each month.

Table 39. Cover pool info – CC B

DLR Kredit	DKK137bn
WA LTV	56%
Over-collateralisation	17.6%
Fixed-rate loans	19%
Interest-only loans	45%
Geography	99% Denmark
- Copenhagen area	6%
- Zealand	14%
- South Denmark	28%
- Jutland	51%
- International	1%
Asset type	
- Owner-occupied	5%
- Agricultural	61%
- Commercial	19%
- Rental housing	12%
- Co-operative housing	2%

Source: Cover pool report Q1 17 from DLR, Danske Bank

4. Ratings

The Danish covered bond legislative framework is recognised as among the strongest in the world. In particular, the almost non-existent market risk, eliminated by the balance principle, is a major advantage for traditional Danish covered bonds.

Ratings include capital centres and classification

Danish mortgage banks have a number of different capital centres and the covered bond ratings from S&P, Fitch and Moody's are by capital centre and classification (RO/SDO/SDRO/JCB). For example, Realkredit Danmark's SDRO covered bonds issued out of Capital Centre S are rated 'AAA' by S&P and Fitch, while the SDRO bonds in Capital Centre T are rated 'AAA' by S&P and 'AA+' by Fitch. Realkredit Danmark's Section 15 senior debt (junior covered bonds), issued out of capital centres S and T, is rated 'AA-' by S&P.

Ratings by Standard & Poor's (S&P)

All the major Danish mortgage banks, such as Realkredit Danmark, Nykredit, Nordea Kredit, BRFkredit and DLR Kredit, have 'AAA' ratings with 'Stable outlook' on the most traded capital centres. According to S&P's rating methodology, Danish covered bonds have a systemic importance and a jurisdictional support assessment of 'Very Strong'.

Danish mortgage institutions are exempt from the Bank Recovery and Resolution Directive (BRRD) due to their non-deposit taking nature but are still required to maintain a debt buffer equivalent to 2% of their unweighted loans. For more information on the debt buffer, see Chapter 2. S&P removed all uplift from government support in its ratings of Danish banks in July 2015, following the implementation of BRRD in Denmark. This meant it removed two notches of uplift for Nykredit, placing the issuer rating on 'Negative outlook'. Instead of lowering the rating from 'A+' to 'A-', S&P kept the rating on 'A' due to a one-notch uplift from ALAC based on the assumption that Nykredit would defend this uplift by issuing around EUR2-3bn of new ALAC-compliant debt. S&P put the rating on negative outlook, as Nykredit was required to have this in place in 2017 at the latest. Nykredit successfully issued a total of EUR1bn of senior resolution notes in 2016 (EUR500m in May 2016 and EUR500m in July 2016) and EUR800m of Tier-2 debt in November 2015. As a result, S&P changed the outlook for the Nykredit issuer rating to 'Stable outlook' on 8 July 2016. Nykredit has issued additional EUR0.8bn of senior resolution notes in 2017 (EUR500m in March 2017 and EUR300m in June 2017).

DLR Kredit has also issued senior resolution notes in 2017 pursuant to the debt buffer requirement. In June 2017, DLR Kredit issued EUR1bn in a DKK-denominated bond and projects a senior resolution notes issuance need of DKK3-4bn in the coming two to three years. In May 2019, S&P upgraded the issuer rating on DLR Kredit by one notch to 'A-'.

Table 40. Ratings by Standard & Poor's

Capital centre	Classification	Rating (ICR/ covered bond)	Outlook	WAFF	WALS	Target CE	Actual CE	Unused notches of uplift
Realkredit Danmark		A	Stable outlook					
Capital centre S	SDRO	AAA	Stable outlook	17.23%	31.27%	6.18%	6.80%	3 notches
Capital centre S	JCB	AA-	Stable outlook					
General capital centre	Grand RO	AAA	Stable outlook	17.17%	30.05%	9.32%	10.60%	3 notches
Capital centre T	SDRO	AAA	Stable outlook	18.47%	34.08%	4.89%	8.47%	3 notches
Capital centre T	JCB	AA-	Stable outlook					
Danske Bank		A	Stable outlook					
Register C	SDO	AAA	Stable outlook	26.50%	51.37%	29.88%	27.07%	2 notches
Register D	SDO	AAA	Stable outlook	11.08%	29.20%	10.66%	14.03%	3 notches
Register I	SDO	AAA	Stable outlook	15.92%	28.71%	22.46%	12.05%	0 notches
Nykredit Realkredit		A	Stable outlook					
Capital centre C	Grand RO	AAA	Stable outlook	15.86%	9.12%	6.12%	6.75%	3 notches
Capital centre D	Grand RO/ New RO	AAA	Stable outlook	24.83%	37.66%	9.38%	10.37%	3 notches
Capital centre D	JCB	AA-	Stable outlook					
Capital centre E	SDO	AAA	Stable outlook	14.48%	28.99%	3.88%	3.35%	2 notches
Capital centre G	New RO	AAA	Stable outlook	27.35%	92.10%	26.88%	22.48%	0 notches
Capital centre H	SDO	AAA	Stable outlook	18.36%	31.93%	4.50%	4.34%	2 notches
Capital centre H	JCB	AA-	Stable outlook					
Capital centre I	New RO	AAA	Stable outlook	21.18%	86.58%	21.17%	30.45%	3 notches
General capital centre	Grand RO	AAA	Stable outlook	18.26%	24.65%	11.28%		3 notches
Totalkredit CC C	Grand RO	AAA	Stable outlook	11.56%	9.90%	2.95%	31.84%	3 notches
Nordea Kredit		AA-	Stable outlook					
Capital centre 1	Grand RO	AAA	Stable outlook	18.57%	30.23%	13.78%	58.95%	4 notches
Capital centre 2	SDRO	AAA	Stable outlook	18.21%	36.18%	6.52%	15.14%	4 notches
BRFkredit		A-	Stable outlook					
Capital centre B	Grand RO	AAA	Stable outlook	25.21%	43.79%	16.48%	17.55%	2 notches
Capital centre E	SDO	AAA	Stable outlook	19.31%	34.28%	4.86%	5.61%	2 notches
General capital centre	Grand RO	AAA	Stable outlook	17.23%	44.03%	8.54%	10.00%	2 notches
DLR Kredit A/S		A-	Stable outlook					
Capital centre B	SDO	AAA	Stable outlook	29.11%	54.66%	16.57%	18.30%	2 notches
Capital centre B	JCB	A+	Stable outlook					
General capital centre	Grand RO	AAA	Stable Outlook	32.96%	39.12%	13.02%	13.00%	1 notch

Grand. RO: Grandfathered RO bonds issued before 2008; New RO: RO bonds issued after 2007
Source: Standard & Poor's, Danske Bank

WAFF: weighted-average foreclosure frequency

S&P defines the WAFF as the weighted-average foreclosure frequency. The foreclosure frequency is a loan's probability of default leading to foreclosure. The estimated foreclosure frequency is a function of borrower and loan characteristics as well as the economic stress scenario commensurate with a certain rating level.

WALS: weighted-average loss severity

WALS is the weighted-average loss severity. The loss severity quantifies the loss realised as a result of foreclosure. The expected loss is predicated on assumptions about the potential decline in the market value of collateral that may secure the asset, as well as the expenses incurred in foreclosing on and reselling the property, considering an economic stress scenario, commensurate typically with a certain rating level. The WALS is generally higher in Denmark than the average for the rest of Europe, which is because of a high share of commercial lending. However, the WAFF is comfortably lower than the European average.

CE: credit enhancement

Target credit enhancement (target CE) is the amount of over-collateralisation (OC) that is commensurate with the maximum collateral-based uplift.

Ratings by Fitch

Currently, the only Danish covered bonds rated by Fitch are those issued by Danske Bank and Realkredit Danmark. Danske Bank's covered bonds issued out of register C, D and I are rated 'AAA'. Realkredit Danmark's covered bonds in capital centres S and T are rated 'AAA' and 'AA+', respectively.

Nykredit Realkredit A/S received a long-term issuer default rating of 'A' in August 2012 but covered bonds issued by Nykredit are currently not rated by Fitch. Nordea Bank has a long-term issuer default rating of 'AA-'.

Table 41. Ratings by Fitch

Capital centre	Rating (IDR/CB)	Outlook	D- Cap	Asset segregation	Liquidity gap and systemic risk	Alternative management Cover pool	Alternative management Systemic	Privileged derivatives	Cushion against IDR downgrade
Danske Bank	A	Stable							
Register D	AAA	Stable	3 (Mod. high)	Low	Mod. high*	Moderate	Low	Moderate	2
Register I	AAA	Stable	3 (Mod. high)	Low	Mod. high*	Mod. high*	Low	Mod. high*	2
Register C	AAA	Stable	3 (Mod. high)	Low	Mod. high*	Mod. high*	Low	Mod. high*	2
Realkredit Danmark	A	Stable							
Capital Centre S	AAA	Stable	4 (Moderate)	Very low	Moderate*	Moderate*	Low	Very low	1
Capital Centre T	AA+	Stable	2 (High)	Very low	High*	Moderate	Low	Very low	0
Nykredit Realkredit	A	Stable							
Nordea Bank	AA-	Stable							

IDR = issuer default rating, CB = covered bond, D-Cap = discontinuity cap
Source: Fitch, Danske Bank

IDR uplift

In March 2014, Fitch updated its covered bond rating criteria, with the most significant change being a possible 'up-notching' of covered bond ratings, an issuer default rating (IDR) uplift. The uplift is applied based on 'motivation for measures other than liquidation', 'importance of covered bonds in the jurisdiction' and 'level of senior unsecured debt'. In Fitch's own words, the criteria were amended *"to reflect the beneficial position enjoyed by covered bonds under bank resolution frameworks, most notably, the Bank Recovery and Resolution Directive (BRRD), which is being implemented for EU countries"*.

However, Fitch specifically mentions Danish covered bonds issued out of specialised mortgage banks that are not allowed to take deposits as being outside the IDR uplift scope. Danish mortgage banks are exempt from bail-in but would be subject to a 2% debt buffer requirement of unweighted loans.

Fitch's covered bond rating process

The Danish covered bond rating process can be broken down into the following three steps.

1. Determine the *discontinuity cap* (D-Cap), which is the maximum achievable rating on a *probability of default* (PD) basis.
2. Stress test the over-collateralisation to determine the covered bond rating on a PD basis.
3. Determine the (potential) recovery uplift.

Discontinuity cap (D-Cap)

The D-Cap, which is represented by a number between 0 and 8, gives the maximum potential uplift to the long-term IDR on a PD basis (hence, a *higher* D-Cap is preferable). See table 42.

The D-Cap is driven by the highest risk derived from five published components: (1) asset segregation, (2) liquidity gap and systemic risk, (3) systemic alternative management, (4) cover pool specific alternatives and (5) privileged derivatives. These five components are defined as follows.

1. *Asset segregation*: the degree to which cover assets are considered adequately ring-fenced.
2. *Liquidity gap and systemic risk*: the liquidity risk is the risk arising from incoming cash flows from cover assets not matching payments due on outstanding bonds. This includes both interest payments and redemptions.
3. *Alternative management (cover pool specific)*: the ease with which assets can be transferred to the alternative manager in a data/IT context.
4. *Alternative management (systemic)*: in the event of an issuer default, the management of cover assets and timely payments to bondholders transfers to a third party. Fitch assesses the legal/contractual set-up regarding this managing facility.
5. *Privileged derivatives*: 'privileged derivatives' are those derivatives with the special purpose of hedging the cover assets following an issuer default. In Fitch's view, programmes hedged by privileged derivatives are more vulnerable to an issuer default, as replacement provisions may lack clarity.

Danske Bank's registers D, I and C have a D-Cap of 3. Realkredit Danmark's Capital Centre S has a D-Cap of 4, while Realkredit Danmark's Capital Centre T has a D-Cap of 2. The lower D-Cap for Capital Centre T is due to the liquidity risk posed by the refinancing of the interest reset loans and floating rate loans.

Table 42. Maximum achievable covered bond ratings for various

	D-Cap		
IDR	2	3	4
AA-	AAA	AAA	AAA
A+	AAA	AAA	AAA
A	AA+	AAA	AAA
A-	AA	AA+	AAA
BBB+	AA-	AA	AA+
BBB	A+	AA-	AA
BBB-	A	A+	AA-

** Assuming 2 notches recovery uplift*
Source: Fitch, Danske Bank

Stress test over-collateralisation

The second step in the rating process is somewhat more complicated than the first. Explained in short, the cover pool is stress tested in decreasingly harder scenarios, starting at the maximum achievable rating (the D-Cap). From this starting point, the covered bond rating on a PD basis is then defined as the highest level of stress under which the cover pool (including over-collateralisation) fully meets timely payments of the outstanding covered bonds in a wind-down scenario.

The four major sources of risk in issuer insolvency situations are: (1) cover asset credit risk, (2) maturity mismatches, (3) interest rate risk and (4) currency risk. Fitch mentions the maturity mismatch arising from bullet bonds secured by amortising loans as a key driver of the need for over-collateralisation, while exposures to interest rate and currency risks are often hedged either via derivatives or 'natural hedges' where the rate and/or currency composition of the bonds mirror those of the cover pool.

Recovery uplift

The third and final step in Fitch's covered bond rating methodology involves the recovery characteristics of the cover assets. Cover assets may exhibit a high degree of recovery even in the event of an issuer default. Fitch acknowledges this special feature of covered bonds by allowing for up to two additional notches of uplift to the PD-based covered bond rating if this is within the 'investment grade' category (≥ 'BBB-') and up to three additional notches for non-investment grade PD-based covered bond ratings. Fitch gives a two-notch uplift to the PD-based rating for the Danske Bank and Realkredit Danmark (Capital Centre T) covered bonds. Realkredit Danmark's Capital Centre S has a recovery uplift of 1.

Ratings by Moody's

Moody's was the first ratings agency to rate a Danish mortgage bank more than a decade ago. However, over the past couple of years a large number of Danish mortgage banks have ended their collaboration with Moody's following a general reassessment of the Danish banking system, which led to a range of ratings actions. In addition to taking action on current ratings and rating outlooks, Moody's raised its current over-collateralisation requirements for the various mortgage banks. The many increases in over-collateralisation requirements, which could lead to current ratings being downgraded, caused investor jitters, and following the Timely Payment Indicator (TPI) revision in 2011, some Danish mortgage banks decided to end the collaboration with Moody's.

The majority of Danish mortgage banks (Realkredit Danmark (RD), Nykredit/ Totalkredit, BRFkredit and DLRkredit) and Danske Bank have terminated their collaborations with Moody's and Moody's has withdrawn its covered bond ratings. However, Danske Bank still has an issuer rating from Moody's and Moody's has maintained the issuer rating on Nykredit. This is an unsolicited rating determined by Moody's without access to Nykredit's management or organisation in general.

Covered bonds issued by Nordea Kredit are currently the only Danish covered bonds rated by Moody's. See the table below.

Table 43. Ratings by Moody's Investor Service

Capital centre	Classification	Rating (Issuer/covered bond)	Outlook	TPI	TPI leeway	Collateral score	Current OC	OC level necessary to maintain current rating
Danske Bank		A1	Positive outlook					
Nykredit		Baa1u						
Nordea Kredit		Aa3	Stable outlook					
Capital Centre 1	Grand. RO	Aaa	Stable outlook	Very High	7	11.4%	8.1%	0.0%
Capital Centre 2	SDRO	Aaa	Stable outlook	High	6	12.8%	11.1%	0.0%

Grand RO = grandfathered RO bonds issued before 2008
Source: Moody's, Danske Bank

TPI leeway and collateral score

TPI leeway determines how far an issuer's rating can be downgraded without affecting the covered bond rating. The collateral score is Moody's opinion of how much credit enhancement is needed to protect against the credit deterioration of assets in a cover pool in order to reach a theoretical 'Aaa' based on expected loss, assuming those assets are otherwise unsupported. The higher the credit quality of the cover pool, the lower the collateral score.

Moody's (like S&P and Fitch) has also amended its rating criteria following the agreement on the draft EU directive in spring 2014 on bank resolution, so that it now takes into account that covered bonds are exempt from bail-in, while senior unsecured debt is not; thus putting covered bonds at a relative advantage to senior unsecured bonds, which Moody's deems should also be reflected in its ratings. The most significant change in the rating methodology is how the anchor for the covered bond rating process is now determined. Moody's refers to the covered bond anchor as "*the probability of a covered bond anchor event occurring. A covered bond anchor event occurs when the issuer, or another entity in the issuer group that supports the issuer, ceases to service the debt obligations under the covered bonds*".

5. Bond types

Danish covered bonds are secured by mortgages on residential, commercial and public property. Persistent demand in Denmark for mortgage finance has rendered the Danish covered bond market among the largest in the world. As of January 2017, the volume of Danish covered bonds (denominated in DKK and EUR) issued by specialist mortgage banks stood at DKK2,779bn (EUR373bn).

Bonds are issued against mortgages on residential, commercial and public property

Table 44. Volume of Danish bonds (DKKbn)

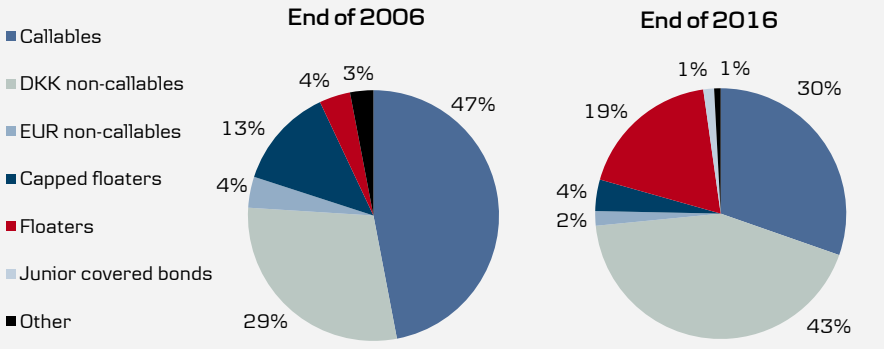
	Jan. 2014	Jan. 2015	Jan. 2016	Jan. 2017
Government bonds	645.8	678.9	629.9	617.9
T-bills	35.5	32.3	33.0	33.7
Mortgage bonds	2,661.3	2,738.7	2,730.0	2,778.8
Other	201.6	165.9	161.4	152.5
Total	**3,544.2**	**3,615.9**	**3,554.2**	**3,582.9**

Source: Danmarks Nationalbank, Danske Bank.

The covered bond market in Denmark has experienced a rapid and profound transition over the past decade. Traditionally, callable annuity bonds predominated, mirroring the dominance of callable fixed rate mortgage loans in the Danish property market. Non-callable bullet bonds were introduced to fund interest-reset loans, which were launched in 1996. Since then, a sustained demand for interest-reset loans has shifted the Danish covered bond market to such an extent that non-callable bullet bonds as at the end of 2016 made up almost 45% of total market volume (see Chart 1 below).

Innovation in recent years

Chart 15. Bond type distribution in the Danish covered bond market



Source: Danske Bank.

The mortgage banks introduced a line of products in 2004 that were funded by issuing capped floaters or floating-to-fixed covered bonds. In 2005, FRNs without a cap were introduced, targeting corporate clients, and in 2007 FRNs with a ratchet coupon (RenteDyk) were launched.

Today, floating-to-fixed bonds and RenteDyk are no longer issued by the mortgage banks and the outstanding amount on the existing series is limited. Also, the issuance of capped floater bonds has decreased in recent years. The issuance of floating rate covered bonds (FRNs without a cap) has increased in recent years – from 4% as of end-2006 to 19% as of end-2016.

Table 45. Bond structures

	Callable annuity bonds	Non-callable bullet bonds	Floaters/capped floaters
Interest payments	Quarterly	Annual	Quarterly
Repayment	Annuity or interest only	Bullet	Annuity or interest only
Coupon	Fixed	Fixed	Floating, capped
Currency denomination	DKK	DKK or EUR	DKK, EUR, SEK or NOK
Maturities	10-30 years	1-11 years	1-30 years
Issuance	Tap	Tap or auction	Tap or auction
Opening period	3 years	Maturity	Maturity

Source: Danske Bank.

Callable annuity bonds

Largest part of mortgage banking market

Callable annuity bonds are unique to the Danish covered bond market. Traditionally, callable annuity bonds were the only type of bonds issued in the Danish covered bond market but the introduction of new products has expanded market diversity.

Payment dates and maturities

Originally, this type of bond had two payment dates per year but four has been the norm since 1985. Standard payment dates are 1 January, 1 April, 1 July and 1 October. Maturities are primarily 10, 15, 20 or 30 years.

Call option

Callable annuity bonds are fixed rate bonds with an embedded call option. The embedded call option enables borrowers to prepay their loan at par at each payment date during the duration of the loan.

Payment profile

Traditionally, all callable loans were issued as annuity loans (level-pay loans). Annuity loans amortise with equal payments consisting of principal and interest but the amount of principal repaid increases over time, while the amount of interest decreases. In 2003, deregulation enabled mortgage banks to offer borrowers interest-only payments for up to 10 years. Callable annuity loans with an interest-only option are funded in separate callable bond series (interest-only hybrids).

Ordinary repayments

Borrowers' interest payments and redemptions made on the payment dates are distributed to investors in accordance with the percentage of bonds drawn so that any investor's holding in a given bond series corresponds to the overall percentage of bonds drawn in that series. The amount is rounded to the nearest øre (DKK0.01) for bonds denominated in Danish kroner and euro cents for bonds denominated in euro. The amounts of bonds drawn are published on the publication date.

Pools

There is no direct link between the borrower and the investor in the sense that the investor does not buy a bond in the name of a specific person or property. The pool of borrowers in a bond series may consist of both private and corporate borrowers. The repayments at one payment date are the sum of the redemptions from all borrowers in the pool. Every month the mortgage banks publish the borrower distribution of each bond series to enable investors to predict prepayment behaviour.

Opening period

Callable bond series are open for issuance for a period of three years[1], e.g. between 1 September 2014 and 31 August 2017 all 30-year loans were financed through the issuance of bonds maturing in 2047 and all 20-year loans by bonds maturing in 2037. When the bond series with maturity 2037 and 2047 closed for issuance as of 31 August 2017, new callable fixed rate loans are issued in new bond series with maturity 2040 and 2050. On account of this opening period and the possibility of taking a loan with a shorter maturity than the bond's maturity, the actual cash flow on a bond is not equivalent to the theoretical cash flow of a callable bond. Hence, the calculation of key figures on bonds requires information about the actual cash flow. After each payment date, the mortgage banks supply these figures to the OMX Nordic Exchange.

[1] The opening period can in certain circumstances be shorter or longer than three years, e.g. in connection with implementation of the new Mortgage Act in July 2007, the 2038 bond series was closed early and the opening period for the 2041 series was extended to almost four years.

Par rule

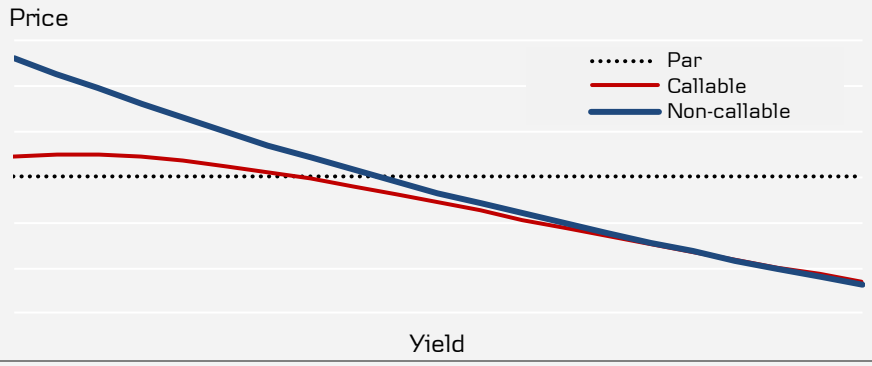
Mortgage banks have agreed not to offer callable loans based on bonds priced above par, referred to as the par rule, to avoid arbitrage from borrowers simultaneously disbursing a loan at a price above par and prepaying the loan at par. The opening period of a bond series may therefore be shortened if bond prices exceed par but the bond series will be reopened for issuance if the price falls below par again.

Pricing callable bonds

The traditional convex relationship between the level of interest rates and the prices of traditional bonds is not directly applicable to callable bonds. The reason is that a callable bond can be considered as a portfolio of a non-callable bond and a sold option to repay the bond at par. As interest rates decline and the price of the bond rises above par, the value of the option will rise (see the chart below).

Compared with a non-callable bond, the price is kept down when interest rates decline, as debtors are likely to start repaying the bond at par. When a bond becomes extremely exposed to remortgaging, the price will fall when interest rates fall. Conversely, these bonds may offer a defensive investment alternative for investors who expect increasing interest rates.

Chart 16. The price of a callable and non-callable bond



Source: Danske Bank.

Non-callable bullet bonds

Interest-reset loans and non-callable bullet bonds

Non-callable bullet bonds are fixed rate bonds with a single annual payment on 1 January, 1 April, 1 July or 1 October. Nykredit is currently the only Danish mortgage bank to issue non-callable bullet bonds with an annual payment on 1 July. Maturities range from one to 11 years, with emphasis on the one- to five-year segment. The characteristics of the bonds mirror those of plain-vanilla Danish government bonds and most European covered bonds.

Non-callable bullet bonds were introduced to fund interest-reset loans (FlexLån) first launched by Realkredit Danmark in 1996. Since then, sustained demand for interest-reset loans has been recorded, leading to a profound transition of the Danish covered bond market from callable issues to non-callable issues. As at end-2016, non-callable bullet bonds made up around 45% of total market volume in the Danish covered bond market.

The popularity of interest-reset loans is *inter alia* attributable to the great flexibility they offer to borrowers. The borrower may choose between more than 20 different interest-reset profiles, though all of these are funded by issuing a single range of bonds.

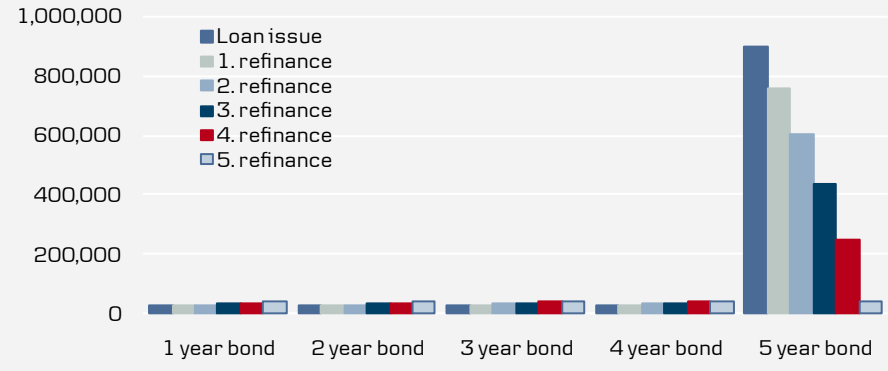
Payment dates and maturities

Interest-reset loans are offered as 10-, 15-, 20- or 30-year loans. The borrower can choose to repay rehis loan four or 12 times a year. The one- to 11-year non-callable bullet bonds that fund the loans have one interest payment a year, on 1 January, 1 April, 1 July or 1 October. Each year, when the shortest bond matures, a new 11-year bond is opened.

Annuity loans based on bullet bonds

As is the case for callable bonds in Denmark, the majority of loans that are interest-reset are repaid in accordance with the ordinary annuity or annuity with an interest-only option. As the bonds funding the loans are bullet bonds, the bonds and loans are balanced once a year by issuing an amount of bonds required to offset the remaining principal of the annuity profile of the individual loan. The chart below illustrates a 30-year annuity loan based on a five-year interest-reset profile.

Chart 17. Funding profile of 30Y annuity loan based on a 5Y interest-reset profile



Source: Danske Bank.

Increasing issues in interest-reset loans funded by longer maturities

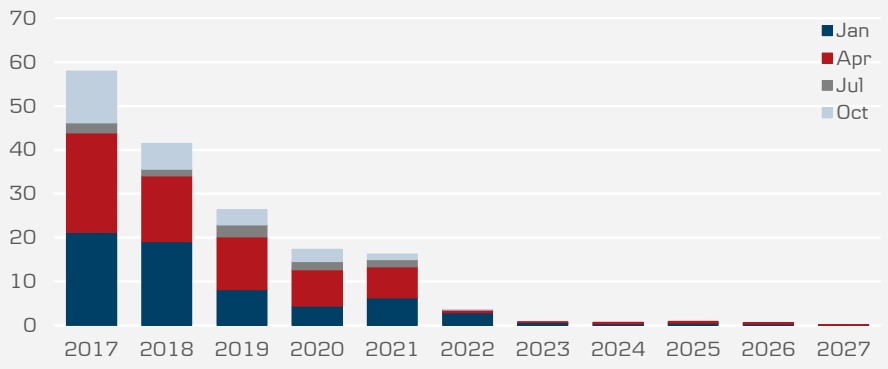
Since the launch of FlexLån in 1996, the most popular profile of the loans has been the loan funded by the one-year bond. As a result, this bond is by far the most liquid non-callable bond today. Lately, an increase in demand for loans funded by bullet bonds with longer maturities has been recorded, increasing the volume of bonds with three- and five-year maturities substantially.

Interest-reset with payment dates 1 January, 1 April, 1 July and 1 October

The payment date of the interest-reset loan has traditionally been 1 January, with a refinancing auction in December. However, in recent years, the outstanding amount for interest-reset loans has increased quite significantly and hence the auctioned amount at the December auction. In order to limit the increasing auction size of the December auction, since 2005 Nykredit has offered borrowers interest-reset loans with payment dates of 1 April and 1 October and since February 2013, Nykredit has been offering interest-reset loans with a payment date of 1 July. In 2010, Realkredit Danmark, BRFkredit, Nordea Kredit, DLR and LRF started issuing non-callable bullet interest-reset covered bond series with payment dates of 1 April or 1 October.

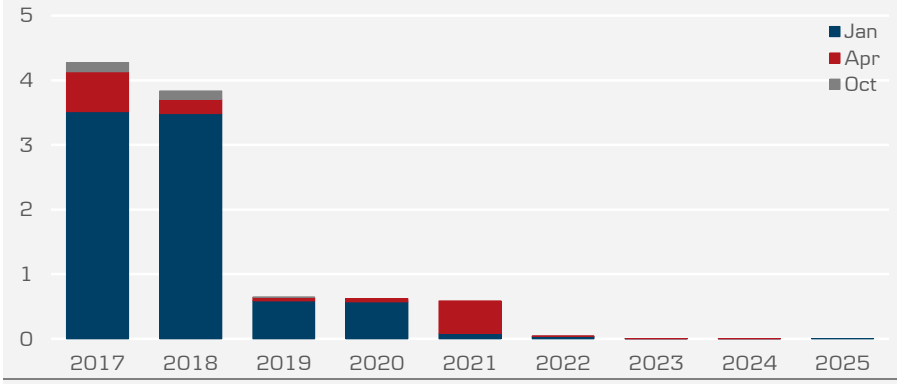
The volume of non-callable bullet bonds split by maturity and payment date is indicated in the charts below.

Chart 18. Volume of DKK non-callables (EURbn), end-2016



Source: Danske Bank.

Chart 19. Volume of EUR non-callables (EURbn), end-2016



Source: Danske Bank.

Pools

As is the case for all covered bonds in Denmark, there is no separation of the borrowers in a security code. This means that a borrower can be either a private or a commercial borrower. However, there are restrictions in Danish legislation as to which maturity and repayment profiles can be offered in the various segments (see Chapter 2).

Opening period

The mortgage banks aim to keep the bond series that fund the interest-reset loans open throughout their maturity.

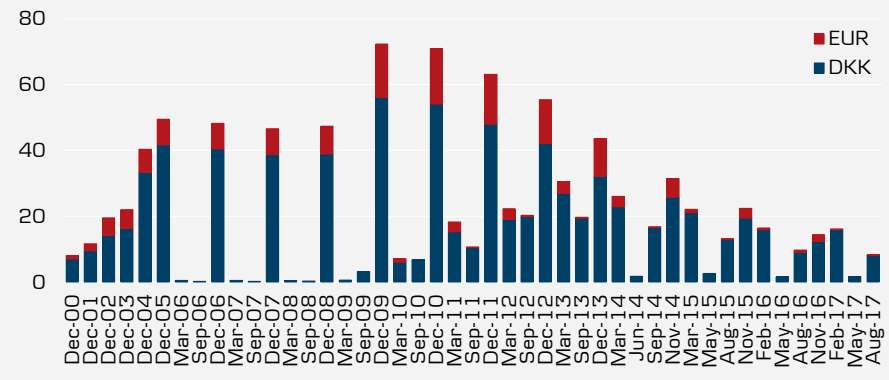
Refinancing maturing bonds at auction

Non-callable bullet bonds are issued on tap throughout the maturity to match loan origination. Bonds maturing on 1 January, 1 April, 1 July and 1 October are refinanced by new bond issues sold at auctions in November, February, May and August, respectively. Due to the success of interest-reset loans, refinancing auctions have grown into one of the most liquid-issuing activities in European covered bond markets.

The auctions take place at OMX Nordic Exchange's mortgage-issuing sub-market. The Dutch auction principle and hidden call method are used. Under the Dutch auction principle, all bids above the cut-off price are settled in full at the cut-off price. For bids at the exact cut-off price, proportional allocation is used. All bids below the cut-off price are not settled. Hidden call means the bidders can see only their own bids, while the issuer can see all bids.

The total volume of the refinancing auctions is indicated in the chart below.

Chart 20. Auction volume of non-callable bullet bonds (EURbn)



Source: Danske Bank

New mortgage act on non-callable bullet bonds as of 1 April 2014

A new mortgage act was passed as of 1 April 2014, aiming at reducing refinancing risk for borrowers. Under the new law, loans where the underlying bonds are issued with a maturity of up to two years risk the maturity of the underlying bonds being extended if (1) the yield level

increases by more than 500bp at a refinancing auction or (2) the mortgage bank is unable to sell its bonds at a refinancing auction (failed auction trigger). Since 1 January 2015, the failed auction trigger has also applied to loans where the underlying bonds are issued with a maturity of more than two years. Read more about the new legislation under *New legislation addressing refinancing risk* in Chapter 2.

Non-callable bullet bonds denominated in euro

At the commencement of the euro, the Danish mortgage banks launched a euro programme to fund EUR-denominated interest-reset loans. The euro programme was launched on equal terms with DKK-denominated non-callable bullet bonds. Hence, EUR-denominated covered bonds are non-callable fixed rate bullets with maturities from one to 11 years and a single annual payment due on 1 January, 1 April or 1 October.

Demand for EUR-denominated interest-reset loans has been driven mainly by the Danish kroner versus euro yield spread.

ECB eligibility

Realkredit Danmark, Nykredit, Nordea Kredit, BRF and DLR have issued EUR-denominated covered bonds – non-callables and floaters. EUR-denominated bonds issued through VP securities are ECB eligible.

Floating rate/FRNs

Floating-rate loans intended for the corporate market

In recent years, we have seen increasing issuance in floating rate covered bonds (FRNs). The outstanding amount in FRNs amounted to 19% of the total covered bonds issued at the end of 2016, compared with 4% at the end of 2006. Floating rate mortgage loans are issued primarily to corporate borrowers but CITA floaters are also offered to residential borrowers.

Bond structure

The Danish floating rate covered bond market is very diversified and the bonds have a range of different characteristics (see table below). The majority of floating rate bonds are denominated in DKK or EUR with interest rate fixing against 3M EURIBOR, 3M/6M CIBOR and 6M CITA (6M CITA is the Danish equivalent to the 6M EONIA rate), respectively. However, some bonds are denominated in PLN with interest rate fixing against WIBOR or SEK with fixing against STIBOR.

Table 46. Characteristics of floating rate notes (FRNs)

Currency	DKK, EUR, SEK, NOK or PLN
Fixing rate	3M/6M EURIBOR, 3M/6M CIBOR, 3M/6M CITA, 3M STIBOR, 3M NIBOR or 3M WIBOR (plus potential interest rate spread)
Cash flow profile	Annuity or bullet
Bond type	RO (20% risk weight), grandfathered RO or SDO/SDRO
Number of terms	2 or 4 terms per year
Interest rate fixing	1-Jan/1-Jul or 1-Apr/1-Oct. or 1-Jan/1-Apr/1-Jul/1-Oct
Fixing date	1st, 2nd, 3rd, 4th, 5th or 6th last banking day of Jun/Dec or Mar/Sep or Mar/Jun/Sep/Dec
Callable?	Callable or non-callable
Coupon multiplier factor	ACT/360 or ACT/ACT
Implied coupon floor	Some floater bonds have an embedded floor on the coupon rates of 0%

Source: Danske Bank.

Coupon multiplicator factor

A coupon multiplicator is used for some bonds when calculating the coupon rate at the time of fixing. For example, if the fixing is based on 6M CIBOR, the coupon rate is equal to 6M CIBOR multiplied by 365/360. The 365/360 multiplication is to neutralise the differences occurring from deviations in the interest rate conventions in the money market and the bond market; thus making the product suitable for derivatives solutions.

Some FRNs are callable at par

Some floating rate notes issued by Nykredit, DLR and Nordea Kredit are callable at par. Floating rate notes issued by Realkredit Danmark are all non-callable.

RO and SDRO/SDO

The majority of floating rate bonds are issued as SDO/SDRO bonds. However, some bonds were issued as RO before the implementation of the new Mortgage Act in 2007 and these bonds are grandfathered. There are also new bonds that are issued as RO under the new Mortgage Act. These bonds have a risk weight of 20%.

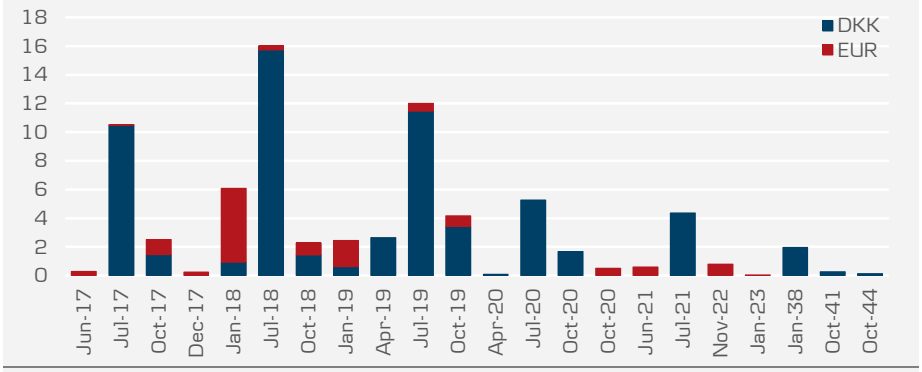
Embedded coupon floor of 0%

Some floater bonds cannot have negative coupon rates and hence the bonds have an embedded coupon floor of 0%. Floater bonds issued before 2015 generally have an embedded coupon floor.

Maximum maturity of 35 years

Floating rate loans are offered as both annuity loans and bullet loans and the maximum maturity is 35 years. The majority of floating rate notes are issued in the 0- to five-year segment (see chart below).

Chart 21. Outstanding amount on FRNs (EURbn), end-16



Source: Danske Bank.

Capped floaters

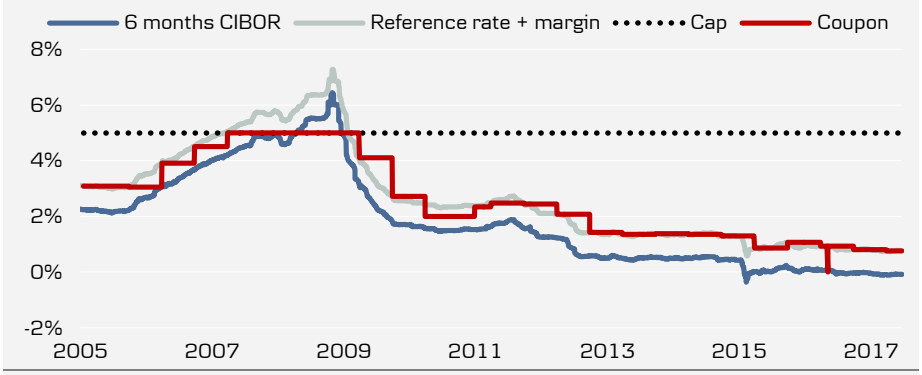
Capped floaters are floating rate bonds with embedded caps applying to the entire maturity of the loans maximised at 30 years. Capped floaters are based on a traditional cap structure in which interest rates are floating for the entire term of the bond, although they are maximised at the cap rate.

Interest rates for DKK-denominated bonds are fixed semi-annually based on six-month CIBOR plus a fixed margin each 1 April and 1 October or 1 January and 1 July. However, interest payments and redemptions fall due on 1 January, 1 April, 1 July and 1 October.

Two structures

Some capped floaters are callable at 105 for the entire term to maturity. Market pricing of capped floaters has so far suggested that the call premium will be insignificant due to the cap structure rendering market prices substantially above par unlikely. The capped floaters' cap structure is illustrated below.

Chart 22. Capped floaters' cap structure, cap rate 5%



Source: Danske Bank.

Capped floaters are offered as both traditional annuity loans and annuity loans with a 10-year interest-only option.

Junior covered bonds (section 15 senior debt[2])

Introduced in 2007

Junior covered bond (JCB) is a bond type introduced into the Danish bond market in connection with the new Mortgage Act in July 2007. Mortgage banks may issue senior debt in order to raise supplementary capital. The proceeds from the issuance of senior debt have to be invested in assets, such as government bonds, which are placed in the cover pool[3].

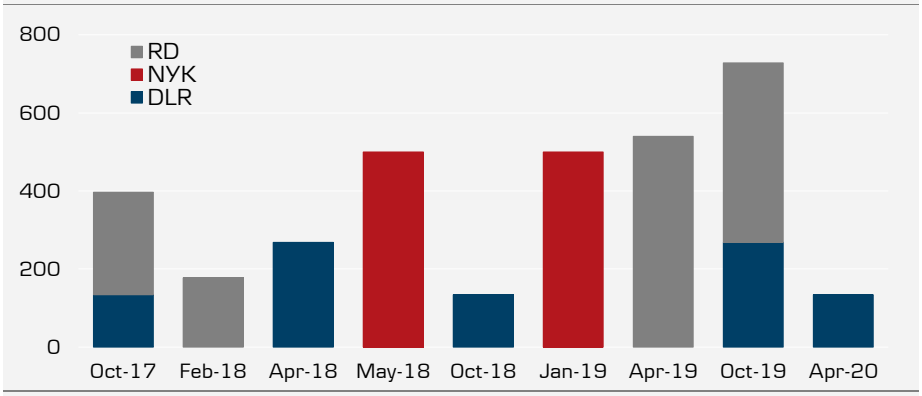
Secured in the cover pool

Section 15 senior debt is secured in the cover pool but is subordinated to ROs and SDOs/SDROs. Hence, section 15 senior debt does not have the same level of security as ordinary covered bonds and SDOs/SDROs. In the event of bankruptcy, investors in section 15 senior debt do not get their money back until covered bonds investors have received theirs. Hence, junior covered bonds are not gilt-edged ('guldrandet') and do not fulfil UCITS.

Realkredit Danmark, Nykredit, BRF and DLR have issued JCBs

Nykredit and BRF were the only issuers of junior covered bonds until March 2012, when Realkredit Danmark announced that it had decided to issue junior covered bonds. DLR started to issue junior covered bonds in November 2012. The chart below shows the maturity distribution of junior covered bonds.

Chart 23. Maturity distribution of Danish JCBs (EURm) – end July 2017



Source: Danske Bank.

[2] Section 33e was changed to section 15 in December 2012. Hence, Junior covered bonds were issued under section 33e in the Danish Mortgage Act before December 2012.
[3] There are limits on which assets the institution can place in the cover pool.

Senior debt from a mortgage bank is different from senior debt from a bank

Section 15 senior debt from a mortgage bank can be compared with traditional senior debt from a bank but there are a number of differences.

The proceeds from traditional senior debt from a bank are not placed in the cover pool, even though the bank is permitted to issue SDOs. However, just like a mortgage bank, the bank must top up with supplementary collateral if the value of the assets in the cover pool does not match the value of the SDOs issued.

Direct link to the cover pool

Hence, traditional bank debt has no 'direct link' to the cover pool and does not necessarily have to be used to buy assets that can serve as supplementary collateral. There is also a difference in the event of bankruptcy, as investors in traditional bank debt get their money back once the assets of the bankrupt estate have been added up and it can often take several years to settle an estate.

In the table below, we list some of the features that characterise SDO/SDRO and section 15 senior debt from a mortgage bank and traditional senior debt from a bank.

Table 47. Characteristics of SDO/SDRO bonds and senior debt

	SDO/SDRO	Senior debt (mortgage)	Senior debt (bank)
Gilt-edged	Yes	No	No
UCITS	Yes	No	No
BIS capital weight	10% or lower	20%	20%
Proceeds from issuance	Funding of home loans	Purchase of assets	No specific requirements regarding use of proceeds
Security in case of bankruptcy	Security in cover pool	Security in cover pool but subordinate to, e.g. SDO/SDRO investors	Subordinate to, e.g. all depositors
Payout in case of bankruptcy	No acceleration of cover pool	After covered bond investors, if there is money in cover pool	Immediately after bankruptcy, if there is money in the estate

Source: Danske Bank.

6. Issuing and trading Danish covered bonds

Unlike most other types of bond issuance, which occur through a single auction or series of auctions (tranches), the majority of Danish covered bonds are issued by means of 'taps'. A tap issue refers to an ongoing type of periodic issuance, typically daily, in response to loan origination and refinancing.

Bonds issued directly to borrowers until the 1980s

Until the 1980s, Danish covered bonds were issued directly to individuals in need of mortgage finance. For example, if a customer needed DKK50,000 to purchase a house, that customer would enter into a borrowing agreement with the mortgage bank and receive a mortgage bond in return, which the customer would then sell in order to obtain the funds needed to purchase the property.

During the changeover from a bearer bond system to a registered bond system, this practice changed and the mortgage associations began to issue covered bonds on behalf of a pool of mortgage borrowers. However, the practice of regular and periodic issuance continued, with bonds issued in larger denominations and the underlying mortgage borrowers retaining a call option on their borrowings, allowing them the right to repay the funds advanced. Tap issuance occurs on a daily basis in very large amounts.

Auction of non-callable bullet bonds

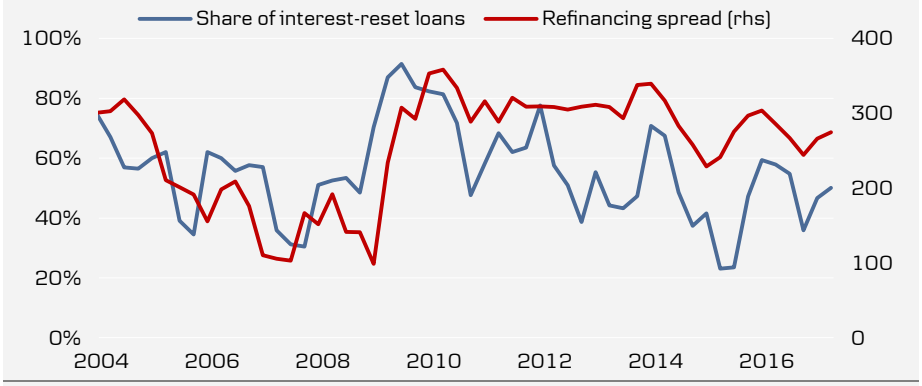
Subsequently, as issuance volumes grew, an auction system was introduced for non-callable bullet bonds (see Chapter 5). Traditionally, Danish covered bond issuers held a single annual refinancing auction. However, in recent years, Danish mortgage banks have increased the number of refinancing auctions to two, three or four per year in response to volume growth.

Issuance activity is driven largely by the slope of the refinancing curve

Issuance activity in the different covered bond segments is to some extent driven by the slope of the refinancing curve, especially for 30-year callable annuity bonds and the non-callable bullet bonds used to fund interest-reset loans. For example, in an interest environment with a steep refinancing curve, with low yields at the short end of the curve and high yields on 30-year callable annuity bonds, we usually see an increase in the gross lending of interest-reset loans relative to 30-year callable annuity loans.

The chart below shows the correlation between the steepness of the covered bond refinancing curve (the yield on a 30-year callable annuity bond minus the yield on a one-year non-callable bullet bond) and the lending amount of interest-reset loans as a share of the total volume of loans granted by Danish mortgage banks. Since 2012, mortgage banks have increased the contribution fees on interest-reset loans relative to 30-year callable annuity loans in order to increase the incentive for borrowers to choose a 30-year callable annuity loan. This has, to some extent, reduced the correlation between the refinancing spread and the share of interest-reset loans.

Chart 24. Correlation between share of interest-reset loans and refinancing spread



Source: Finance Denmark, Danske Bank

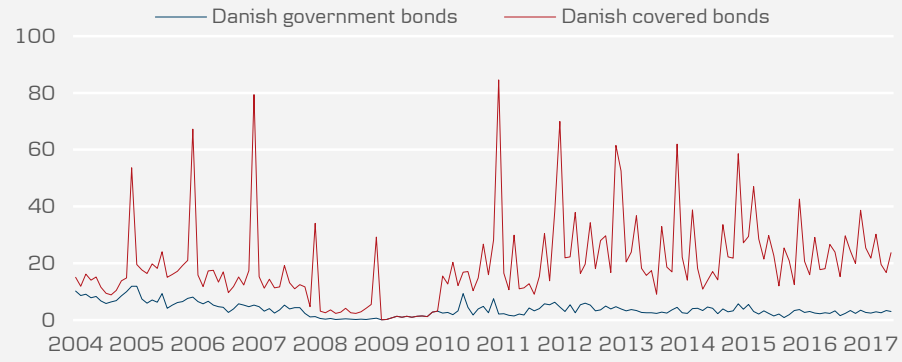
Trading Danish covered bonds

When trading covered bonds, the investor must allow for several practical elements. In this chapter, we also focus on the liquidity of covered bonds compared with that of government bonds and where to find current bond prices.

Turnover affected by global crisis

The Danish covered bond market has historically enjoyed deep secondary market liquidity with a high average daily turnover but, as the chart below shows, daily turnover reduced significantly during the financial crisis in 2008 and 2009. However, the low turnover did not hinder tap issuance in Danish covered bonds by the mortgage banks during the financial crisis. As shown in the chart below, there tends to be a spike in the turnover rate for Danish covered bonds in November/December, February/March, May and August/September, which is due to the refinancing auctions.

Chart 25. Daily average turnover of Danish bonds (bn)



Source: Nasdaq Nordic Exchange, Danske Bank

Turnover of Danish bonds

In the past decade, the liquidity of covered bonds has exceeded government bond liquidity due to high levels of mortgage prepayments, high issuance activity and refinancing auctions, as covered bonds experience increased liquidity in such periods.

The table below shows the average daily turnover of selected Danish government bonds and Danish covered bonds. As the table shows, the turnover of some of the most liquid covered bonds has exceeded the turnover of Danish government bonds in recent years. The table also shows that liquidity has been high for one-year, non-callable covered bonds. This is due primarily to high issuance activity and refinancing auctions.

Table 48. Average daily turnover (DKKm)*

DKKm	2014	2015	2016
DGB 3% Nov-21	165	317	279
DGB 1.5% Nov-23	469	242	168
DGB 4.5% Nov-39	114	138	107
3% 2044 callable	586	184	82
3% 2044 IO callable	474	177	113
2.5% 2047 callable	1,275	463	523
2.5% 2047 IO callable	510	472	484
2% 2047 callable	-	840	757
2% 2047 IO callable	-	408	410
RTL 1Y (Jan) DKK	1,768	1,060	637

** The average daily turnover of Danish covered bonds is the average daily aggregated turnover for series issued by Realkredit Danmark, Nykredit, Nordea Kredit and BRFkredit*
Source: NASDAQ OMX Nordic Exchange, Danske Bank

Highly liquid and diversified issuance, prices quoted by Danske Bank

Danske Bank quotes prices for the most liquid government bonds and covered bonds. The prices are available from Bloomberg (DBDK).

Difference in prices of otherwise identical series

A bond series of the same type but issued by different mortgage banks may see a slight difference in price when close to or above par because of different debtor distributions and differences in the borrowers' prepayment behaviour. A price difference may also be attributable to differences in liquidity and ratings differences.

Repo facility at the Danish central bank and the ECB

It is possible to do repos with Danmarks Nationalbank, the Danish central bank, against collateral in Danish covered bonds. The maximum loan limit depends, among other things, on the value of the collateral (after margin and haircuts). In addition, EUR-denominated covered bonds issued through VP securities and complying with the ECB's eligibility criteria are ECB eligible when they are approved by Danmarks Nationalbank and are entered on the ECB's list of eligible assets.

Market maker scheme ensures liquidity

With over 2,000 Danish covered bonds listed on the Nasdaq Nordic Exchange, it is evident that they are not equally liquid. Typically, the most liquid bond series are those that are open for issue but fair liquidity is also offered among the older series.

A market-making scheme ensures liquidity for the securities. In order to support the secondary market, seven banks have signed voluntary agreements to act as market makers.

According to the market-maker scheme, the seven banks are obliged to offer prices (bid and ask prices) on the covered bonds included in the market-making scheme.

Besides a temporary reduction in amounts offered, the market-maker agreement has been unaffected by the global financial crisis and bid-ask spreads remained at DKK0.10 at all times for the most liquid bonds.

7. Prepayment

Borrowers raising a callable mortgage loan are entitled to prepay the mortgage at par prior to maturity. A borrower's right to prepay is embedded in one or two prepayment options.

- Callable loans have an embedded call option and a delivery option.
- Non-callable loans have an embedded delivery option only.

To comply with the specific balance principle described in Chapter 2, the borrower's call option must be embedded in issued covered bonds in order to achieve a perfect hedge, i.e. the mortgage banks do not suffer a loss when call options are exercised. The delivery option is embedded in all loans originated by Danish mortgage banks. It should be stressed that a loan does not necessarily have to be terminated or prepaid when a property changes hands. Accordingly, when a property is sold, the mortgage bank decides whether the new owner can take over the loan.

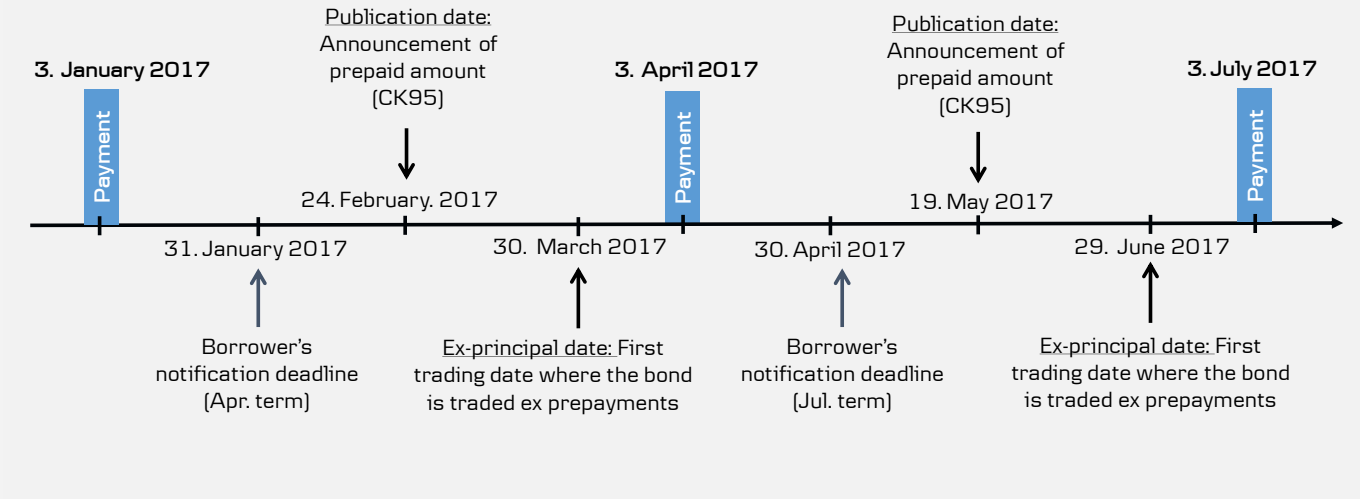
How to refinance a mortgage

Using the call option

If a borrower wants to exercise the call option and prepay a loan at par, he may choose between immediate prepayment and prepayment on the payment date. The former is the most common choice. Borrowers must give two months' notice before exercising the call option, i.e. notification dates are 31 January, 30 April, 31 July and 31 October.

About 40 days prior to the payment date, accurate information on the prepayment volumes for the individual bond series is available on the publication date. Extraordinary prepayments are distributed among investors according to the same principle of drawing as described above for ordinary repayments (see Chapter 5). The bond trades ex-principal (ex-prepayment) two days before the term date[4].

Chart 26. Important dates for mortgage bond refinancing



Source: Danske Bank.

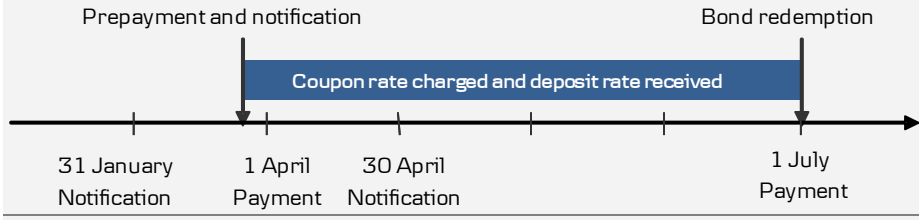
Immediate prepayment means that the remaining debt and interest payments are payable to the mortgage bank within three days, i.e. prior to the payment date. However, as investors are still entitled to their coupon payments, the borrower still has to pay the coupon until the payment

[4] A new redemption model for callable bonds was introduced in October 2015. Before October 2015, the bonds traded ex-principal one day before the publication date.

date (1 January, 1 April, 1 July and 1 October), which, in principle, is the first date on which the loan may be prepaid.

Thus, the borrower prepays the remaining principal plus the coupon payment for the period until the payment date. The borrower is compensated for making the funds available to the mortgage bank until the payment date (see chart below). This compensation is normally calculated at a rate close to the current money-market rate.

Chart 27. Notification and payments in connection with extraordinary prepayment



Source: Danske Bank

Prepayment on the payment date means that the borrower does not have to prepay the remaining principal and the coupon due until the payment date.

When a borrower prepays a loan, it usually raises a new one. This involves two separate transactions and the borrower is therefore free to raise a mortgage loan with a different mortgage bank than the one with which the repaid loan was raised.

Using the delivery option

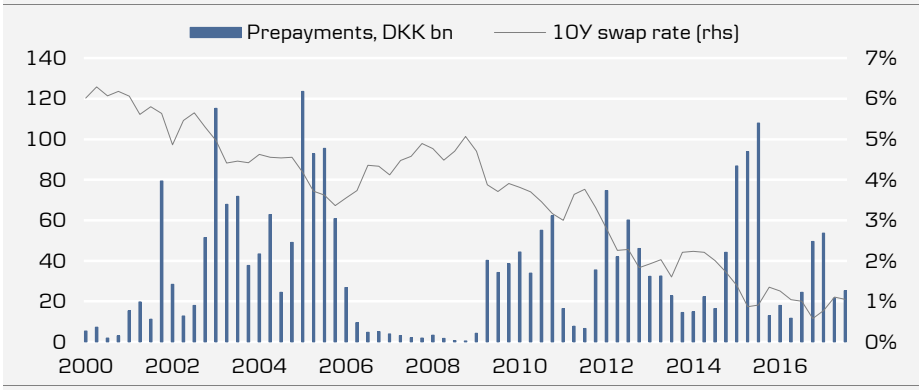
When a borrower exercises the delivery option, the underlying bonds are purchased at market price. By delivering the bonds to the mortgage bank, the loan is – fully or partially – redeemed. The borrower runs the hypothetical risk of not being able to buy the bond due to lock-in effects and the mortgage banks suffer no loss when the option is exercised.

Borrowers will exercise the delivery option only if the bond price is below par and will be charged a trading fee typically of 0.10-0.30% depending on the loan size.

Observed prepayment rates

Observed prepayment rates are indicated in the chart below and include both delivery and call option prepayments. As can be seen, observed prepayments are closely correlated to a decline in long-term interest rates, suggesting that re-mortgaging at a lower interest rate is the main reason for prepayment.

Chart 28. Correlation between long-term interest rates and prepayments



Source: Danske Bank

Calculating prepayment gains

Most Danish mortgage loans are prepaid in connection with re-mortgaging (debt management) or in connection with the sale of a house (though prepayment is not compulsory, as the loan may be taken over by the new owner).

The advisory services provided by banks and mortgage banks focus on the gain on the first year's net payments and on the net present value of the old loan and the new loan alternative.

Today, borrowers focus primarily on liquidity savings in the form of lower net payments and their required gains are therefore measured mainly in terms of the difference between the first year's net payments on the existing loan and the new loan. In some cases, the first year's net payments are reduced but the gain measured in terms of the net present value of future payments is negative. This would typically be the case if the borrower chose to raise a loan with a longer term to maturity than the old loan. Under such circumstances, some borrowers will want to refinance, while others prefer to wait until the net present value gain is positive and above a threshold level.

The second parameter in the advisory service is the difference in net present values, also called the prepayment gain.

The calculation of the prepayment gain is very sensitive to the yield curve applied. In practice, a flat yield curve corresponding to the after-tax yield on the refinancing alternative is often applied. The prepayment gain can be calculated using the following formula.

$$Prepayment\ gain = \frac{NPV(old\ loan) - (rem.debt + costs) \cdot Disc}{NPV(old\ loan)}$$

NPV (old loan) is the net present value of the old loan, corresponding to the remaining after-tax payments discounted at the after-tax yield of the new refinancing alternative. The *rem. debt* is the remaining debt to be refinanced and *costs* are the refinancing costs. *Disc* is the discounting factor from the payment date to the actual date on which the borrower decides to prepay the loan (no later than the notification date).

The borrower will most often be advised to refinance the mortgage based on a financial gain calculated in percent (as shown above) but also in absolute value.

Different types of re-mortgaging strategies

Borrowers have gradually become more conscious of managing their debt and increasingly use different re-mortgaging strategies to optimise their home financing.

Their choice of re-mortgaging strategy is heavily dependent on interest rate movements since the existing loan was raised and, in certain cases, the borrower's expectations with regard to future changes in interest rates. Below we set out a brief description of the most commonly used re-mortgaging strategies.

Re-mortgaging to a lower coupon

Following a substantial decline in interest rates, borrowers will benefit from re-mortgaging an existing loan to a new loan with a lower nominal rate of interest, as described above. The borrower will receive a gain in the form of lower future net payments and thus lower first-year net payments due to the lower interest rate. However, this type of re-mortgaging typically results in an increase in outstanding debt, depending on the price of the bonds underlying the new loan.

Re-mortgaging to a higher coupon

Following substantial increases in long-term interest rates, the borrower is able to reduce the outstanding debt by redeeming the old loan at a low market price and refinancing it through new bonds at a higher coupon than that of the original loan. However, this type of re-mortgaging leads to rising future payments because of the higher interest payments. Such re-mortgaging is therefore profitable only if interest rates decline again within a short time period. Borrowers

initially achieve a reduction in their outstanding debt at the expense of higher payments, which they hope to be able to reduce by re-mortgaging to a lower coupon later.

Re-mortgaging to interest-reset mortgages

The introduction of interest-reset loans (see Chapter 5) formed the basis of a new type of re-mortgaging strategy. In periods of rising long-term interest rates and a substantial steepening of the yield curve and in periods of plunging short-term interest rates, borrowers holding a loan funded by long-term fixed rate bonds may re-mortgage their loans by redeeming the loan and refinancing it by raising a loan based on short-term bonds. The gain achieved from adopting this strategy is a reduction in the outstanding debt and lower future mortgage payments, assuming that future short-term refinancing rates remain low. In the opposite case, where long-term interest rates have plummeted and short-term interest rates are higher than long-term interest rates, the borrower is able to reduce his mortgage payments by re-mortgaging from an interest-reset loan based on short-term bonds to a fixed interest rate loan based on long-term bonds.

Following the introduction of interest-reset loans, borrowers have greater opportunities for achieving future re-mortgaging gains because redemption of the existing loan and disbursement of the new loan may take place at interest rates across the yield curve.

Re-mortgage gain depends on several factors

Prepayment gain depends on the borrower and size of the remaining principal

The re-mortgaging gain generally depends on several debtor-specific factors. Hence, it is of significance whether the borrower is a private individual or a corporate borrower because the tax deduction rate for interest paid by the borrower varies. However, in recent years, the tax deduction rate for private borrowers has been gradually reduced and we expect the difference in the tax deduction rate between private borrowers and corporate borrowers to be reduced markedly in coming years.

In 'The Whitsun Package', which was part of the 1998 tax reform, the tax deduction rate for private individuals was reduced from an average of 46% to 33% and in the tax reform, 'Forårspakken 2.0' from February 2009, the tax deduction rate was reduced yet again from 33% to 25% over a transitional period from 2012 to 2019. The deductible rate for businesses has also been reduced in recent years and stands at 25% today, compared with 34% in 1998.

Moreover, the size of the remaining principal typically determines the re-mortgaging gain. If the remaining principal is small, the refinancing costs in the form of a fixed fee weigh more. The gain is therefore relatively smaller than for a large remaining principal.

Finally, the re-mortgaging gain may depend on the term to maturity. Hence, the achieved gain is typically greater when refinancing a 30-year loan than when financing a shorter-term loan.

Refinancing campaigns by mortgage banks

In recent years, greater attention in the media and campaigns launched by mortgage banks have resulted in borrowers responding more quickly to the opportunities for a re-mortgaging gain.

Advisory services have also become more sophisticated and borrowers are able to have their refinancing opportunities monitored, meaning they are contacted when the re-mortgaging gain exceeds a pre-agreed level.

8. Estimating prepayments

Estimating prepayments is essential to the pricing of callable covered bonds — not just for the coming payment date but also for all future payment dates. Prepayments are important to investors as they affect cash flows. As a result, the duration of callable bonds is affected by changes in the estimated prepayment rates.

Estimating prepayments using traditional models

There are several different models for estimating prepayments, one of the most commonly used being the so-called capital gain requirement model where the parameters of the model are estimated based on historical prepayment data. This model assumes that a given debtor will refinance his loan if the obtainable re-mortgaging gain is greater than his debtor-specific required gain. Furthermore, the model allows for different debtor patterns by assuming that the various groups in the debtor distribution behave differently when it comes to borrowers' inclination to refinance at various rates. Before 1 January 2016, Danske Bank also used such a model to estimate the risk of callable bonds. In the section *Danske Bank's old model for callable bonds (traditional model)*, we have described our old model, which in many ways is similar to other banks' models for callable bonds.

Danske Bank has introduced a new SuperFly model

Instead of using a traditional method/model to estimate future levels of prepayments for callable bonds, Danske Bank has chosen a new path. Our new model approach (SuperFly) is not to *estimate future prepayments* based on historical prepayments data (as we did before with the traditional model), but to *estimate the prepayments implied* by the market. Hence, this is a new and unique method to calculate the risk of callable bonds.

Data for estimating prepayments

One of the most important factors affecting a borrower's prepayment decision is the gain from refinancing as described in Chapter 7. Historical prepayment rates and debtor distributions are used in the estimation of the parameters in traditional capital gain requirement models (traditional models).

Historical prepayment rates

Historical prepayment rates for each series give a first impression of the re-mortgaging sensitivity of a bond series. Traditionally, series that have experienced significant prepayments can be characterised as 'having lost their prepayment potential' as the remaining borrowers have presumably been able to realise decent refinancing gains at an earlier date. However, we increasingly see so-called burned-out series continuing to experience high prepayment rates.

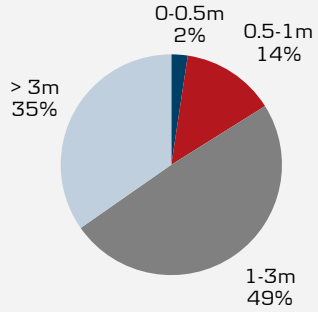
Debtor distributions

The debtor distribution of a bond series is a breakdown of the total underlying remaining debt. A debtor distribution table breaks down loans into five groups according to the size of the remaining debt in DKKm, the share of cash and bond loans and the share of corporate and private loans. This type of distribution makes it possible to divide borrowers into 20 debtor groups.

Corporate versus private loans

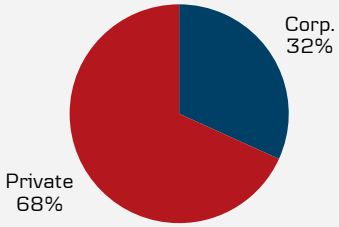
In traditional models, large corporate loans are generally assumed to have a higher re-mortgaging rate than small private loans, because these loans, due to the higher remaining principal, have a lower percentage cost when prepaying. The size of the remaining principal is important due to both its relation to fixed re-mortgaging costs and the psychological factor that makes a gain of DKK100,000 more tempting than a gain of DKK1,000.

Chart 29. Debtor distribution: loan size – RD 2.5% 2047



Source: Danske Bank

Chart 30. Debtor distribution: private versus corporate – RD 2.5% 2047



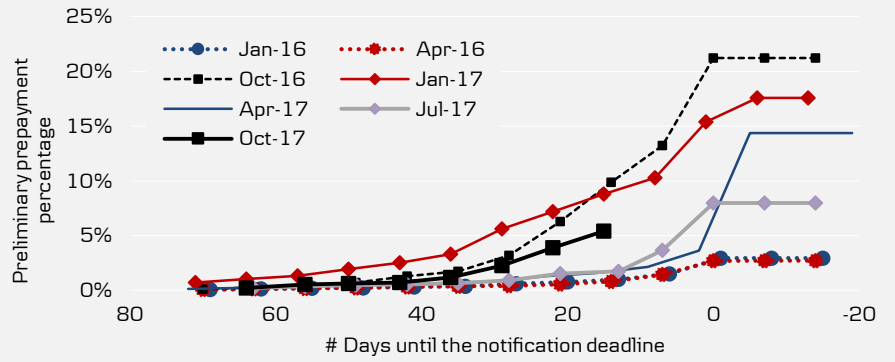
Source: Danske Bank

Preliminary prepayments

Every week, the individual mortgage banks publish preliminary prepayments for each series for future, non-published payment dates. These prepayments allow for an estimation of the volume of prepayments for the next payment date (comparison with previous payment dates). They also allow for a calculation of the share of total prepayments for a given announced preliminary prepayment by using prepayment data at the same time prior to the previous payment date. The preliminary prepayment rates are used in Danske Bank's new model (SuperFly) and in the old model (Danske Analytics).

Typically, preliminary prepayments are characterised by a strong exponential increase up to expiry of the notification period. Any expectation based on announced prepayments therefore becomes more reliable as the expiry of the notification period approaches. One may also track any differences between the institutions up to the notification date.

Chart 31. Evolution in preliminary prepayment rates – RD 3.5% 2044



Source: Danske Bank

SuperFly – a unique model for estimating implied prepayments

Instead of using a traditional method/model based on historical data to estimate future levels of prepayments for callable bonds, Danske Bank has chosen to implement a new model approach (called **SuperFly**) where the future prepayments are estimated as *prepayments implied* by the market. This is a new and unique method to calculate the risk of callable bonds. There are several reasons why we have chosen this new method, but the most important are the following.

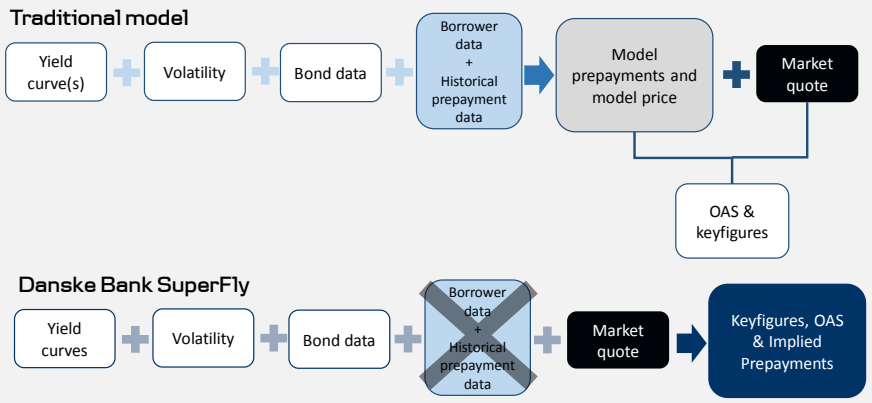
- The implied prepayment approach offers much greater flexibility in the model, which ensures more stable risk key figures. Hence, we do not expect to re-calibrate our model every quarter to align the model's expected prepayments to the actual prepayments, which was the case for our old, traditional model.
- We expect that the model will provide risk key figures that are more in line with markets' expectations of prepayments instead of our own model's expected prepayments.

So how do we estimate the implied prepayments? The price of the callable bond and the market interest rate are used to:

1) Determine whether the callable bond could see prepayments (mostly determined by the difference in the bond's coupon and the yield of an alternative mortgage loan).
2) Determine how many prepayments the callable bond could see in order to be fairly priced (mostly determined by the price of the bond).

Hence, if the callable bond is trading well above par, this could indicate that the implied prepayments are low, whereas a lower price would indicate that the implied prepayments have risen. All the risk key figures are calculated on the back of the implied prepayments.

Chart 32. Overview of the inputs and outputs in a traditional model and the new SuperFly mortgage bond pricing model



Source: Danske Bank

Compared to our old, traditional model (and the standard for other banks still) the main difference is that the prepayments in our new model are *implied* by the market and not our *expected* prepayments.

Below we list some of the other important features of our new model.

- The SuperFly mortgage bond model uses a 1-factor Cheyette model for generating rate scenarios. The Cheyette model is calibrated to an underlying European option model (typically a shifted SABR model) where the underlying zero-level is shifted to -2% due to the low rates. The mortgage bond model also includes a mortgage bond credit curve that measures the effective credit of the Danish mortgage bond market. It is expected that liquid mortgage bonds will trade close to levels of this curve.
- When pricing a callable mortgage bond, the Cheyette model is calibrated to a strip of swaptions reflecting the prepayment schedule of the bond in question. The strike and duration of the calibration swaptions are initially set to the coupon and maturity of the bond but then adjusted for the notional structure and the credit of the bond. This calibration then

gives risk key figures, both delta and vega, that are consistent with the underlying rate and volatility models.

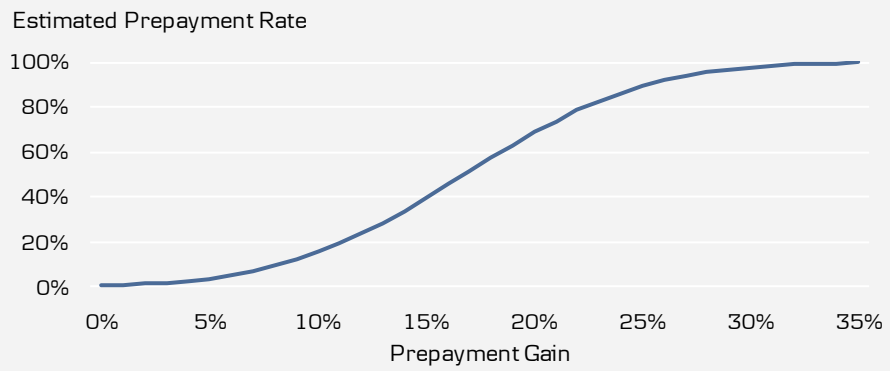
- The model shifts focus between the OAS and the implied prepayments depending on the yield level and the prepayment risk of the bond. For low coupon callable bonds with no prepayments the market (and our model) focuses on the OAS for input to relative value. For high coupon callable bonds the focus is instead on the prepayments, since investors price the bonds given their expectations of the level of future prepayments. Hence, the model also focuses on implied prepayments.
- Given the above, OAS for high coupon callables with prepayments is very close to zero and the focus should instead be on the levels of implied prepayments. In simple terms, if investors expect lower prepayments than the implied prepayments given by the model, the bond looks cheap.
- We provide a new key figure (OASWeight), which tells how much focus investors should put on the OAS rather than the implied prepayments.

Danske Bank's old model for callable bonds (traditional model)

Required gain model

In a traditional model, the relationship between prepayment gains and prepayments is often described using a normal distribution function where the estimation of the parameters of the model is based on historical prepayment data. The mean value indicates how large the modelled prepayment gain must be if the series has a prepayment rate of 50%. Based on a stochastic model of the yield curve, it is possible to calculate prepayment gains (for each debtor group) for the entire term of the bond in different interest rate scenarios.

Chart 33. Normal distribution of estimated prepayments



Source: Danske Bank

Before 1 January 2016, Danske Bank used a traditional model (Danske Analytics) based on a capital gain requirement model and a Gaussian term structure model of interests. The required gain model uses the refinancing gain, the pool factor[5] and the time to maturity of the existing loan as explanatory variables. The refinancing gain is the NPV gain the borrower can achieve by refinancing to a loan with the same time to maturity as the existing loan. The refinancing rate is assumed to be equal to the swap rate for the given time to maturity plus a debtor spread.

A debtor spread is added as the model is estimated using historical data. An extraordinary widening of spreads between mortgage bonds and swaps can cause inconsistencies between the assumed refinancing rate and the actual refinancing rate if no correction using the debtor spread is made. The debtor spread is estimated as the extraordinary spread between the mortgage bonds and swaps. Debtors are split into three groups – debtors with small loans, debtors with medium-

[5] Outstanding mortgage pool principal as percentage of the original principal balance.

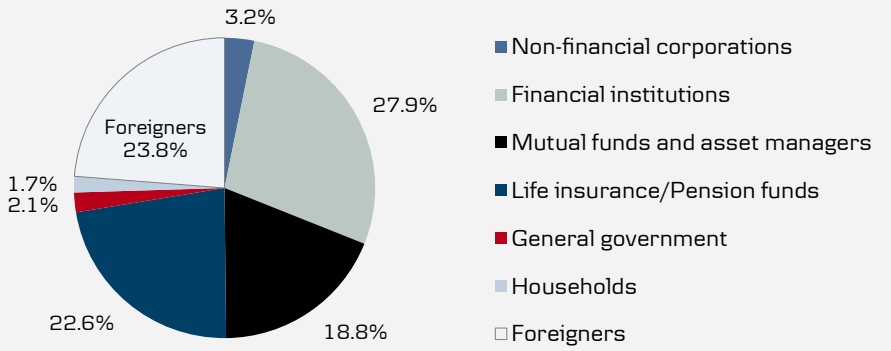
sized loans and debtors with large loans. This should provide sufficient homogeneous behaviour in each group to use the same prepayment function for all debtors in the group.

The term-structure model of interest rates is a Gaussian Hull & White model. It is calibrated to the DKK swap curve and swaption volatilities. The calibration to swaption volatilities incorporates the entire range of at-the-money swaptions.

9. Investors in Danish covered bonds

The largest resident investor group in Danish covered bonds is financial institutions, holding 28% of the total volume of covered bonds. The second-largest domestic investor group in the Danish covered bond market is life insurance companies and pension funds, which hold 23% of the total volume, while mutual funds and asset managers and so on hold 19%.

Chart 34. Investors in Danish covered bond market - April 2017

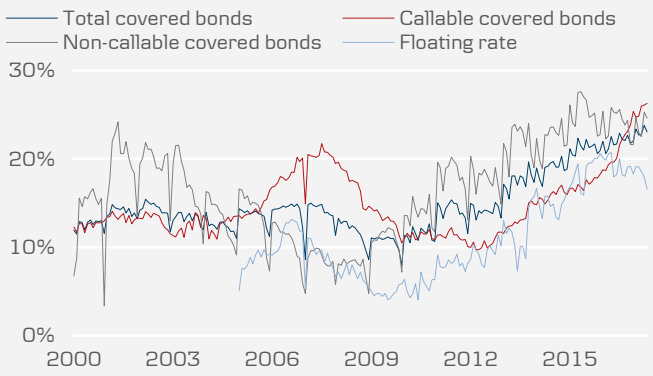


Source: Danmarks Nationalbank, Danske Bank

Life insurance companies and pension funds are characterised by their long-term investment horizon. The greater part of this sector's total bond holdings consists of Danish covered bonds. The holdings of banks and mortgage banks are also concentrated in Danish covered bonds and amount to a nominal DKK792bn (EUR106bn). This investor group is characterised by a relatively short-term investment horizon.

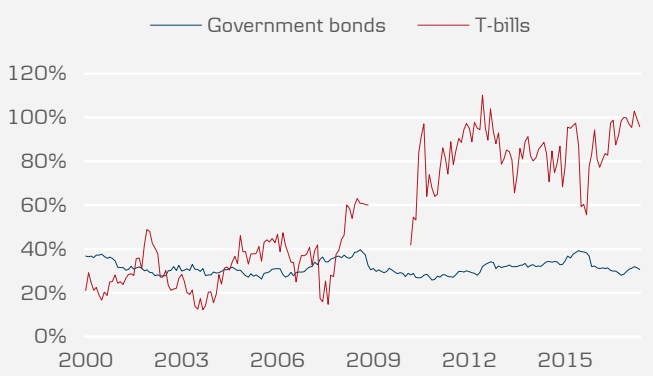
Traditionally, foreign investors have been significant players in the Danish government bond market but over the past decade, they have also shown an increased interest in Danish covered bonds. Based on statistics from April 2017, foreigners own a nominal DKK675bn (EUR91bn) worth of Danish covered bonds, equivalent to 23.8% of the total volume of Danish covered bonds. For comparison purposes, foreigners' holdings of government bonds at the time amounted to a nominal DKK244bn (EUR33bn), or 31% of the total volume of Danish government bonds.

Chart 35. Foreign ownership of Danish covered bonds



Source: Danmarks Nationalbank, Danske Bank

Chart 36. Foreign ownership of Danish government bonds



Source: Danmarks Nationalbank, Danske Bank

Bond-specific portfolio shares

Foreign investor areas of interest

In the last decade, foreign investors have shown a particular interest in one-year non-callable bullet series. As of April 2017, foreign investors held 53% and 11% of the total outstanding amount in RTL DKK Apr-18 and RTL DKK Apr-18, respectively. The 1Y DKK-denominated non-callable covered bonds are characterised by being liquid.

In 2016 and 2017, foreign investors have had an increasing interest for low coupon callable covered bonds. The foreign holding of Danish callable covered bonds is 26% as of April 2017. An increase from 20% one year ago. The foreign holdings in the callable bond segment are 28.4% in 2% 2047 (ordinary and interest only), 44.9% in 2.5% 2047 (ordinary and interest only) and 11.6% in 1.5% 2037.

Table 49. Investor distribution - April 2017

	RTL DKK Apr-18	RTL DKK Apr-20	2'47/2'47io	2.5'47/2.5'47io	1.5'37
Outstanding amount (bn)*	111.3	76.3	224.9	177.4	53.7
Non-financial corporations	0.2%	2.8%	1.2%	2.9%	2.9%
Financial institutions	32.0%	54.0%	33.1%	26.6%	54.3%
Life insurance/pension funds	13.0%	28.1%	35.4%	21.3%	27.4%
General government	1.5%	3.1%	0.7%	1.2%	2.3%
Households	0.2%	1.1%	1.2%	3.0%	1.5%
Unallocated domestic	0.0%	0.0%	0.0%	0.0%	0.0%
Foreigners	53.1%	11.0%	28.4%	44.9%	11.6%

** The table shows the aggregated volumes for the most liquid SDO/SDRO bonds issued by Realkredit Danmark, Nykredit, Nordea Kredit and BRFkredit*
Source: Danmarks Nationalbank, Danske Bank

Resident investors

In the 20- and 30-year segment, the holdings of financial institutions, life insurance companies and pension funds are concentrated in Danish covered bonds such as the 1.5% 2037, 2% 2047 and 2.5% 2047. Financial institutions also focus on the non-callable series with short maturities, as these are used for money-market transactions.

10. Performance

Danish covered bonds have traditionally provided a yield pickup compared with, for example, Danish swaps or government bonds. This yield difference is estimated by the asset swap spread (ASW) for non-callable bonds and floater bonds and option-adjusted spread (OAS) for callable bonds. Moreover, general risk measures such as the Macaulay duration do not apply to callable mortgage bonds but instead the duration can be described using option-adjusted duration or OA-BPV.

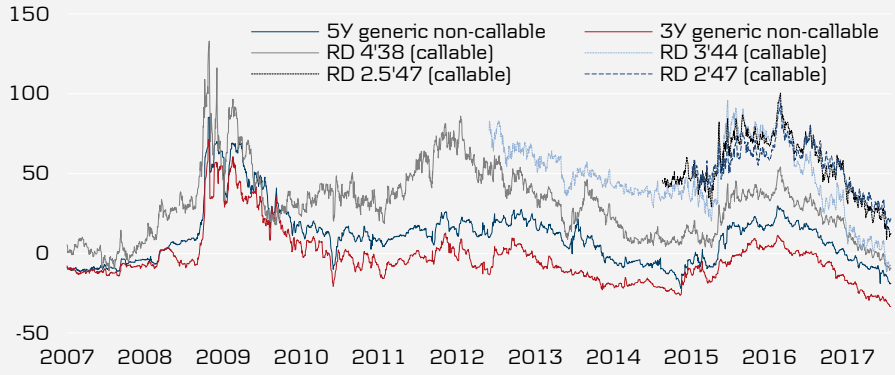
Option-adjusted spread (OAS)

The OAS specifies the additional yield compared with the Danish swap curve at which each callable covered bond trades adjusted for estimated prepayments. The OAS is an indicator of the additional yield that can be obtained by holding the callable covered bond and reflects the prepayment and credit risks as well as liquidity considerations. A widening OAS indicates that the bond has become cheaper relative to swaps and vice versa. Note that the OAS depends on the model used for forecasting future prepayments.

Asset swap spread (ASW)

The ASW specifies the spread against 3M or 6M CIBOR for non-callable bullet covered bonds and the capped floaters. The ASW for the capped floaters is calculated under the assumption that the cash flow of the capped floaters can be hedged using an amortising cap.

Chart 37. Danish covered bonds OAS/ASW



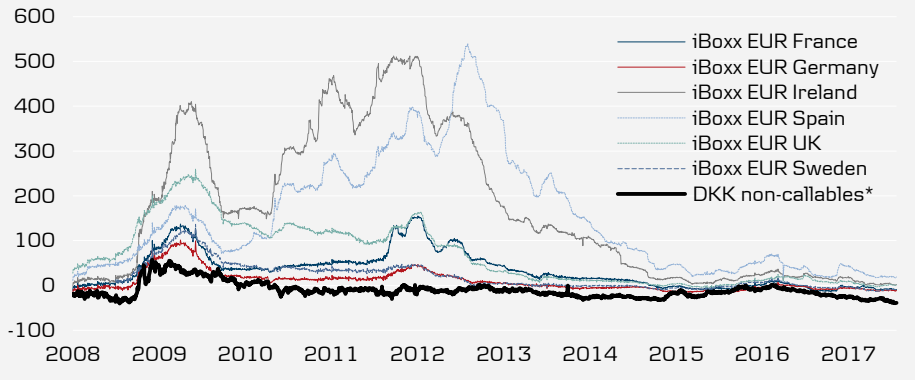
Source: Danske Bank

Historical development in spreads

The spreads (OAS and ASW) for the Danish covered bonds experienced a quite significant widening in autumn 2008 due to the increased risk aversion in the market. However, compared with other European covered bonds, the spread widening in Denmark was moderate (see the chart below). In addition, the Danish bond market was unaffected by the European debt crisis, as investors used the Danish bond market as a 'safe haven'.

Since 2012, we have seen a significant tightening of the (local) ASW spreads on European covered bonds driven partly by the ECB's CBPP. Over the same period, spreads on Danish covered bonds traded in a relatively stable range until 2015, when we saw a gradual widening of spreads. The drivers of the spread widening in 2015 were uncertainty about the impact of regulation (for example the implementation of the LCR as of 1 October 2015, uncertainty regarding leverage ratio and risk weights) and increased volatility in financial markets. In recent years, we have seen a significant tightening of the spreads (OAS and ASW) for the Danish covered bonds.

Chart 38. Covered bond ASW spreads (bp, mid)

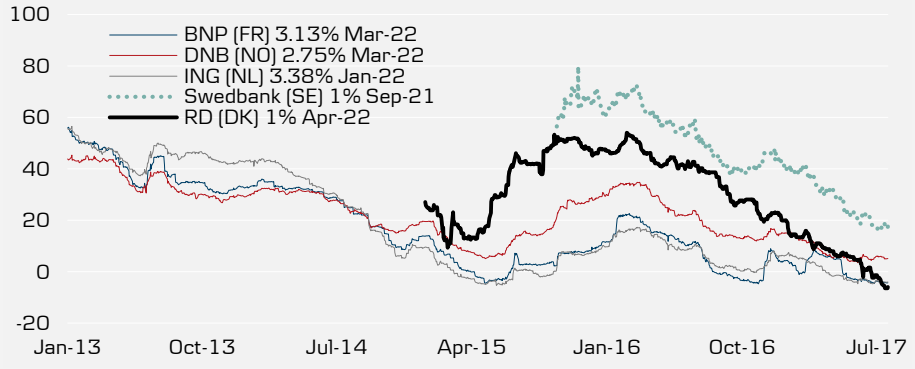


Source: Danske Bank

Cross-currency swapped ASW spread

The ASW 3M CIBOR spreads for Danish covered bonds are more or less at the same ASW levels (ASW 3M EURIBOR) as European covered bonds. If we look, for example, at the ASW 3M CIBOR spread for RD (DK) 1% Apr-22 and compare it with the ASW 3M EURIBOR spreads for covered bonds with maturity in 2022 issued by ING, Swedbank, BNP and DNB, the Danish covered bond generally trades with an ASW spread close to the levels for other European covered bonds.

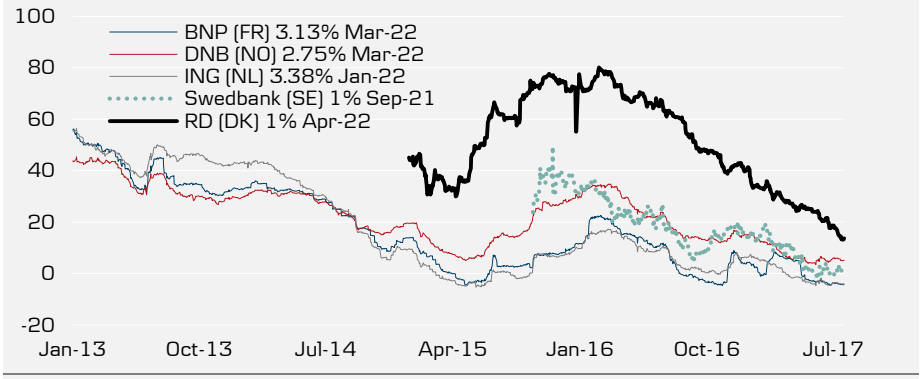
Chart 39. Local ASW 3M spread for European covered bonds with maturity in 2022



Source: Danske Bank

However, looking at the cross-currency swapped ASW spread where the ASW 3M CIBOR spread is swapped into 3M EURIBOR, the spreads of the Danish covered bonds currently trade with a pickup relative to European peers (see the chart below).

Chart 40. Cross-currency swapped ASW 3M EURIBOR



Source: Danske Bank

Risk

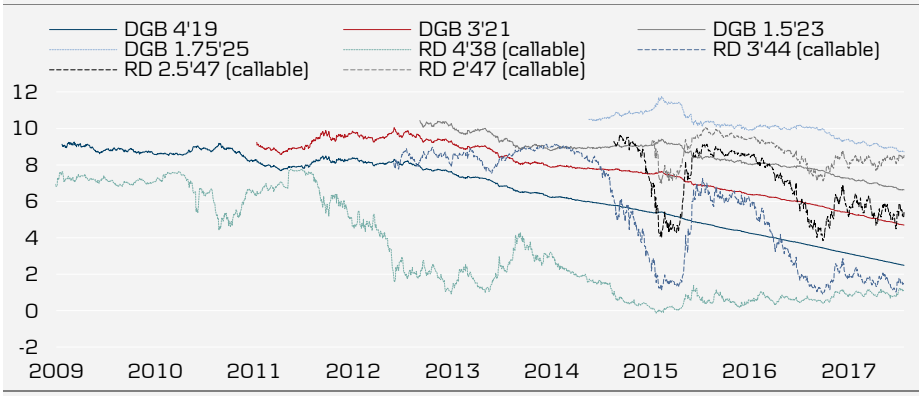
Option-adjusted risk measures

As suggested by the name, option-adjusted BPV (OA-BPV) adjusts for the embedded option when calculating the interest rate risk of the callable covered bonds. The OA-BPV may thus be negative for bonds far above par. This is the case when the effect of prepayments being influenced by interest rate changes is greater than the mere discounting effect. This means the price may fall even though interest rates are falling.

The charts below show the BPV for Danish government bonds DGB 4% 2019, DGB 3% 2021, DGB 1.5% 2023 and DGB 1.75% 2025 and OA-BPV for callables 4% RD 2038, 3% RD 2044, 2.5% 2047 and 2% 2047. The OA-BPV for Danish callable covered bonds has decreased in the recent year due to the decreasing interest rate level and increasing prepayment risk.

Chart 41. BPV for Danish covered bonds and Danish government bonds

BPV government bonds and non-callable covered bonds and OA-BPV for callables



Source: Danske Bank

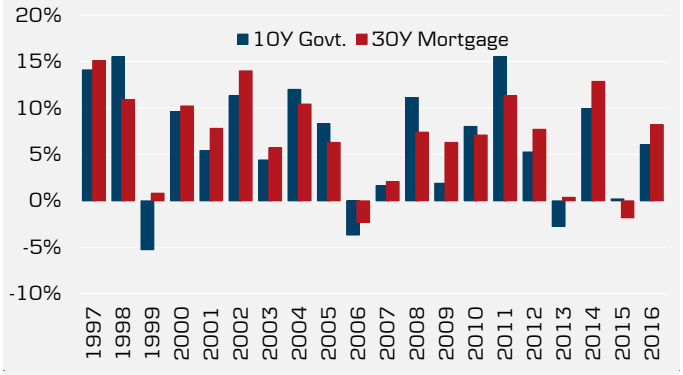
Historical returns

The charts below illustrate developments in the annual return on the 30-year covered bond benchmark index and the 10-year government benchmark index since the end of 1995. As the chart below right shows, 30-year Danish covered bonds in general outperform 10-year government bonds.

However, in 2004, 2005 and later on in 2010 and 2011, the 10-year government benchmark outperformed the 30-year covered bond benchmark. This is a consequence of the 30-year covered bond benchmark simply having lower duration compared with the 10-year government benchmark over this period. Combined with an environment of decreasing interest rates, it led to a larger capital gain for the 10-year government benchmark.

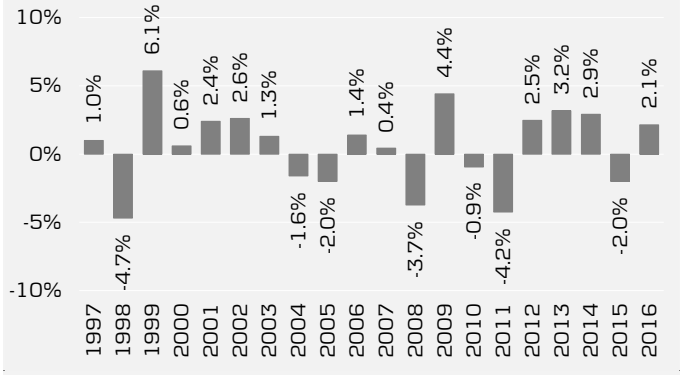
In 1998 and 2008, the Danish covered bond underperformed against the 10-year government bond again due to financial turmoil. The underperformance was due to falling interest rates, increasing volatility and significant spread (OAS) widening. However, the negative performance in 1998 and 2008 was followed by very high positive performances in 1999 and 2009, as the market turmoil eased and the spread tightened.

Chart 42. Annual total return for 10Y DKK government and 30Y fixed-rate mortgage bond



Source: Danske Bank

Chart 43. Excess return on 30Y fixed rate mortgage bond relative to 10Y DKK government

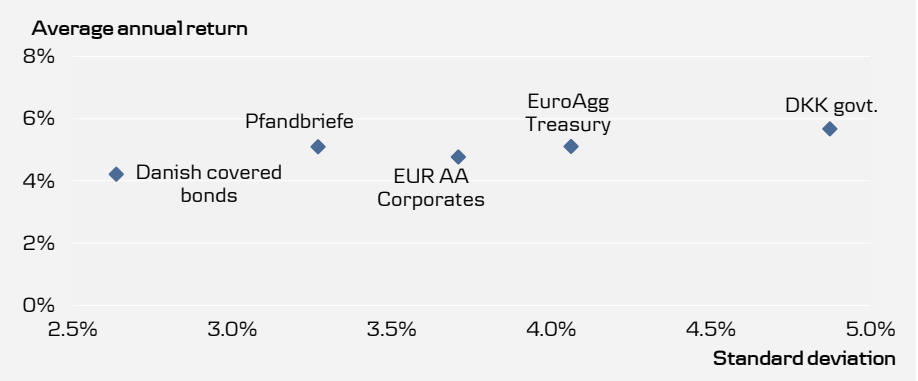


Source: Danske Bank

Returns on the Danish and euro bond markets

The chart below illustrates returns on various European asset types measured against the standard deviation of the return. The asset types include the following indices: EUR government bonds (Bloomberg Barclays EuroAgg Treasury index), Pfandbriefe (Iboxx five to seven years), Danish government bonds (Danske Bank Danish government bond index), Danish covered bonds (Nykredit Danish mortgage bond index) and EUR AA-corporates (Iboxx five to seven years). The listed returns are calculated as average annual returns for the period from the end of 2006 to the end of 2016. Over this period, Danish covered bonds offered the least volatility and an average annual return marginally lower than other European asset types.

Chart 44. Historical return on Danish and EUR bonds from Dec-06 to Dec-16



Source: Bloomberg data, iBoxx, Danske Bank

11. Futures on Danish covered bonds

The Nasdaq Nordic Exchange introduced a bond future on a basket of underlying Danish covered bonds in October 2009 and at the same time established a market-maker scheme in the future (initial spread of DKK0.10 for DKK50m). The future is settled daily on a marked-to-market basis and the settlement amount is fixed by the Nasdaq Nordic Exchange as the difference between the current future price and the future price of the previous trading day. Settlement is made via the Nasdaq Nordic Exchange, which is where netting of positions between market makers is carried out.

The basis of the agreement in the market-maker regime is a CSA plus any premiums or alternatively a clearing account with the Nasdaq Nordic Exchange.

Table 50. Settlement procedure for market makers

Settlement	Daily settlements via Nasdaq Nordic Exchange
Netting	Yes
Agreement base	CSA plus any premiums, or a clearing account with Nasdaq Nordic Exchange

Source: NASDAQ Nordic Exchange, Danske Bank

Characteristics similar to government bond futures

Danish covered bond futures (MBF) expire every third month at the end of March, June, September and December and settlement day is 1 April, 1 July, 1 October and 1 January (or the first business day thereafter). New future contracts are opened about a month before the existing contract expires; thus, positions in one future contract can always be rolled into the next future contract – just like, for example, German government bond futures (Bunds, Bobl, etc.).

There are currently three bond futures on Danish covered bonds. There are two bond futures on 20Y and 30Y callable covered bonds and one bond future on three-year non-callable covered bonds. The current future contracts expire (fixing) on 28 December 2017 (see table below). The contracts have a contract size of DKK1m and a tick size of DKK0.001.

Table 51. Danish mortgage bond futures with expiry 28 December 2017

ISIN	SE0010266403	SE0010265017	SE0010266411
Name	3YMBFZ7	30YMBFZ7	20YMBFZ7
Expiry	28-Dec-17	28-Dec-17	28-Dec-17
Contract size (DKKm)	1	1	1
Tick size (DKK)	0.001	0.001	0.001
Underlying basket	1'20 (Apr) (25%) 1'21 (Apr) (25%) 1'21 (Jul) (25%) 1'22 (Apr) (25%)	2'47 (50%) 2'47 IO (25%) 2.5'47 IO (25%)	2'37 (30%) 1.5'37 (70%)

Source: Nasdaq Nordic Exchange, Danske Bank

The Danish covered bond futures each consist of a basket of underlying unit bonds. Each underlying unit bond usually consists of more than one covered bond series (i.e. from different mortgage banks or 'colours'). For example, the future contract (3YMBFZ7) on three-year non-callable covered bonds consists of four unit series (1% Apr-20, 1% Apr-21, 1% Jul-21 and 1% Apr-22), each weighted 25%. At delivery, the seller of the future contract can choose freely which of the different underlying bond series (which issuers) to deliver. Thus, a delivery option is included in the future similar to that seen in, for example, German government bond futures (Bunds, Bobl, Schatz, Buxl).

The table below lists the bonds in the underlying basket of the 3YMBFZ7 that are due to be delivered when the future expires.

Table 52. Bond series to be delivered on the 3YMBFZ7 bond future

Series	ISIN code	Name	Volume (DKKbn)
1% Apr-20	DK0009294761	RTL RD 1'20 (Apr)	42.4
	DK0009384679	RTL BRF 1'20 (Apr)	12.4
1% Apr-21	DK0009509044	RTL NYK 1'21 (Apr)	4.7
	DK0009294845	RTL RD 1'21 (Apr)	36.2
	DK0009384752	RTL BRF 1'21 (Apr)	9.5
1% Jul-21	DK0009509630	RTL NYK 1'21 (Jul)	19.4
1% Apr-22	DK0009294928	RTL RD 1'22 (Apr)	36.6

Source: Nasdaq Nordic Exchange, Danske Bank

Delivery, fixing and calculation

Delivery is at the fixing price on the coupon day of the underlying bonds or else the next business day. The fixing price is calculated by Nasdaq Nordic Exchange immediately after 10:00 CET on the expiry day of the future contract. The calculation is based on the prices quoted by the various market makers (published by Reuters) for the underlying covered bonds. The fixing is calculated as an average of the middle prices of the various market makers after ignoring the highest and lowest price. The fixing is calculated to three decimal places and published at 11:30 CET on the day of expiry.

The seller of the future contract can freely choose among the various issuers ('colours') in the basket of unit bonds when delivering, though delivery must be in accordance with the weights stated above. Therefore, the seller of the future contract has a delivery option on the underlying bonds, while the buyer of the future contract has implicitly sold this delivery option.

12. Available information

The Danish mortgage banks provide information to investors via the Nasdaq Nordic Exchange (Nasdaq). Nasdaq publishes data on Danish covered bonds according to specified guidelines. These data are released on specific dates and at specific times. If one of these specific dates fall on a non-business day, publication generally takes place on the next business day.

Cash flows: on a quarterly basis

Nasdaq publishes cash flows for each individual bond. These specify principal and interest payments for all coming payment dates until the bond expires. For open series, cash flows are calculated according to the principles of the Nasdaq, while actual cash flows for the closed series are published by the mortgage banks. The cash flows are published no later than 12 working days after the term date.

Debtor distribution: on a monthly basis

Details concerning debtor distribution are provided by the mortgage banks and separate the underlying loans into borrower groups, remaining debt groups and loan types. The debtor distribution data are published no later than four days before the fourth Thursday of the month.

Preliminary prepayments: on a weekly basis

Mortgage banks publish on a weekly basis data on preliminary prepayments comprised of nominal extraordinary repayments for coming, non-published payment dates. Data are based on registered loan terminations for coming payment dates, including immediate prepayments but excluding repayments by delivery of bonds.

Final prepayments: on a quarterly basis

On a quarterly basis, mortgage banks publish data on final prepayments (ordinary as well as extraordinary) for the next payment date comprised of nominal repayments as well as total repayment and prepayment percentages. The final prepayment amounts are published on the publication date and provincial prepayment/redemption rates are announced. The final prepayment/redemption percentages are published one working day before the term date.

Table 53. Available information

Data	Calculated	Sent to Nasdaq Nordic Exchange	Available from Nasdaq Nordic Exchange
Cash flows Payment date, instalment, interest	Quarterly	12 working days after the term date	12 working days after the term date
Debtor distribution Borrower group, remaining debt, loan type	Monthly	Fourth Thursday of every month	Same day
Preliminary prepayments Payment date, nominal amount	Every Friday	Monday after the calculation day	Same day
Final prepayment amount Payment date, nominal amount, total repayment amount, prepayment amount	Quarterly	One working day before the publication date	Publication date
Final prepayment percentage Payment date, nominal amount, total repayment percent, prepayment percent	Quarterly	Two working days before the term date	One working day before the term date

Source: Nasdaq Nordic Exchange, Danske Bank

Sources

- Bloomberg
- BRFkredit
- Danish FSA
- Danmarks Nationalbank
- Danske Bank
- DLR Kredit
- European Covered Bond Council (ECBC)
- European Mortgage Federation (EMF)
- FinanceDenmark
- Fitch Ratings
- iBoxx
- LR Realkredit
- MacroBond Financials
- Moody's Investor Service
- Nasdaq Nordic Exchange
- Nordea
- Nykredit/Totalkredit
- Realkredit Danmark
- Standard & Poor's
- Statistics Denmark

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