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December 2014

SYSTEMIC ISSUES IN MORTGAGE LOANS AND COVERED BOND FINANCE—TECHNICAL NOTE

This Technical Note on Systemic Issues in Mortgage Loans and Covered Bond Finance on Denmark was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed in December 2014.

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Prepared By
Monetary and Capital Markets Department

This Technical Note was prepared by IMF staff in the context of the Financial Sector Assessment Program Update in Denmark. It contains technical analysis and detailed information underpinning the FSAP's findings and recommendations. Further information on the FSAP can be found at: http://www.imf.org/external/np/fsap/fssa.aspx.

CONTENTS

Glossary

ALM	Asset-Liability Management
CIBOR	Copenhagen Inter-Bank Offered Rate
CITA	Copenhagen Interbank Tomorrow/Next Average
CRD	Capital Requirements Directive
DFSA	Danish Financial Supervisory Authority (*Finanstilsynet*)
DKK	Danish Krone
DN	Danmarks Nationalbank
ECB	European Central Bank
EU	European Union
EUR	Euro
FSAP	Financial Sector Assessment Program
GDP	Gross Domestic Product
IO	Interest-Only
IRB	Internal Ratings Based
LCR	Liquidity Coverage Ratio
LTV	Loan-to-Value Ratio
MCI	Mortgage Credit Institution
MoBG	Ministry of Business and Growth
NPL	Nonperforming Loan
NSFR	Net Stable Funding Ratio
OC	Overcollateralization
RO	Realkreditobligationer (Traditional mortgage bonds)
SDO	Særligt Dækkede Obligationer (New covered bonds)
SDRO	Særligt Dækkede Realkreditobligationer (New mortgage bonds)

EXECUTIVE SUMMARY[1]

The Danish mortgage finance system has been a mainstay of the economy for literally hundreds of years and has performed well in extremely difficult circumstances. Danish covered bonds backed by mortgage loans are: of high credit quality; very liquid; and among the best investment alternatives to government bonds.

This history of good performance is underpinned by a strong legal and regulatory framework. Property rights are clearly defined and foreclosure procedures are straightforward and efficient. Property valuations are conducted independently from the credit approval process and are monitored on a continuous basis. Covered bond issuance is subject to strict limits on loan-to-value ratios (LTVs) of the underlying mortgage loans and there are specific requirements for overcollateralization (OC) of the bonds. Issuance is also subject to the balance principle, which limits the market risk that issuers can assume.

Mortgage lending has seen significant product innovation in recent years. Most notably, loans with adjustable interest rates and/or interest-only (IO) periods, which have been introduced since the late 1990s, had grown to 75 percent[2] and 53 percent, respectively, of total outstanding mortgage loans at the end of 2013. The major changes in the characteristics of the underlying mortgage loans have naturally been reflected in an important evolution of the covered bond market. Traditionally, covered bonds were callable annuities with maturities closely matching those of the underlying fixed rate loans. By contrast, adjustable and variable interest rate loans are financed by bonds with short maturities (mostly one year, but up to five years).

The reliance on short-term bonds to finance adjustable and variable rate loans has introduced a major maturity mismatch into the system. In addition, mortgage loan impairments and the stock of nonperforming loans (NPLs) have increased significantly since 2007, albeit from a low level, and the large share of adjustable and variable rate loans means that a future normalization of European interest rates and the imminent end of IO periods for many borrowers could cause further debt servicing pressure. The system will also be tested by the implementation of Basel III Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) regulatory reforms. The portfolio reallocation to comply with LCR requirements will diversify portfolios away from own issued bonds to those of other institutions. However, this will increase the already high degree of interconnectedness among Danish financial institutions, so that a problem affecting one institution or one refinancing auction could more easily spread and adversely affect the health of the entire mortgage finance system.

[1] This note was prepared by Robert Sheehy, external expert.

[2] Includes index-linked loans, for which interest rates are generally linked to the consumer price index. Such loans accounted for 3 percent of total outstanding mortgage loans at the end of 2013.

The covered bond framework will need to adapt to mitigate the systemic risks associated with the increased use of adjustable and variable rate loans and IO periods. Such changes should maintain insofar as possible the benefits that the mortgage system has brought to the Danish homebuyer. Policy formulation is facilitated by the intertwined nature of the risks, so that solutions aimed at addressing one risk also contribute to reducing stresses in other areas.

The most important challenges are to reduce the maturity mismatch and refinancing risk associated with the reliance on short-term fixed rate bullet bonds and to mitigate the credit risk posed by the large share of adjustable rate loans and IO periods. The recently adopted legislation provides a mechanism to address the emergency of a failed refinancing auction, but it would be desirable to provide incentives for the banks to limit the risk of such a destabilizing event. The plan to introduce a supervisory diamond for MCIs that will set out a number of risk parameters (including the share of short-term bonds) should provide an important tool to achieve this objective. The authorities may wish to adopt policies aimed at reducing the attractiveness of adjustable/variable rate mortgage loans in order to mitigate their potential adverse effects on loan default risk and impairments (e.g., by encouraging the banks to continue to increase the costs of such loans). Such measures would also contribute to reducing the maturity mismatch and refinancing risk. Limiting the use of loans with IO periods will also help reduce credit risk. In addition, it will lower the need for additional OC of covered bonds in the event of a housing price decline stemming from interest rate increases or other factors.

The high degree of interconnectedness of the financial system through the covered bond market means that ensuring the liquidity and health of this market is crucial for financial stability. The current low interest rates and flat yield curve provide a window of opportunity for the authorities to implement measures aimed at reducing the maturity mismatch by lengthening the maturity of covered bonds financing long-term loans at a time when the cost to borrowers is minimal. Measures to reduce the use of loans with adjustable rates and/or IO periods will reduce credit risk and also reinforce the effect of other measures aimed at lowering refinancing risk.

Table 1. Key Recommendations—Mortgage Banks and Covered Bonds Market

Recommendations	Priority[1/]
Reduce refinancing risk by putting into place regulatory and other incentives for borrowers and lenders to lengthen bond maturities (DFSA, MOBG) • Short-term covered bond financing could require more capital or be restricted directly. • Balance principle might be adjusted for the refinancing risk. • Regulation could favor loans (and thus covered bonds) with characteristics favored by long duration investors (e.g., fixed interest rates, market-friendly rate reset mechanisms).	Short term
Limit impact of an eventual normalization of interest rates by ensuring that the credit risk is adequately taken into account in loan pricing and approvals (DFSA, MoBG) • Incentives should promote longer fixed rate periods on mortgage loans and more pricing differential between adjustable/variable and fixed rate loans. • Debt service-to-income filter for loan approvals could be further stressed by requiring a higher fixed rate hurdle. • Measures to reduce loans with IO periods (see below) would limit additional OC requirements for covered bonds due to housing price declines stemming from a rise in interest rates.	Short term
Realign incentives to reduce reliance on loans with interest-only (IO) periods (DFSA, MoBG) • LTV limits for such loans should be lowered or amortization to a lower ceiling should be required. • Higher capital charges/credit loss provisions could be imposed until IO periods expire. • Tax deductions during the IO period could be reduced.	Short term

1/ Short-term indicates within 18 months; medium-term indicates within 18 months to three years.

INTRODUCTION

1. The Danish market for covered bonds is one of the largest in the world. Covered bonds backed by mortgage loans totaled nearly €360 billion at the end of 2013, second only to Spain (just over €400 billion) in aggregate amount. The stock of covered bonds is equivalent to 143 percent of GDP, more than four times as large as in any other country. The covered bond market is also nearly four times larger than the Danish government debt market.

2. The Danish system of mortgage loans financed by covered bonds is more than 200 years old and has proved to be resilient throughout its history. The mortgage lending system dates back to exceptional financing mechanisms put into place in the aftermath of the 1795 Copenhagen fire, in which one quarter of the total housing stock in the city was destroyed. The system has been resilient, with no defaults to date on Danish covered bonds despite periods of exceptional economic turmoil, including the bankruptcy of the Kingdom of Denmark in the early 19th century, the Great Depression of the 1930s and occupation by Germany during World War II. In the recent global financial crisis, the Danish market for mortgage bonds remained relatively liquid, with only a small increase in bid-ask spreads, though liquidity risk was higher as the participation of dealers in the market was reduced.[3]

3. This history of good performance is underpinned by a strong legal and regulatory framework. Danish mortgage legislation dates back to the mid-nineteenth century and is among the oldest in the world. Property rights are clearly defined and foreclosure procedures are straightforward and efficient. Property valuations are conducted independently from the credit approval process and are monitored on a continuous basis. Covered bond issuance is subject to strict limits on LTV ratios of the underlying mortgage loans and there are specific requirements for OC of the bonds. Issuance is also subject to the balance principle, which limits the market risk that issuers can assume (in particular, the balance principle puts limits on interest rate, foreign exchange, volatility, and liquidity risk).

4. Danish covered bonds differ from those of other major European issuing jurisdictions in several respects, mainly in terms of how risks are managed. A key difference is that the balance principle effectively requires that loan prepayments be passed through to covered bond investors, similar to the way prepayment risk is handled in securitization structures. Prepayment risk on loans collateralizing covered bonds is retained by the issuer in most other countries. Assets serving as collateral for Danish covered bonds are mostly held in capital centers that are not part of the general balance sheet, much as the bankruptcy-remote special purpose vehicles used in securitizations; such assets are normally held on the general balance sheet in other covered bond jurisdictions. Prepayment LTV calculations in other jurisdictions are also frequently based on the

[3] Jens Dick-Nielsen, Jacob Gyntelberg and Thomas Sangill, Liquidity in Government versus Covered Bond Markets, Bank for International Settlements Working Paper No. 392, November 2012.

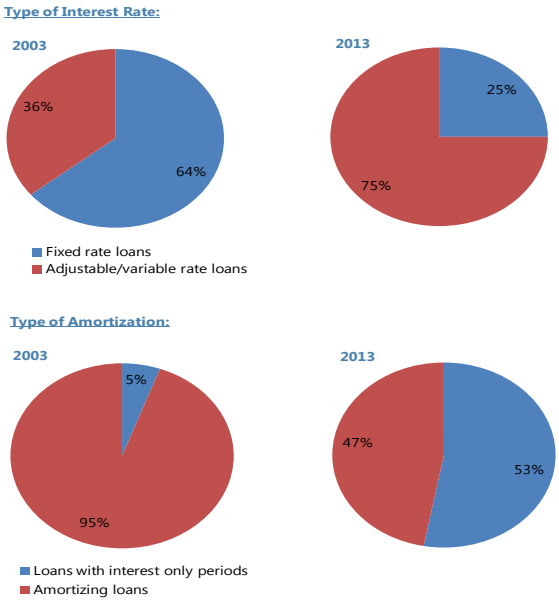
mortgage lending or long-term sustainable value rather than the market value, and methods of calculation may differ.

5. The Danish mortgage market is governed by the Mortgage Loan and Mortgage Credit Bonds Act (the Mortgage Credit Act) and the Financial Business Act. The last major modification of the Mortgage Credit Act and Financial Business Act was implemented in 2007, primarily to make the Danish covered bond system compliant with the EU Capital Requirement Directive (CRD). The main changes required continuous LTV compliance on an individual loan basis and allowed Danish universal banks access to the covered bond market. Issuers must choose between two balance principles, a specific balance principle, which is very close to that required previously, and a more relaxed general balance principle, which is consistent with the rules applied to commercial banks in other European countries. The changes also allowed junior covered bonds to be issued in certain circumstances.

6. Mortgage lending has seen significant product innovation since adjustable interest rate loans were introduced in 1996. Loans with interest-only (IO) periods of up to 10 years have been offered since 2003 (up to 30 years since 2007, though such loans are not offered in practice), interest rate caps and floating-to-fixed interest rate options were introduced in 2004, and ratchet coupons began to be offered in 2007. As a result, there has been a significant shift in the composition of the outstanding mortgage loan stock (Figure 1). Adjustable and variable interest rate loans, including index-linked loans, amounted to 75 percent of total outstanding mortgage loans at the end of 2013 and loans with IO periods comprised 53 percent of all mortgage debt.[4]

[4] Loan data are for mortgage credit institutions only. Mortgage loans by commercial banks are mostly at variable interest rates and the total amount of such loans is relatively small.

Figure 1. Mortgage Loans 2003–2013
(In Percent of Total Loans)



Source: Danish FSA and Danmarks Nationalbank

7. The major changes in the characteristics of the underlying mortgage loans have naturally been reflected in an important evolution of the covered bond market. Traditionally, covered bonds were callable annuities with maturities closely matching those of the underlying fixed rate loans. By contrast, adjustable and variable interest rate loans are financed by non-callable bullet bonds with short maturities (one to five years).[5] The face amount of the bonds and loans is rebalanced when the bonds are refinanced by issuing an amount of new bonds that matches the remaining balance of the loans. Maturing bonds were refinanced at an annual auction in December until 2006, when auctions in March and September were introduced. A June auction began in 2014.

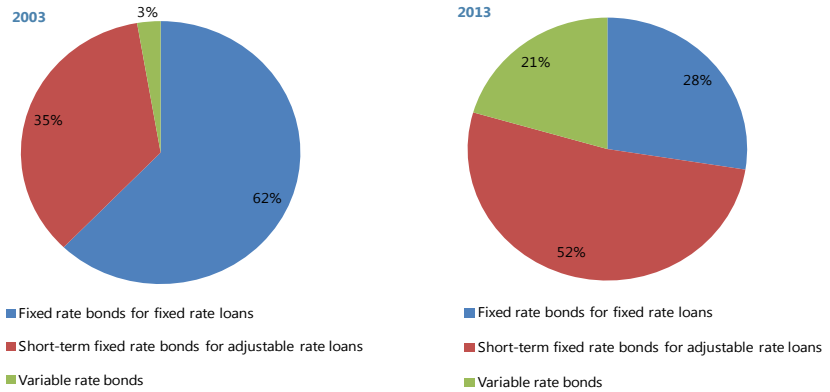
8. The impact of the shift to adjustable interest rate loans has been a sharp increase in the importance of non-callable bullet covered bonds (Figure 2). As of the end of 2013, such bonds (in Danish kroner and in euros) had risen to more than half of total covered bonds outstanding.[6] The refinancing risk that is inherent in the maturity mismatch has raised some concerns, despite the expectation that most domestic investors will continue to rollover their investments. As a consequence, the authorities have amended the Mortgage Credit Act to provide for a mandatory extension of existing bond maturities in the event of a failed refinancing or a large

[5] Since the introduction of adjustable interest rate loans, the most popular loan profile has been a 30-year loan with a one-year fixed rate loan financed by a one-year non-callable bond. However, since the beginning of 2012, many borrowers have opted for longer fixed rate periods. The share of new adjustable rate loans with a fixed rate of one year or less fell from 31 percent in 2011 to 25 percent in 2013.

[6] Covered bond data are for mortgage credit institutions plus Danske Bank issues registered with VP Securities. Danske Bank issues not registered with VP Securities are not normally traded in Denmark and are not included.

increase in bond interest rates. Moreover, regulatory oversight is being increased with the introduction of a supervisory diamond approach that will result in additional analysis of risk when short-term financing is large.

Figure 2. Covered Bonds 2003–2013
(In Percent)



Source: Danish FSA and Danmarks Nationalbank

THE DANISH MORTGAGE FINANCE SYSTEM

A. Mortgage Loans

9. Effective land and mortgage registration is a strength of the Danish mortgage system. The Cadastre (Geodatastyrelsen) assigns a specific and unique identification number to each land parcel. The Land Book (Tingbogen) registers all rights and encumbrances attached to each numbered property, and is the definitive record of legal title, mortgage liens and all other rights and encumbrances associated with each property. The Land Book is administered by the Land Registration Court under the responsibility of the Ministry of Justice. Data on valuation of land parcels and buildings are recorded in the Municipal Register of Real Properties (Det Fælleskommunale Ejendomsdatasystem), which is used for the collection of real estate taxes.

10. The Danish legal framework for foreclosure is strong and is buttressed by speedy repossession and forced sale procedures. A mortgage loan is declared in default after 3½ months of non-payment, and forced sale procedures are initiated unless alternative workout procedures are agreed with the borrower. Forced sales are carried out by special enforcement courts, which are part of the regular court system. Sales proceeds are distributed to the mortgage lienholders in order of priority and any uncovered claims remain as an unsecured claim against the borrower. It typically takes no more than nine months from the declaration of default until a forced sale is finalized.

11. The Danish mortgage system is further strengthened by the Mortgage Credit Act, which imposes maximum lending periods and LTVs according to the type of property

financed.[7] Lending maturities may not exceed 35 years for loans guaranteed by municipalities and 30 years for all other mortgage loans. Moreover, private mortgage loans must be repaid no more slowly than a 30-year annuity, with an option for an IO period of up to 10 years.[8] Maximum LTVs for residential properties, whether privately or commercially owned, are 80 percent of the property value (Table 1). Maximum LTVs for commercial and agricultural property are 60 percent (70 percent if supplementary collateral is provided or for agricultural property loans financed by traditional mortgage bonds—ROs), and 40 percent for un-built property sites. Any financing in excess of these amounts must be provided from sources other than covered bonds.

Table 2. Denmark—Maximum Loan-to-Value Ratios for Mortgage Loans
(In Percent)

Property type	RO	SDO/SDRO
Residential	80	80 1/
Commercial	60	60 2/
Agricultural	70	60 2/
Un-built property sites	40	40

1/ The maximum LTV is 75 percent if the IO period is longer than 10 years.
2/ The maximum LTV is 70 percent if supplementary collateral is provided to cover the amount in excess of 60 percent.
Source: Mortgage Credit Act

12. The valuation of properties financed by mortgage loans cannot exceed the open market price that could reasonably be achieved within a selling period of six months. When assessing the market value of the property, the risk of changes in market conditions is taken into account, and any factors that result in an exceptionally high price are disregarded. Valuations are carried out by experienced professionals not involved in the loan approval process. For properties that meet certain criteria, the DFSA may grant an exemption from the requirement for physical inspections, provided valuations are determined by models with satisfactory back test results.

13. A unique feature of the Danish mortgage finance system is the option of borrowers to pre-pay or buy back their loans, either at par or at the prevailing market price. Fixed rate loans may be pre-paid at par at any time and adjustable rate loans may be pre-paid at par on any rate adjustment date. All loans may be pre-paid at any time by purchasing bonds equivalent to those financing the loan and delivering them to the lender (the delivery option).[9] In a high interest rate

[7] Mortgage-Credit Loans and Mortgage-Credit Bonds, etc. Act No. 1261 of 15 November 2010, Sections 3 through 5.

[8] Longer IO periods are permitted for loans for owner-occupied housing financed by covered bonds, provided that the LTV is less than 75 percent.

[9] Bonds are considered to be equivalent for this purpose if they have a corresponding (but not necessarily identical) payment structure. Deviations are limited to insignificant amounts by the risk limits of the balance principle (discussed below).

environment, the borrower can cancel his loan by buying the bonds below par at the current market price. The willingness of the borrower to prepay his loan is affected by the differential tax treatment of so-called bond loans (where the principal of the loan equals the nominal value of the bonds and interest coupons are the same as those on the bonds) and cash loans (where the principal equals the cash value of the bonds issued and interest payments are higher to reflect the discount). The higher interest tax deduction for cash loans is lost upon prepayment and the borrower also has to pay a tax on any capital gains.

14. Until adjustable interest rate loans were introduced in 1996, Danish mortgage loans were fixed rate callable annuity loans with maturities of up to 30 years. Lenders managed the risk on such loans by issuing covered bonds with fixed interest rates approximately equal to the loan rates and by passing prepayment risk on to the bond investors. From 2003, borrowers were offered the option of a loan with an IO period of up to 10 years, in which case the annuity repayment portion of the loan was reduced to 20 years. The decline in interest rates since 2000 resulted in high levels of prepayments on fixed rate loans, which fell to only 25 percent of outstanding mortgage debt by the end of 2013.

15. Adjustable and variable interest rate loans have become the dominant form of mortgage loans, reaching 75 percent of total mortgage debt by the end of 2013.[10] Such loans played an important anti-cyclical role during the financial crisis, as borrowers were able to reduce payment obligations by shifting from high fixed interest rates to the lower rates on adjustable rate loans. The interest rate on adjustable rate loans is reset to correspond to the new interest rate on the underlying covered bonds on each refinancing date. An initial fixed interest rate period of one year is the most popular form of loan, although, the current low interest rates have led an increasing number of borrowers to select a longer initial fixed interest rate period (up to five years). Nevertheless, the interest rate on about 65 percent of all adjustable rate loans at end-2013 was scheduled to be reset within one year. The interest rate on variable rate loans is reset each three or six months with reference to the relevant CIBOR or CITA benchmark (or Euribor if denominated in euros) and the spread on such loans is revised to a market clearing rate on each refinancing date.[11] About half of such loans have interest rate caps that apply for the entire term of the loan.[12] Prepayment risk on adjustable and variable rate loans is mainly retained by lenders, which finance them with short-term non-callable fixed rate bonds and refinance the remaining balance periodically.

16. Since their introduction in October 2003, IO periods have become a common feature of mortgage loans, particularly adjustable rate loans. As of end-2013, 65 percent of all variable

[10] Includes index-linked loans, which accounted for 3 percent of total outstanding mortgage loans at the end of 2013. Interest rates on such loans are generally linked to the consumer price index.

[11] Copenhagen Inter-Bank Offered Rate (CIBOR) and Copenhagen Interbank Tomorrow/Next Average (CITA).

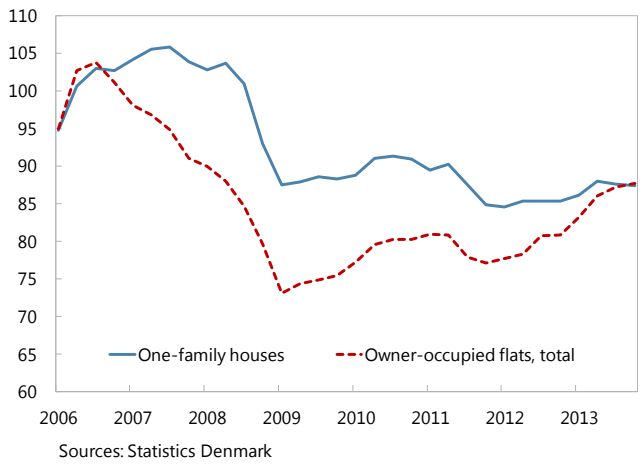
[12] Two different cap structures are available, a floating-to-fixed structure in which interest rates become fixed at the cap rate if it is triggered and a traditional cap structure in which interest rates are floating for the entire maturity of the loan, but maximized at the cap rate.

rate loans and 26 percent of all fixed rate loans included an IO period. As IO periods were initially for a maximum of ten years, they began to expire in late 2013. About 4,700 borrowers were affected in 2013; this number will rise to nearly 36,000 borrowers in 2015 and to more than 84,000 borrowers in 2019.[13]

17. If the current LTV on the property is less than 80 percent at the end of the IO period, lending institutions can offer a new loan with an IO period to avoid an increase in the required monthly payment. However, real property prices in Denmark, which rose sharply during 2004–07, have subsequently declined substantially (Figure 3). Although housing prices increased slightly during 2013, they remain nearly 20 percent below the level of 2007. LTVs have correspondingly increased, and it is estimated that a substantial number of households are not eligible for a new loan with an IO period and will thus have to begin amortization payments. In the absence of a housing price increase, about half of the borrowers reaching the end of their IO periods in 2019 will fall into this category.[14] It is anticipated that some borrowers will react to the higher payment following the end of IO periods by taking out additional loans, either mortgage loans if LTV limitations can be met, or ordinary bank loans. Nevertheless, data for individual households indicate that most would be able to continue to service their debts even with higher interest rates and the prospective end of IO periods.

Figure 3. Housing Prices 2006–2013

(Index, 2006=100)



Sources: Statistics Denmark

18. Mortgage loan delinquencies and defaults have traditionally been low in Denmark, and recoveries have been high, reflecting the strong legal and regulatory framework and generally conservative lending practices. The LTV ceiling of 80 percent on new mortgage loans limits lender losses in the event of a default. In addition, mortgage loans are full recourse in

[13] Danmarks Nationalbank, Financial Stability, First Half 2014, p.26.

[14] Ministry of Business and Growth, Debt expenses in households with expiry of interest-only and high ratio of LTV, April 9, 2013.

Denmark and borrowers remain personally liable for any shortfall between the sale value of a repossessed property and the outstanding amount of the loan. Nevertheless, impairment losses have increased in recent years, albeit from a low level, reflecting slow economic growth and a rise in unemployment in the wake of the financial crisis. Impairment losses for mortgage banks were 0.19 percent of total lending in 2013, up 23 percent from the previous year.

B. Covered Bonds

19. Since the legislative changes of July 2007, there are three types of senior covered bonds in Denmark (Table 3). Traditional mortgage bonds (realkreditobligationer—ROs) are issued exclusively by mortgage credit institutions (MCIs), are not CRD-compliant (mainly because they do not require continuous observance of LTV limits), and have a risk weighting of 20 percent. ROs issued prior to January 2008 are grandfathered under the CRD and have a risk weighting of 10 percent. New mortgage bonds (særligt dækkede realkreditobligationer—SDROs) are also issued only by MCIs, but fulfill CRD requirements. New covered bonds (særligt dækkede obligationer—SDOs) can be issued by either MCIs or commercial banks; they also fulfill CRD requirements and the cover pool can include exposures to other credit institutions. Both SDROs and SDOs have risk weightings of 10 percent. Both require continuous observance of LTV limits on an individual loan basis; supplementary collateral must be added to the cover pool in the event that LTVs increase above the maximum. In certain circumstances, MCIs are permitted to issue so-called junior covered bonds (also known as Section 15 senior debt); such bonds are used to raise supplementary capital and are secured by the cover pool, but subordinated to the other bonds.

Table 3. Denmark—Types of Covered Bonds

	SDOs	SDROs	ROs
Issuers	Mortgage banks Commercial banks	Mortgage banks	Mortgage banks
CRD-compliant	Yes	Yes	No
Risk weighting	10 percent	10 percent	20 percent 1/
LTV compliance	Continuous	Continuous	Origination
IO/maturity restrictions	No 2/	No 2/	Yes
Cover pool	Mortgage loans Public agency loans Shipping loans 3/ Claims on credit institutions 4/	Mortgage loans Public agency loans	Mortgage loans Public agency loans
Junior bonds	Yes	Yes	Yes 5/

1/ 10 percent if issued before January 2008.
2/ Provided LTV ratio is below 75 percent.
3/ Commercial banks only. Bonds backed by shipping loans must be issued from dedicated cover registers.
4/ Up to 15 percent of outstanding bonds.
5/ Since 2012

Source: Nykredit, Danish Covered Bonds, September 2010, and Danske Bank, Danish Covered Bond Handbook, May 14th, 2013.

20. Covered bonds are issued from specific capital centers segregated from the general balance sheet of the issuing institution. For SDROs and SDOs, the underlying loans must be assigned to the relevant capital center (or recorded in a special register in the case of commercial bank issuers), while for ROs, they may be assigned to the capital center or held by the institution in its own name. For MCIs, mandatory OC is calculated for each capital center depending on the risk weighting of the underlying loans, and additional OC is determined by the evolution of LTVs and calculations under the balance principle. For commercial banks, only the LTVs and balance principle calculations are relevant. In all cases, additional voluntary OC is permitted in order to meet other objectives (e.g., rating agency criteria).

21. Institutions must choose whether to be regulated by the general or specific balance principle. The general balance principle is similar to ALM requirements in other European countries, while the specific balance principle effectively requires that most risks be passed through to the bond investors. Both principles are made operational by the requirement that (costly) OC of the capital centers must be sufficient to cover stress tests for several risks. Under both the specific and general balance principles, interest rate risk determined on the basis of various stress tests may not exceed a marginal percentage of the total OC in the relevant capital center (Table 4). Similar stress tests and criteria apply for foreign exchange risk. The allowance under both risk categories differs for MCIs and commercial banks, with MCI requirements usually more restrictive. Under the general principle, additional OC is required to cover volatility and liquidity risk, while issuers choosing the specific balance principle are subject to special restrictions intended to limit the amount of such risks retained.

22. Both the general and specific balance principles require issuers to limit the non-credit risks on their balance sheets. The general balance principle allows more interest rate, foreign exchange, volatility and liquidity risks than the specific balance principle, with lower limits for MCIs than for commercial banks. Prepayment risk, other than for short periods, is passed through to bond investors for all fixed rate mortgage loans. For adjustable and variable rate loans, where covered bonds are generally non-callable short-term obligations, the interest rate risk associated with the maturity mismatch is considered to revert back to the borrower, as the interest rate and spread on the loan is re-set to a market clearing rate when the bond has to be refinanced. More general credit risk, including the credit risk stemming from possible payment shock on interest-rate reset dates or from the end of IO periods, remains with the issuer. Issuers also retain some other risks (e.g., payment date/coupon reset mismatch, basis risk on interest rates or exchange rate). Refinancing risk is not covered by the balance principle.

Table 4. Denmark—Balance Principle Risk Limits for Covered Bonds
(as percent of OC in the capital center/cover register)

	General Balance Principle		Specific Balance Principle
	Commercial banks	Mortgage banks	
Interest rate risk			
+/- 100 bp parallel shift	10%	3% 1/	1%
+/- 100 bp twist	100%	15% 2/	1%
+/- 250 bp parallel shift	100%	15% 2/	
EUR interest rate risk	50% offset	50% offset	No offset
Foreign exchange risk			
+/- 10% shift in region	10%	20% 3/	0.1% 4/
+/-50% shift in other	10%	2% 5/	
Volatility risk			
+/- 100 bp shift	5%	1.5% 6/	Perfect hedge
Liquidity risk			
Payments deficit			
Up to 12 months	100%	100%	25%
Beyond 12 months	NPV surplus	NPV surplus	25%-100%

1/ 1% of mandatory OC plus 2% of additional OC.
2/ 5% of mandatory OC plus 10% of additional OC.
3/ 10% of mandatory OC plus 10% of additional OC.
4/ Currency risk is calculated as the greatest loss suffered in a 10-day period with 0.99 probability (Currency Indicator II).
5/ 1% of mandatory OC plus 1% of additional OC.
6/ 0.5% of mandatory OC plus 1% of additional OC.
Source: Nykredit, Danish Covered Bonds, September 2010, and Danske Bank, Danish Covered Bond Handbook, May 14th, 2013.

23. Danish covered bonds (both callable fixed rate bonds and non-callable floating rate bonds) are normally issued on tap as required on a daily basis. Each new mortgage loan origination or refinancing is funded by a specified amount of one or several bonds whose ISIN codes are currently open for issuance. Long-term bonds generally have an open period of three years, which enables issuers to build large bond issues over time. The daily tap issues also avoid having to sell large amounts of bonds on any single day, although some tap issues can be substantial. Because the most important mortgage loan category (adjustable/variable rate loans) is funded by short-term non-callable bonds (most often with maturities of one year), refinancing operations for these non-callable bonds are very large. They take place through periodic auctions (on a quarterly basis, though the December auctions are the most important) of new short-term fixed rate bullet bonds with current market coupons.

24. In the event of bankruptcy of the issuer, covered bonds enjoy a senior claim on all assets in the relevant capital center or register. The covered bonds also rank pari passu with counterparties of derivative contracts hedging imbalances between loan cash flows and payments on the bonds. Payments due to bondholders or derivative counterparties are not accelerated, but remain due as scheduled. A trustee is appointed by the bankruptcy court to administer the issuer and the assets of the cover pool(s). The trustee can issue new bonds in the event that existing bonds mature before the mortgage loan assets, and can also issue unsecured debt if appropriate. Other creditors may not be paid before covered bond investors. In the case of MCIs (but not commercial

banks), if the assets in a cover pool are not sufficient to cover outstanding bonds, covered bondholders have a senior claim on the ordinary assets of the issuer. If assets in the cover pool are more than needed to repay senior and junior covered bonds issued from a capital center, any excess becomes part of the ordinary assets of the issuer and is used first to satisfy senior bondholders of other capital centers and then other (unsecured) creditors of the institution and junior covered bondholders. Unsecured creditors cannot be repaid or the institution wound up until all covered bondholder claims have been satisfied or, if this is not possible, all assets have been liquidated.

25. Concerns about the growing refinancing risk implied by the maturity mismatch in the system prompted the authorities to introduce a law requiring mandatory extension of covered bond maturities in certain circumstances.[15] The law became effective April 1, 2014 for one year bonds and January 1, 2015 for two year bonds. In the event of failure of a refinancing auction or if the interest rate at an auction increases by more than 5 percentage points compared with one year earlier, the term of bonds reaching maturity at that time will be extended by 12 months and the rate of interest on the bonds and corresponding mortgage loans will be raised by 5 percentage points. If at the end of the 12 month extension, conditions have not improved so that refinancing can take place, even at higher interest rates, the term of the bonds will be extended by a further 12 months at the same rate of interest. The new rules apply to new covered bond issues or in cases of bankruptcy of the issuer.

C. Issuers

26. The Danish covered bond market is relatively concentrated in a small number of bond issues. Although there were more than 1,500 different bond series outstanding at the end of 2013, about two thirds of the market was accounted for by the 100 largest bond series. During open periods, issuers have used tap issues to build large benchmark bonds with uniform properties. Covered bonds may also be used as a joint funding vehicle for two or more institutions in order to achieve larger issues; the first such issue took place in 2012.[16] In addition, institutions frequently issue bond series of the same type as others. Covered bonds of the same type with the same rating from different issuers have traditionally been regarded as near-perfect substitutes and trade at identical prices (e.g., 5 percent 2041 callables) or at prices that differ very slightly due to minor perceived differences in liquidity, rating stability or cover pool composition.

[15] Act No. 89 of 11 March 2014 to Amend the Act on Mortgage-Credit Loans and Mortgage-Credit Bonds, etc. and the Financial Business Act (Regulation of the refinancing risk inherent in mortgage-credit bonds, covered mortgage-credit bonds and covered bonds, etc.).

[16] The first joint funding agreement included BRFkredit, Jyske Bank and Sydbank. A variation on a joint funding vehicle is used by Nykredit to allow for larger covered bond issues by aggregating its own mortgage loans with those of Totalkredit, its wholly owned subsidiary. The loans remain on the Totalkredit balance sheet and continue to be serviced by it. An intercompany master security is created with Nykredit as lender and Totalkredit as borrower that specifies all of the underlying mortgage loans in detail and passes cashflows from them to Nykredit. This master security is then assigned to the Nykredit capital center issuing the covered bonds.

27. The Danish covered bond market is also highly concentrated among issuers, reflecting the small number of mortgage lenders in the country. Covered bonds are issued by only seven institutions, and two of these (Nykredit/Totalkredit and Realkredit Danmark) accounted for more than 70 percent of all outstanding issues as of the end of 2013 (Table 5). The market is split relatively evenly between independent MCIs and commercial banks or their subsidiaries. The MCIs often have strategic alliances with smaller banks or estate agency chains that are sources of new loan business. Subsidiaries of commercial banks generally source loans through the branch network of the owner.

Table 5. Denmark—Outstanding Covered Bonds by Issuer, December 2013

Institution	Bonds		Balance principle	Ownership
	DKKbn	%		
BRFkredit	209.5	7.9	General	Nonbank Foundation 1/
Danske Bank 2/	20.7	0.8	General	Commercial bank
DLR Kredit	136.5	5.1	Specific	Danish universal banks
LR Kredit	15.6	0.6	Specific	Danish universal banks
Nordea Kredit	370.6	13.9	Specific	Commercial bank
Nykredit/Totalkredit	1162.4	43.6	General	Nonbank Associations
Realkredit Danmark	747.5	28.1	Specific	Commercial bank
Total	2662.8	100.0		

1/ Jyske Bank became the majority shareholder of BRFkredit in February 2014.
2/ Includes only issues registered with VP Securities, which are traded domestically.
Source: Danish FSA and Danmarks Nationalbank.

28. MCIs and commercial banks are subject to different covered bond regulations owing to the different nature of their businesses and their funding sources. MCIs are specialized banks whose business is limited to mortgage banking (i.e., mortgage loans on real property, unsecured loans to public authorities or guaranteed by them, and senior claims against credit institutions). MCIs cannot accept deposits and rely on covered bonds, unsecured loans and capital or retained earnings for funding.[17] Commercial banks, by contrast, engage in a wide range of financial businesses (of which mortgage banking is normally relatively small) and rely mainly on deposits for their funding.

29. These differences are reflected in a more restrictive set of requirements for the issuance of covered bonds by MCIs. In particular, MCIs must have more capital and provide for more OC in each capital center. Their loans are matched to specific bond issues, and the bulk of their reserves must be invested in government debt, covered bonds, or deposits at the central bank. The requirements applying to issuance of covered bonds by commercial banks are based on their broader business and their access to a wider range of funding sources.

[17] Because MCIs cannot accept deposits and borrow only very limited amounts on an unsecured basis, the high level of encumbrance associated with covered bond issuance is not material.

30. The effects of bankruptcy or a suspension of the banking license of a covered bond issuer are slightly different for MCIs and commercial banks. The main difference is that any residual covered bond claims that cannot be met by the assets of a capital center of an MCI become senior claims on its ordinary assets, while any such claims for a commercial bank do not enjoy preferential status. The likelihood of such a situation is less in the case of an MCI due to mandatory additional OC requirements intended to ensure that such a shortfall will not occur; commercial banks are not required to inject additional capital in such a situation. However, failure by either MCIs or commercial banks to cover a collateral shortfall immediately will result in loss of covered bond status of the issue in question and the suspension of the covered bond license of the issuer; the status of existing issues not affected by the shortfall will not change.

31. Partly as a result of the continuous LTV requirements and their limited ability to source additional collateral to meet the limits in cases of valuation declines, several MCIs have begun to issue junior covered bonds (Nykredit, BRF, Realkredit, DLR). One MCI has also issued senior covered bonds (SDROs or SDOs) in amounts corresponding to LTVs of a significantly lower level (e.g., 60 percent) than the maximum limit of 80 percent. A second (subordinated) loan covering the difference is then used as collateral for an RO from a separate (possibly unrated) capital center. Because ROs are not subject to continuous observance of the LTV criteria, additional collateral to compensate for asset price declines is not required.

D. Investor Market

32. The Danish covered bond market has historically been characterized by high daily turnover, reflecting the practice of regular tap issues as new mortgage loans are generated. Turnover peaks each quarter with the refinancing auctions for fixed rate bullet bonds (Figure 4). Daily turnover was reduced significantly during the 2008–09 financial crisis, but regular tap issuance during this period was not affected.

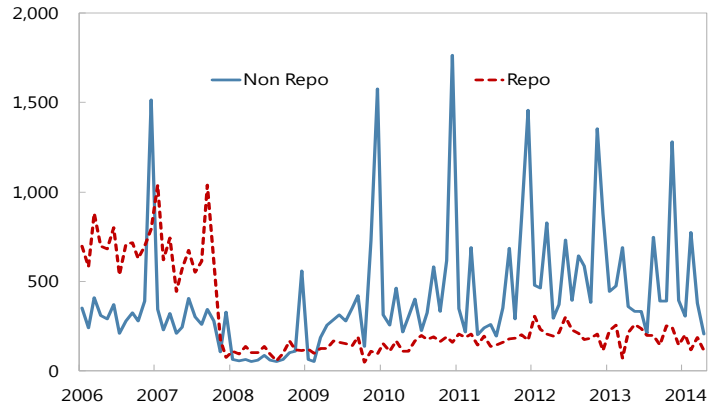
33. Both the primary market and the secondary market for covered bonds benefit from a market making agreement supported by six Danish banks.[18] Participants have agreed to offer bid and ask prices on a best efforts basis for a standard transaction size (DKK 200 million) in several liquid covered bond series (currently 12 different series), and also frequently provide such prices for other bonds. Danish covered bonds are also supported by a large repurchase market, which accounts for more than 25 percent of total turnover. The Danmarks Nationalbank accepts Danish covered bonds as collateral for lending to MCIs and commercial banks at a haircut (up to 11 percent depending on residual maturity) from the official price (average of all trades) on the NASDAQ OMX NORDIC exchange on the previous day. Partly due to these arrangements, bid-ask spreads generally remained at 10–20 basis points[19] and spreads to benchmarks increased by only 100–150 basis

[18] Danske Bank, Jyske Bank, Nykredit Bank, SEB Nordea, Spar Nord Bank and Sydbank.

[19] Nykredit, Danish Covered Bonds, September 2010, p.29; Danske Bank, Danish Covered Bond Handbook, 14 May 2013, p. 48.

points[20] during the recent financial crisis for the most liquid bonds, even though volumes were reduced.

Figure 4. Daily Average Covered Bond Turnover by Month
(In Billion of DKK)



Sources: NASDAQ OMX NORDIC

34. The NASDAQ OMX NORDIC exchange has offered covered bond futures since 2009, thus enabling investors to hedge certain types of risk. Three covered bond futures are currently offered: 20-year and 30-year callable bonds and three-year non-callable bonds. Futures expire at the end of each calendar quarter and can be rolled into the next futures contract if desired. Futures are settled daily on a marked-to-market basis, with netting of positions. Each bond future consists of a basket of at least two (and generally more) bonds of the relevant maturity. Futures have been especially popular for foreign investors.

35. Danish covered bonds historically have received high ratings from the major credit rating agencies. The ratings were based on the reduction in market risk inherent in the balance principle, low expected probabilities of default and loss on the underlying mortgage loans, and the systemic support expected to be available for the banking sector. Recently, the agencies have expressed concern about the market risk stemming from the recurring need to refinance large amounts of short-term bonds supporting longer-maturity adjustable/variable rate mortgage loans. Higher payment requirements associated with the coming end of IO periods for many loans and a possible eventual normalization of interest rates could also put some pressure on probabilities of default. Finally, the failure of Amagerbanken and Fjordbank Mors, where senior creditors and uninsured depositors were bailed in, has led to a re-evaluation of the systemic support available to banks in difficulty. The result has been that ratings have sometimes come under pressure or been withdrawn at the request of the issuer, which limits the ability of some investors to participate in the market.

[20] Nordea Markets data.

36. Domestic investors are the main participants in the covered bond market, though the share of foreign investors has risen in recent years. As of December 2013, domestic investors accounted for 84 percent of total bonds outstanding, and foreign investors, mainly institutional investors and hedge funds, held the remaining 16 percent (Table 6). The largest domestic investors are financial institutions (38 percent of the total), life insurance companies and pension funds (26 percent), and mutual funds and asset managers (11 percent). The shares of different investor groups vary considerably for different covered bond types and maturities. Foreign investor holdings are concentrated in non-callable bonds, particularly the one-year maturities, and euro-denominated bonds, where they hold as much as 80–90 percent of some bond series.

Table 6. Denmark—Investors in Covered Bonds, December 2013

	DKK bn	Percent
Domestic financial institutions	1021.6	38.4
Insurance and pension funds	701.6	26.3
Mutual funds and asset managers	284.6	10.7
Other domestic investors	240.4	9.0
Foreign investors 1/	414.6	15.6
Total	2662.8	100.0

1/ It is estimated that foreign affiliates of Danish investors accounted for approximately DKK 100 billion of total holdings by foreign investors at end-December 2013.
Source: Danish FSA and Danmarks Nationalbank

37. Danish covered bonds, all of which are highly rated, enjoy a risk weighting of 10 percent when held by EU banks or credit institutions using the standardized approach, with the exception of ROs issued after 2008, which have a weighting of 20 percent. Outside the EU, highly rated covered bonds generally have a risk weighting of 20 percent. If the investing institution employs the advanced IRB approach, the risk weighting will generally be less. Covered bonds are therefore an attractive investment for financial institutions. They are generally considered to be relatively liquid investments and are used to invest short-term funds.

38. In the implementation of Basel III/CRDIV in the EU, and in particular the LCR, covered bonds will be discounted for liquidity calculations and would be subject to a maximum. The European Commission (EC) has specified that high-quality covered bonds that meet certain criteria may be classified as Level 1 HQLA up to a ceiling of 70 percent and with a haircut of 7 percent. Holdings of bonds issued by the institution itself cannot be included. Regarding the proposed NSFR, the authorities consider that short-term non-callable bonds with a soft bullet feature should qualify as a stable source of financing for long-term adjustable rate loans; the current Basel proposal is not specific on the treatment of such structures.

39. The large share of covered bonds held by domestic financial investors contributes to high interconnectedness in the Danish financial sector, as most institutions hold significant amounts of bonds of other domestic issuers. Such cross holdings will grow substantially with the

implementation of the LCR, as banks will likely seek to diversify their portfolios by replacing own issued covered bonds with those of other institutions. The importance of these interdependencies is increased by the small number of participants on the issuer side, which means that problems in one institution are more likely to have an impact on others. The fact that covered bonds from different institutions have traditionally been regarded as near perfect substitutes enhances this transmission effect. The importance of covered bonds as a percentage of Danish GDP means that this interconnectedness has broader implications for the overall economy.

POTENTIAL RISKS TO FINANCIAL STABILITY

40. The Danish mortgage finance system has been a mainstay of the economy for literally hundreds of years and has performed well in extremely difficult circumstances. Danish covered bonds backed by mortgage loans are of high credit quality, are very liquid, and are among the best investment alternatives to government bonds. Preservation of a strong mortgage loan sector is crucial given its large size in relation to the financial sector and the overall economy.

41. The system is currently facing a number of challenges. One important concern is that the reliance on short-term bonds to finance adjustable and variable rate loans has introduced a major maturity mismatch into the system. In addition, mortgage loan impairments and NPLs have risen significantly since 2007, albeit from a low level (reaching 0.19 percent and 1.7 percent, respectively at end 2013), and a future normalization of European interest rates and the imminent end of IO periods for many borrowers could cause further pressure, although analyses of individual household data indicates that most of those affected would be able to continue to service their debts. With the implementation of the LCR in the EU, some adjustment of portfolios is likely to be necessary, including exchanging own-issued bonds for those of other institutions. This will increase the already high degree of interconnectedness among Danish financial institutions, which means that a problem affecting one institution or one refinancing auction could more easily spread and adversely affect the health of the entire mortgage finance system. The qualification of short-term bullet bonds as stable liabilities in the NSFR calculation is also a potential future issue.

42. The large share of adjustable and variable rate mortgage loans is not by itself unusual, as the housing finance market in many other countries is a floating rate market. However, the Danish market is characterized by the importance of adjustable rate mortgage loans financed with short-term fixed rate bullet bonds, which creates a rising maturity mismatch in the system, as bonds financing new loans mature and must be refinanced along with the historical stock of bonds issued earlier. Similar issues arise in the financing of long-term variable rate loans with short-term bonds, though the initial term to refinancing is generally somewhat longer. In 2013, maturing covered bonds financing adjustable rate loans were DKK 955 billion (EUR 128 billion), equivalent to about half of GDP and more than two thirds of the amount of such bonds outstanding at end-2012. The move to quarterly auctions reduces but does not eliminate the risk of a failed refinancing auction, the consequences of which could be severe. Although it can be argued that much of the domestic investor base (though privately owned) is effectively captive due to the lack of high quality

investment alternatives, the refinancing needs have become so large that this might not be sufficient to ensure against a potential auction failure. The large share in certain bond series accounted for by foreign investors, to whom the captive investor argument does not generally apply, increases this risk.

43. The stability of the investor base, both domestic and foreign, could be adversely affected if the growing maturity mismatch (or other factors) were to lead to widespread credit rating downgrades of Danish covered bonds. Such a scenario is not impossible, given that such concerns have been cited as leading to Moody's withdrawal of ratings for most Danish covered bonds, and Fitch has downgraded its ratings for some bonds.[21] A number of investors are subject to limitations related to credit rating, and their participation in the covered bond market could be reduced if further downgrades occur. A softening of covered bond prices following such downgrades could be exacerbated by mark-to-market and stop-loss rules, causing more investors to withdraw, making the market less liquid and leading to a further deterioration of market prices.

44. The reaction of investors to the new legislation providing for mandatory extension of bond maturities in certain circumstances has been limited[22] in the current search-for-yield environment, as the favorable impact of elimination of uncertainty seems for now to have largely outweighed the increase in extension risk. It is clear that the new provisions make valuation of Danish covered bonds more difficult, raising questions about how to define the final maturity date and making assessment of interest rate risk much more complex. However, potential adverse effects on the domestic investor base are likely to be cushioned by the small size of the Danish government bond market and the lack of high quality domestic investment alternatives. The reaction of foreign investors could be more significant, particularly in times of stress. For all investors, the main issue is likely to be the increase in complexity, as the simplicity of the short-term bullet bonds has historically been one of their attractive features.

45. The changes also potentially make the Danish market more pro-cyclical. The prospect of a maturity extension would likely lead to price declines as some investors attempt to exit the market before the extension is activated. The high degree of interconnectedness of the financial system adds to this pressure, as many of the bonds affected by falling prices would be in the portfolios of other financial institutions, which could lead them to reduce holdings of similar investments.

46. An eventual normalization of European interest rates, which implies a substantial increase from the low policy-induced rates of recent years, would mean a significant payment shock for many borrowers. For example, a return to pre-crisis interest rate levels (e.g., 2005) would entail a near tripling of interest charges (and payments, for loans in the IO period) for many adjustable rate borrowers. Given the large proportion of mortgage loans with adjustable rates, the

[21] Both rating agencies have indicated that the recent legislation providing for mandatory extension of bond maturities in certain circumstances has reduced their concern about the maturity mismatch.

[22] It is estimated at five to ten basis points.

effects of an interest rate increase would be widespread and could lead to some additional loan impairments.[23] A rise in interest rates could also put downward pressure on housing prices, increasing LTVs and requiring issuers to post additional collateral for outstanding covered bonds. Although recent indications by the ECB that monetary easing will continue for some time mean that this risk is limited in the near term, it nevertheless represents an important medium-term challenge. The potential risk implied by the growing share of euro-denominated mortgage loans, though theoretically important, is limited by the strong commitment of the government to the fixed exchange rate between the Danish kroner and the euro.[24]

47. The extensive use of loans with IO periods means that any decline in housing prices puts pressure on MCI balance sheets, as institutions must provide additional collateral to ensure continuous LTV compliance. The forthcoming expiry of IO periods on large numbers of mortgage loans also means that payment obligations will increase significantly for many borrowers, as principal payments will begin on a shortened amortization schedule. Some rise in delinquency and default rates on mortgage loans may ensue, as the substantial decline in housing prices since many of the loans were originated precludes many borrowers from cushioning the impact by taking out a new loan with another IO period.[25] Alternatively, if lenders choose to extend the IO period so that homeowners in financial difficulties can handle the payments, the loans will need to be written down. Nevertheless, the impact is likely to be limited by the long advance notice of the payment increase and the underwriting practices that tested for ability to make the higher payments at the time the loan was granted. Danish financial institutions had comfortable core Tier 1 capital ratios at the end of 2013, and stress tests suggest that they are highly resilient and could easily absorb a rise in loan impairments of the magnitude foreseen.

48. The likelihood that the risks facing the Danish mortgage finance system will materialize is remote, but the risks are themselves substantial. Moreover, the risks are highly intertwined, so that the impact of one is exacerbated by the presence of the others. For example, a normalization of European interest rates could contribute to a further drop in housing prices, which due to the absence of amortization on loans with IO periods, would result in the need for additional collateral for existing covered bonds, putting pressure on MCI balance sheets. A jump in interest rates would also be reflected in higher payment obligations for a large majority of borrowers; the increase would be particularly sharp for loans in the IO period and some pressure on default rates would likely ensue. The high degree of interconnectedness of the system means that risks materializing in one institution would quickly spread across the entire mortgage finance sector. In

[23] A recent study, based on comprehensive income and indebtedness data for individual households, concluded that most borrowers with loans for which payments rise with higher interest rates or the end of IO periods are sufficiently robust financially to be able to absorb the higher payment obligations. Danmarks Nationalbank, Monetary Review, 4th Quarter 2012, Part 2, Danish Families' Financial Robustness, Variable Rates and Deferred Amortization.

[24] The exchange rate has fluctuated in a narrow range around DKK 7.45 per euro in recent years.

[25] Borrowers could in principle take out a new loan with an IO period for 80 percent of the new lower collateral value and refinance the remaining amount with an unsecured bank loan, but this would still result in additional amortization payments.

particular, the failure of a covered bond refinancing auction for one bond series would almost certainly contribute to difficulties in refinancing maturing bonds issued by other institutions, resulting in a jump in interest rates across the board.

POLICY RECOMMENDATIONS

49. The Danish covered bond framework has served the economy well, including during the recent global financial crisis, but it will need to adapt in response to recent product innovation. In particular, it would be prudent to explore ways to mitigate the systemic risks associated with the increased use of adjustable-rate loans and loans with interest-only periods, while maintaining insofar as possible the benefits that they have brought to the Danish homebuyer. Policy formulation is facilitated by the fact that, given the intertwined nature of the risks, solutions aimed at addressing one of the risk components also contribute to reducing stresses in other areas.

50. An important challenge facing the authorities is to reduce the maturity mismatch and refinancing risk associated with the current practice of financing long maturity adjustable and variable rate mortgage loans with short-term bonds. The recently adopted legislation provides a mechanism to address the emergency of a failed refinancing auction, but it would be desirable to provide incentives for the banks to limit the risk of such a destabilizing event. Ideally, the existing regulatory structure could be adapted by using Pillar II reviews or the systemic risk buffer to ensure that lenders take refinancing risk into account by requiring the MCIs to set aside additional capital when the maturity mismatch is large or by restricting it directly, perhaps through application of the Supervisory Diamond approach.[26] Consideration could also be given to modifying the balance principle to include some quantification of this risk—e.g., by requiring additional OC of capital centers issuing short-term bonds. Alternatively, regulation could favor the creation of longer maturity covered bonds to be sold to investors by requiring higher risk weights on loans that do not have certain characteristics (e.g., fixed interest rates or market-friendly rate reset mechanisms). The tranching techniques traditionally used in securitizations might be helpful in packaging such loans for investors seeking longer maturity assets. The risks of such loans might also be more easily covered in the options market.

51. The authorities may wish to adopt policies aimed at reducing the attractiveness of adjustable/variable rate mortgage loans in order to mitigate their potential adverse effects on loan default risk and impairments. Such measures would also contribute to reducing the maturity mismatch and refinancing risk. Some pricing differential has already emerged in the administrative margins charged by banks for adjustable/variable rate versus fixed rate loans; such margins, which earlier were almost identical, were about 20 basis points higher for adjustable/variable rate loans at the end of 2013. Borrowers have responded by lengthening the initial fixed rate period on their loans, which will help cushion the effect of a potential rapid rise in interest rates. The authorities

[26] The Supervisory Diamond for banks sets up a number of benchmarks to indicate banking activities that in principle should be regarded as having a higher risk profile. The Danish FSA conducts an individual and specific assessment of the risks in situations in which banks exceed the benchmarks.

could encourage lenders to further increase the pricing differential by requiring higher credit provisions or additional capital to ensure that the additional risk of adjustable/variable rate loans is fully taken into account. Supervisors currently require that lenders employ stressed debt service-to-income criteria in their loan approval process for such loans; the parameters of the stress could be further increased to provide additional debt servicing cushion.[27]

52. Some limitation or guidance on the conditions of loans with IO periods should also be considered. Eligibility for such loans could be limited to loans with LTVs substantially below 80 percent, or alternatively, borrowers could be required to amortize the portion of the loan above a lower LTV ceiling.[28] Such a provision would reduce the credit risk of such loans and also diminish the need for additional collateral for covered bonds in the event of a future housing price decline. Lenders could be encouraged to limit the length of IO periods (or price them more appropriately) by requiring higher credit loss provisions for loans with longer IO periods.[29] Ending or reducing tax deductibility of interest payments on loans with IO periods, even if only during the IO period, could also encourage borrowers to use such loans more sparingly.

53. With the implementation of the LCR in the EU, some adjustment of financial portfolios is likely to be required. It will be important that this adjustment is managed so as to limit the impact on market conditions during the transition phase. Similar issues are likely to arise with the future implementation of the NSFR.

54. The high degree of interconnectedness of the Danish financial system through the covered bond market means that ensuring the liquidity and health of this market in a stressed situation is crucial for financial stability. The current low interest rates and flat yield curve provide a window of opportunity for the authorities to implement measures aimed at reducing the maturity mismatch by lengthening the maturity of covered bonds financing long-term loans at a time when the cost to borrowers is minimal. Measures to reduce the use of loans with adjustable rates and/or IO periods will reduce credit risk and reinforce the effect of other measures aimed at lowering refinancing risk. The central role of mortgage finance and covered bonds in the financial system means that such policies are vital to the future health of the Danish economy.

[27] Lenders may only offer adjustable/variable rate loans or loans with IO periods to borrowers that have the capacity to repay a fully amortizing fixed rate 30-year loan at the current rate of interest on such loans. Executive Order on Good Business Practice for Financial Undertakings, Executive Order No. 928 of 28 June 2013, Section 19. The provision has formally been in place since December 2012, but has been applied informally for several years.

[28] For example, Swiss mortgage loans with IO provisions are generally limited to LTVs of 60 percent or less. The borrower is required to amortize the portion of the loan above this ceiling.

[29] Such provisions can be justified on a forward-looking basis, as the interest rate on such loans generally includes a premium to cover the additional credit risk.