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DENMARK

TECHNICAL NOTE

THE DANISH MORTGAGE MARKET: A COMPARATIVE ANALYSIS

SEPTEMBER 2006

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I. INTRODUCTION

1. **The Danish mortgage system is among the most sophisticated housing finance markets in the world and presents some unique characteristics.** The combination of a tight regulatory framework with developed specialized, "in-house" expertise in lending and credit assessment, and in wholesale funding and risk management has translated into a highly rated system (and institutions), able to deliver a variety of mortgage products at close to capital market conditions. The note will (i) discuss the particularities of the regulatory framework of the Danish mortgage system. It will then (ii) compare and contrast mortgage financing in Denmark and in other European countries, looking both at the product side (i.e., mortgage loans) and at the funding side (i.e., mortgage bonds) and discuss recent European regulatory evolutions, which could have potentially far-reaching consequences for the Danish mortgage system. To conclude, the paper will (iii) highlight the challenges faced by the Danish mortgage system.

II. THE DANISH MORTGAGE SYSTEM: REGULATORY FRAMEWORK

2. **The Danish mortgage system is widely recognized as one of the most sophisticated housing finance systems in the world.** Through the implementation of a strict balance principle, the system has proved very effective in providing borrowers with flexible, transparent and close-to-capital markets funding conditions. Simultaneously, as pass-through securities, mortgage bonds transfer market risk from the issuing mortgage bank to bond investors. Lastly, strict property appraisal rules and credit risk management by the mortgage banks have also historically shielded mortgage bonds from default risk.

A. Mortgage Credit Institutions are Specialized Lenders

3. **Mortgage Credit Institutions (MCIs) are specialized lenders restricted to conducting narrowly defined mortgage credit activities.** Mortgage credit institutions are the only financial institutions allowed to grant loans against mortgage on real property by issuing mortgage bonds (*Realkreditobligationer*). The scope of activities allowed to MCIs is limited to the origination and servicing of mortgage loans, their funding, exclusively through the issuance of mortgage bonds, and activities deemed accessory. They are not authorized to fund their credit activity with deposits or issue guarantees, but can develop banking and insurance activities through subsidiaries.

4. **The Danish mortgage system is highly concentrated and comprises mutual associations and public limited companies.** The Danish mortgage system was first established as a cooperative or mutual system, at the end of the 18th century, essentially to serve local communities.[1] The first Danish Mortgage Act was passed in 1850, establishing

[1] Loans against mortgages on real property were initially provided on the basis of a *joint and several liability* of borrowers: each and every mortgage borrower in a pool was severally and jointly liable for the liabilities of the entire bond series backing the pool. Several and joint liability started to decline in 2001, and the majority of mortgage bonds is now issued without the several and joint liability of borrowers.

new mortgage credit institutions, as associations. The system kept evolving thereafter, in particular in the early 1970s, when mortgage financing was simplified and standardized. The last major round of reform took place in 1989, removing existing restrictions to the establishment of new mortgage credit institutions, as public limited companies, and authorizing commercial banks to own mortgage credit institutions. Today, there are eight mortgage credit institutions active in the Danish mortgage market, some affiliated with commercial banks (DLR, LR, Nordea Kredit, RealKredit Danmark, FIH), others operating on a standalone basis, as foundations (BRFKredit, NykreditRealkredit). While some institutions specialize in specific market segments, others cater for the entire spectrum of mortgage borrowers.[2] The specialized lender principle and the progressive rationalization of the system explain that the high degree of concentration of the Danish mortgage market is quite unique in Europe, only matched by the Swedish market (Table 1).

Table 1. Concentration in EU Mortgage and Housing Credit Markets

Country	Market Share of the Five Biggest Lenders, in Percent (2003)
Denmark	95[3]
France	75
Germany	45
Italy	65
Netherlands	75
Spain	50
Sweden	95
UK	60
Czech. Republic	80
Hungary	70
Poland	80

Sources: ECB (2004); and Mercer Oliver Wyman (2003) in London Economics (2005)

5. **Access to distribution channels is critical and is likely to be increasingly important.** Mortgage credit institutions compete in a tightly regulated environment. The specialized nature of mortgage institutions and the largely commoditized nature of mortgage products in Denmark result in competition for market share primarily taking place through product innovation and distribution, and distribution channels are likely to be increasingly important going forward. Mortgage credit institutions often do not have their own distribution networks but offer their products through a large range of distribution channels, including branch networks of commercial banks (note that most of the largest mortgage credit institutions are part of banking groups) and agreements with realtors.

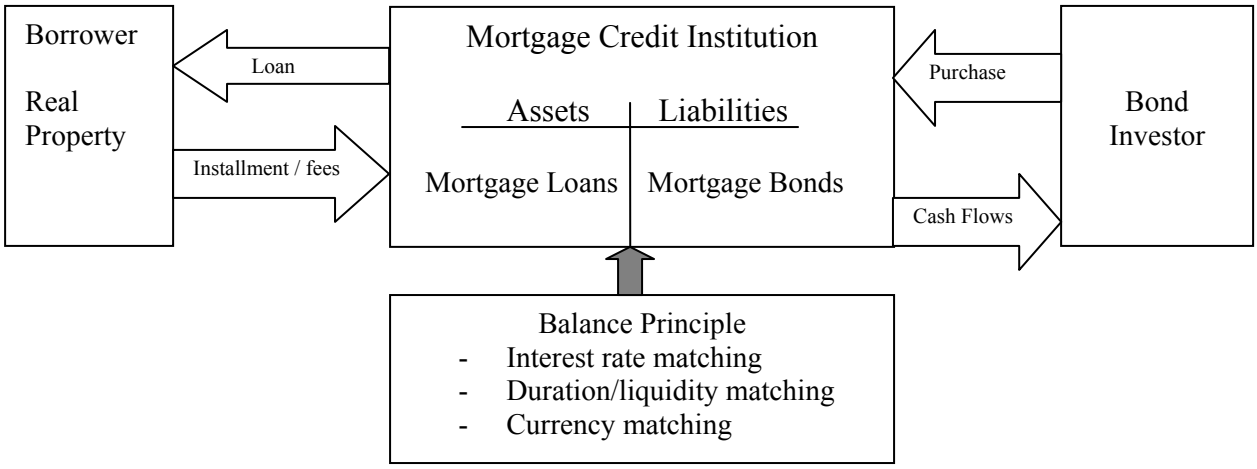
[2] For example, DLR Kredit focuses primarily on agriculture properties and private home rental.

[3] Following the acquisition of Totalkredit by Nykredit in 2004, the five biggest lenders represent more than 99 percent of mortgage lending in Denmark.

B. The Balance Principle

6. **As a result of a strict interpretation of the balance principle established by the Mortgage Credit Act, the Danish mortgage system is a pass-through system allowing mortgage borrowers to benefit from close to capital market financing conditions.** The balance principle imposes strict matching rules between the assets (e.g., mortgage loans) and the liabilities (e.g., mortgage bonds) of mortgage credit institutions. Each new loan is in principle funded by the issuance of new mortgage bonds of equal size and identical cash flow and maturity characteristics. The proceeds from the sale of the bonds are passed to the borrower and similarly, interest and principal payments are passed directly to investors holding mortgage bonds (Figure 1).

Figure 1. The Balance Principle



7. **The prepayment of mortgage loans results in a proportionate redemption of mortgage bonds, and remortgaging results in the issuance in new bonds.** Within mortgage credit institutions, mortgage pools and the corresponding bonds can be segregated in different "capital centers," each with its own reserve fund, and ring-fenced from the rest of the institution. By essentially limiting the role of mortgage credit institutions to conduits between mortgage borrowers and mortgage bond investors, the system allow the former to benefit from financing conditions directly derived from those that prevail in capital markets, for the type of loan they request, at the time the borrowing takes place. The service provided by the mortgage institution is paid for by borrowers through front-end fees, annual administrative fees, and pre-payment fees. The annual contribution paid by borrowers depends on the level of the Loan To Value ratio at the time when the bonds are issued. It covers the interest margin of the mortgage credit institution, and usually represents 0.5 percent of the remaining debt.

8. **The evolution from a full to a new "global" balance principle has given mortgage credit institution some limited flexibility in the management of their assets and liabilities.** Before 2000, MCIs were required to implement a perfect match between their assets and their liabilities with respect to interest rate and maturity characteristics. The 2000

amendments to the Mortgage Credit Act relaxed the strict matching requirements imposed on individual loans and bonds, and introduced instead specific requirements on aggregate risks (i.e., interest rate, liquidity, exchange rate and counterparty risks), therefore allowing for enhanced product innovation while maintaining tight asset and liability management constraints. For example, while mortgage bonds must be secured on loans granted against mortgages on real property, up to 2 percent of a bond series can be collateralized by safe substitute assets, such as government bonds, in order to facilitate the management of redemption risk. However, interest rate risk arising from mismatches between assets and liabilities cannot represent more than 1 percent of the capital base of the institution.[4] Liquidity gaps, measured as the net present value of cash flows related to loans and funding are limited to a declining proportion of the capital base as the payment date nears: liquidity deficits for payments expected in more than 10 years can represent up to 100 percent of the capital base of the institution. They can not exceed 50 percent when due between year 4 and year 10, and are limited to 25 percent for payments due between year 1 and year 3. While MCIs are allowed to use options to manage their assets and liabilities, they are normally limited to options with a maturity of four years or less. Lastly, mortgage credit institutions are not allowed to carry exchange rate risk in excess of 0.1 percent of their capital base.[5]

9. S**trict rules also apply to the management of their capital base by mortgage credit institutions.** For MCIs, capital adequacy requirements apply not only at the level of the institution as a whole, but also at the level of each and every capital center within the institution. At least 60 percent of the capital base (and reserves) must be invested in listed bonds, and the associated interest rate risk, measured as a 100 bp adjustment must not exceed 8 percent of the capital base. Mortgage credit institutions are also limited in their ability to invest their capital. For example, real estate assets and property companies cannot represent more than 20 percent of their capital base.

10. **In the conduct of their activities, the risk assumed by mortgage credit institutions is largely limited to credit risk**. This risk has two components: the risk that the borrower defaults and, in this context, the risk that the value of the property will not match the outstanding amount of the loan. Note that new types of mortgage loans are changing the way credit risk is incurred by mortgage banks: with deferred amortization loans, credit risk is higher, since repayments are postponed to a future date.

C. Strict Lending Rules

11. **The strict lending rules imposed by the Mortgage Credit Act differ depending on the type of property financed.** Maximum loan to value (LTV) ratios and lending periods are set up for each category of property. While for all categories of properties, the maximum lending period can be up to 30 years (and up to 35 years cooperative homes), maximum

[4] Interest rate risk is calculated as the worst-case outcome from a series of scenarios specified by the supervisor.

[5] Exchange rate risk is measured on a VaR basis: maximum loss over a 10 day period, at a 99 percent probability, for all relevant on balance sheet, including the securities portfolio, and off balance sheet items.

lending limits differ significantly according to the nature of the mortgaged property. For owner-occupied homes, rental properties, cooperative homes and housing projects, mortgage loans can represent up to 80 percent of the value of the property. In contrast, maximum LTV ratios are limited to 70 percent for agricultural properties, 60 percent for commercial real estate and secondary residences, and 40 percent for un-built sites.[6] In addition, a change in the purpose of a mortgaged property and the transfer of a property to another property category can result in changes in the characteristics of the mortgage loan.

12. **In assessing the "mortgageable" value of properties, mortgage credit institutions are expected to adopt a conservative approach.** The key principle is that the estimated value should fall within the amount that an experienced buyer with knowledge about price and market conditions for the said type of property would be deemed to be willing to pay. In particular, when assessing the market value of the property, the risks of changes in market conditions as well as in the structural conditions of the property shall be taken into account whereas factors which result in a particularly high price shall be discarded. The property serving as collateral must be valued on sight. However, following this initial assessment, mortgage lenders are not required to periodically mark-to-market the value of the properties backing their loans.

D. Registration and Foreclosure

13. **Effective land and mortgage registration are key elements contributing to the good functioning of the Danish mortgage system.** Denmark maintains three registers of real properties. The cadastre (Kort-og Matrikelstyrelsen) is the basic register, and gives a specific identification number to each land parcel. This unique title number is then used by other registers, in particular the Land Book. The Land Book registers all rights attached to each property, and is therefore the legal register providing safe titles and securing private rights. It is only when a mortgage has been finally and correctly registered in the Land Book that the mortgage bank can grant a loan without any other type of security. The Land Book is administered by district courts, under the responsibility of the Ministry of Justice. Lastly, the Municipal Register of Real Properties gathers data on valuation of land parcels and buildings, and is mainly used in relation with the collection of land taxes.

14. **Speedy forced sales and repossession procedures add to the efficiency of this framework.** In the event of non-payment of its mortgage-related obligations by the mortgagor, the mortgage bank may put the property up for a forced sale. Forced sales are carried through by enforcement courts, which are part of the ordinary system of courts. Mortgagees will be covered in order of priority and while uncovered mortgage loans will be deleted from the Land Register, but the mortgagees will keep their (uncovered) claim against the borrower as a personal claim. It typically takes no more than six months from the time when the borrower defaults on the loan until a forced sale can be carried through.

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[6] As the Danish corporate structure is dominated by SMEs that do not have access to the corporate bond market, mortgage loans are frequently used by the corporate sector to finance its activities.

E. The Supervision of Mortgage Banks

15. **The supervision of mortgage credit institutions by the Danish FSA combines the general risk-based approach used for all banking institutions with a specific focus on the framework set up by the Mortgage Credit Act.** In the evaluation of a financial institution, the DFSA distinguishes between the general risk inherent with the type of institution and the specific risk associated to a particular institution. In contrast to commercial banks, which are assumed to have a "high general risk," MCIs are considered as "average general risk" institutions, thanks to the various legal and regulatory limitations placed on the risks they are allowed to assume. The specific risk of each institution is estimated by the supervisor's internal rating system. Through ratios related to solvency, growth in loan portfolios, evolution of market risks, the rating system helps determine the intensity of supervision applied to each individual institution. Regarding mortgage credit institutions, indicators based on the issuance of mortgage bonds and the origination of loans help assess how institutions implement the requirements of the balance principle. The analysis of loans granted by type of properties and comparative reports on late payments and losses allow to closely monitoring the evolution of credit risk within the different mortgage credit institutions. Specific on-site inspection programs focusing on key aspects such as property valuation practices complement the off-site supervisory work.[7]

III. Mortgage Financing In Denmark

16. The balance principle and the tight regulatory framework in which mortgage credit institutions operate have not prevented the broadening of the range of mortgage loans available to borrowers, and the corresponding diversification of mortgage bonds available to investors.

A. The Product Side: Mortgage Loans

17. **Fixed rate callable annuity loans remain the dominant mortgage loans, although new type of loans has appeared since the mid-90s, in response to the changing demand expressed by borrowers and mortgage bond investors.** Adjustable interest rate loans have been reintroduced in 1996, with maturity up to 30 years. The associated mortgage bonds have a shorter maturity than the corresponding loans. The entire remaining debt, or a specific fraction of it, is refinanced at periodic intervals.[8] At the time of the refinancing, the interest on the loan is adjusted to the market level. Adjustable interest loans can also be granted in a series of installments, over a specified number of years. Loans with an installment free period of up to 10 years (interest-only loans) have been introduced in 2003, as adjustable interest loans or fixed rate loans. Mortgage loans with interest rate guarantees were introduced in

[7] The DFSA uses its own valuator teams.

[8] Noncallable bullet bonds with maturity from 1 to 11 years are used to finance interest reset loans: the borrower takes out a 20- to 30-year annuity loan, where interest rate is adjusted periodically (typically yearly). When the remaining debt of the loan needs to be refinanced, new bonds are issued.

2004, in two main forms: (i) floating-to-fixed loans, where the conversion takes place when the 6-month CIBOR rate reach the cap, and then remain fixed even if the market rate later declines; and (ii) capped-floater loans, where the interest rate is reduced if the rate later declines again, and combine a fixed-interest rate loan with interest reset features and are based on variable interest bonds, adjusted over CIBOR every 6 months. The maturity of the underlying bonds ranges from 5 to 30 years, and the entire loan is refinanced when the bond matures. Thanks to the balance principle, these new type of loans do not result in additional large funding or liquidity risk for the mortgage banks. However, some of these loans (interest-only loans) may prove more risky for borrowers, and this may further strain the repayment ability of residential as well as corporate borrowers, potentially contributing to a more general increase in non-performing loans when the credit cycle deteriorates.

18. **The growing appetite of Danish mortgage borrowers for variable rate loans in recent years is not unique, but corresponds to a trend witnessed throughout Europe (and in the US).** A survey study conducted by London Economics (2005) showed that mortgage loans with interest rate fixation periods of less than a year have gained ground in most European countries, where mortgage loans are traditionally fixed-rate loans in recent years. In Denmark in particular, the estimated market share of mortgage loans with interest rate fixation periods of less than a year (including capped loans) grew from 4.2 percent to about 37 percent between 1999 and Q2 2006. More precisely, their share of the mortgage market has remained stable or declined only in countries where variable rate loans are usually the dominant form of mortgage loans. In the UK, their market share declined from 80.5 percent to 75 percent.

19. **A distinctive feature of the Danish mortgage market is the call and delivery option embedded in standard Danish mortgage loans.** These embedded call and delivery options enable a borrower to pre-pay or buy-back his loan at any given time, at par or at the prevailing market price. Outside of Denmark, only U.S. fixed-rate mortgage contracts offer borrowers a penalty-free (i.e., other than administrative fees) prepayment option (but no delivery option). Fixed-rate mortgage loans can be granted as callable or non-callable loans. Callable loans may be prepaid, at par, before maturity, either on a payment date or "at once" (i.e., before the next payment debt).[9] Adjustable interest rate loans (and index-linked loans) are always non-callable, and can only be redeemed at par at the time of the adjustment. Like other mortgage loans, they can, however, be prepaid at any time, by delivering the underlying bonds. In a high interest rate environment, the borrower can cancel his loan by buying back equivalent bonds in the market, instead of being forced to prepay and incur a loss. Furthermore, when rates are high, buying back the loan (below par) and refinancing into another loan/bond closer to par allows for capital gains, in return for accepting larger coupon

[9] Since bond investors are entitled to their coupon payments until the next payment date, the borrower will have to prepay the full coupon. He will, however, be compensated for making the funds available to the credit institution before the payment date, at a rate close to the prevailing money market rate.

payments. Practically, the mortgagor buys back "his" bonds in the market and delivers them to the mortgage credit bank that will then cancel the loan.[10]

Box 1. Bond Loans and Cash Loans

Mortgage loans can be granted as bond loans or cash loans. In a bond loan, the principal of the loan matches the volume of bonds that are issued by the mortgage credit institution. The amount paid to the borrower corresponds to the market value of the issued bonds. If the bond price is below par (or if interest rate rise between the moment the loan is offered and the time it is paid to the borrower) then a higher number of bonds must be sold, and the principal of the loan will exceed the proceeds effectively paid to the borrower. The interest rate on the loan is equal to the coupon rate on the underlying bonds. In a cash loan, the principal of the loan corresponds to the proceeds effectively paid out to the borrower. The face value of the loan corresponds to the market value of the underlying bonds. The interest rate on the loan corresponds to the yield to maturity of the underlying bonds, and is higher than to the coupon rate of the bonds, since the bonds are usually issued below par. Compared to bond loans, the non-deductible capital loss is transformed into higher, tax deductible, interest payments. In return, prepayment of cash loans will lead to the taxation of investment gains. Fixed Price Agreements and guarantees allow the borrower to hedge the uncertainty associated with bond and cash loans.

20. **These options and the increased variety of mortgage loans have contributed to an increase in re-mortgaging activity in the recent period of declining long-term interest rates.** In periods of falling interest rates, remortgaging into a new loan with a lower nominal interest rate will result in a gain in the form of lower future net payments; usually, however, at the price of an increase in the overall outstanding debt. Conversely, at time of rising long term interest rates, redeeming an existing loan at a lower market price and refinancing into a new loan will achieve a reduction in outstanding debt, at the price of higher future interest payments. The strategy is ultimately profitable if the interest rate declines again in a not too distant future, allowing for another remortgaging operation to a lower coupon debt.[11] The introduction of adjustable interest rate loans has expanded the range of remortgaging strategies. In a steepening yield curve environment and rising long-term rates, borrowers holding a fixed-rate callable mortgage loan can refinance into shorter variable rate mortgage loans and reduce their outstanding debt. Conversely, in a flattening environment with declining long-term rates, holders of variable rate mortgage loans will be inclined to refinance into long-term fixed mortgages. Increased sophistication of advisory services at mortgage credit institutions have led to more systematic monitoring of remortgaging opportunities for their customers, and contributed to fuel remortgaging activity in recent

[10] For bond investors the call and delivery options embedded in Danish mortgage bonds impose a pre-payment risk throughout the maturity of the bonds. For different bond series, the prepayment risk is influenced by the trend and volatility of interest rate and the composition of the underlying borrowers' pool. Changes in the probability of prepayment can quickly affect the liquidity of mortgage bond series. With the development of new types of loans, the complexity of the option features imbedded in mortgage bonds increases, requiring increasingly sophisticated risk management systems.

[11] Before the tax deductibility of interest rate payments was reduced in 1998, "horizontal remortgaging" allowed borrowers with fixed rate cash loans to benefit from rising interest rates, by refinancing through a new cash loan backed by bonds carrying the same nominal coupon as the old loans, but a higher effective interest rate, therefore leading to lower future net interest payments.

years. However, products such as capped loans are likely to lead, ultimately, to a decline in remortgaging over the longer term.

21. **Compared to other European housing finance systems, the Danish mortgage system combines a relatively high degree of completeness and cost-efficiency.** Market completeness can be evaluated against a series of criteria, in particular the variety of mortgage products available to potential borrowers, market access (i.e., the range of borrowers who effectively have access to mortgage products), the distribution of products and the availability of information and advice on mortgage products. Based on these criteria, the 2003 Mercer Oliver Wyman and European Mortgage Federation study ranked the Danish market third out of a sample of eight European markets.[12] Further, more comprehensive, surveys have confirmed this high completeness level of the Danish mortgage market (Table 2).

Table 2. Availability of Mortgage Products

	Availability of Mortgage Products			Mortgage Product Availability to Nonconforming Borrowers		
	Max (estimated average) LTV	Interest Only Loans	Equity Release Mechanism	Senior (more than 50 year)	Credit Impaired	Self-Certified Income
Belgium	125 (75)	WA	NA	WA	LA	WA
Denmark	80 (80)	LA	WA	WA	WA	WA
Finland	(65)	NA	WA	WA	LA	WA
France	100 (80)	LA	NA	WA	NA	WA
Germany	80 (70)	LA	NA	WA	NA	LA
Italy	80 (55)	WA	NA	WA	LA	LA
Netherlands	125 (90)	WA	WA	WA	LA	WA
Spain	80 (65)	WA	LA	WA	LA	LA
Sweden	(75)	WA	WA	WA	LA	WA
UK	130 (75)	WA	WA	WA	WA	WA

WA: widely available, LA: limited availability, NA: not available

Sources: London Economics Survey; Mercer Oliver Wyman & MITA (2005); and IMF and Author estimates.

22. **Furthermore, mortgage products in Denmark appear cheaper than in most European countries, and the introduction of new mortgage products does not appear to have changed this situation.** The diversity of mortgage systems makes direct cost comparisons between countries difficult. Adjusting mortgage prices for factors such as interest rate structure, prepayment option, fee structure, and expected credit losses allow some form of country comparison. According to computations conducted by Mercer Oliver Wyman for the 2003 mortgage study, mortgage costs in Denmark were the third lowest among a sample of eight European countries. In particular, fees and credit risk management represented less than 10 bp each, an illustration of the efficiency benefits associated with the

[12] Denmark, France, Germany, Italy, the Netherlands, Portugal, Spain, and the UK.

standardization and integration of the mortgage production process and of the strict risk management framework, including mortgage registration and collateral repossession.

B. The funding Side: The Danish Mortgage Bond Market

23. **Outstanding Danish mortgage bonds are predominantly callable bonds, with maturities comprised between 10 and 30 years, and non-callable bullet bonds, used to finance interest reset loans, with maturities between 1 and 11 years** (Table 3). Since the overall mortgage credit market has expanded, the development of new types of loans, and the corresponding new mortgage bonds, has not translated into a reduction of the outstanding stock of traditional callable fixed-rate mortgage bonds, where the most liquid issues are concentrated.

Table 3. Main Features of Danish Mortgage Bonds

	Noncallable Bullet Bonds	Callable Bonds	Capped Floaters	Floating to Fixed Bonds
Interest Payments	Annual	Quarterly	Quarterly	Quarterly
Repayment	Bullet	Annuity or IO	Annuity or IO	Annuity or IO
Coupon	Fixed	Fixed	Floating, capped	Floating, fixed
Currency	DKK and €	DKK and €	DKK	DKK
Maturities	1–11 years	10, 15, 20, 30 years	30 years	30 years
Issuance	Tap and auction, throughout maturity	Tap, during the first 3 years	Tap, during the first 3 years	Tap, during the first 3 years

Sources: RealKredit Danmark, June 2005; and Danske Bank, March 2006.

24. **The Danish mortgage market offers contrasted liquidity conditions and the volume of activity differs significantly among the numerous outstanding issues.** A small number of series (10–15) reach high outstanding amounts—the 10 largest mortgage bonds account for approximately 25 percent of total mortgage bond outstanding volumes—and are very liquid. When possible, mortgage banks enhance the liquidity of these series by reusing the bonds when refinancing mortgage loans and by issuing bonds identical to bonds issued by others.[13] Traditional mortgage bonds are traded in a uniform market, and mortgage bonds with a given coupon and maturity have traditionally been regarded as (perfect) substitutes, including in the market making arrangement organized by the main dealers.[14] Capped rate and deferred amortization bonds do not benefit from such a degree of homogeneity and therefore do not benefit from similar market making commitment, although market making activities have recently been organized for some of these issues. While mortgage bonds are

[13] Mortgage bonds are issued on tap in different series, each backed by a specific pool of loans. As the series remain open for issuance for up to three years, the final size of a particular bond series will depend on the evolution of interest rates during the issuing period.

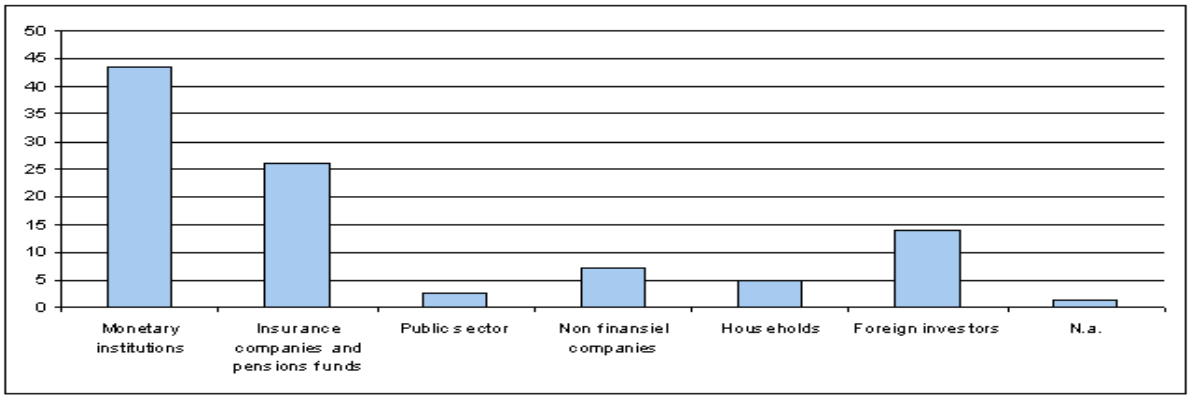
[14] Nine or ten banks have entered into an agreement through the Danish Bankers Association to provide bid-and-ask prices on the most liquid series of mortgage bonds. The agreement covers 60 series of mortgage bonds issued by the five mortgage banks, for pre-agreed standard transaction sizes.

quoted on the Copenhagen Stock Exchange, the large majority of mortgage bonds are traded primarily over-the-counter (OTC), by phone and electronically. The market for Danish mortgage bonds benefits from an active repo market, allowing mortgage banks, investors, and other participants to efficiently manage their positions. Furthermore, mortgage bonds are eligible collateral for the central bank.

25. **Going forward, the increased diversity of mortgage loans offered to borrowers may result in smaller and more heterogeneous bond issues and pricing conditions.** A possible concern is therefore that liquidity in mortgage bond issues will be more and more difficult to maintain. This may affect the appetite of foreign investors (mostly institutional investors and hedge funds) for Danish mortgage bonds. This may also limit the ability to build a complete, homogeneous mortgage bond yield curve in the long run.

26. **Danish mortgage bonds investor base includes institutional foreign investors, including hedge funds.** Monetary institutions, including commercial banks and mortgage banks, represent the largest investor group, holding about 43 percent of mortgage bonds in circulation (Figure 2). Together, pension funds and insurance companies are estimated to hold 25 percent of outstanding issues, whereas direct holding by retail investors amount to 5 percent of holdings. The share of foreign investors (close to 15 percent overall) has been increasing in recent years. They are especially present among the highest liquid bonds (of which they hold about 20 percent of outstanding amounts), and hold significant amounts of callable bonds (about 57 percent of total holdings of mortgage bonds by foreign investors). While foreign investors hold limited amounts of short term non callable bullet mortgage bonds denominated in DKr (6 percent), their holdings of the same type of bonds issued in euros amounted to 22 percent at the end of 2004.

Figure 2. Investors in Danish Mortgage Bonds (Q1 2005)



Source: Danmarks Statistik

C. Danish Mortgage Bonds and Evolution of the European Covered Bond Market

27. **The mortgage bond market dominates the Danish fixed income market and is the second largest mortgage market in Europe.** In 2004, mortgage bonds (and bonds

issued by special institutions) accounted for 71 percent of the market value of bonds listed on the Copenhagen Stock Exchange, whereas government bonds accounted for 27.4 percent of total market value, and Asset-Backed Securities and corporate bonds represented a marginal 1.6 percent. 1673 mortgage bond issued were listed in the market, representing 75 percent of all listed bond issues. In absolute size, the Danish mortgage market is the second largest mortgage market in Europe (14.2 percent of outstanding covered bonds, and 29.3 percent of covered bonds backed by mortgage loans), after the German pfandbrief market, which benefits from a large public loan segment (Table 4).

Table 4. Covered Bonds: Market share of the Main Countries of Issuance
(In % of total outstanding, end 2004)

	Total Covered Bonds	Mortgage Bonds	Public Sector Bonds
Germany	61.4	32.4	89.5
Denmark	14.2	29.3	...
France	6.1	8.2	4.2
Spain	6.1	11.9	0.7
Sweden	5	10.4	...
Ireland	1.9	0.3	3.4
Switzerland	1.8	3.6	...
Luxembourg	1.2	...	2.3
U.K 1/	0.9	1.9	...
Netherlands 1/	0.8	1.6	...
Others	0.7	1.4	...
Total	100	100	100
Memo: in € million	1,644,927	795,135	849,792

Source: European Mortgage Federation

1/ Structured Covered Bonds, issued in the absence of a legal framework.

28. **Danish mortgage bonds have been traditionally viewed as a variety of covered bonds.** In the broad sense, covered bonds can be defined as debt instruments secured on a specific pool of assets, on which investors have a senior claim. More specifically, investors in covered bonds have recourse to both a pool of collateral and the issuing entity. By pooling large amounts of small, usually illiquid loans such as mortgage loans and public sector loans, and issuing covered bonds to fund them, issuers monetize the underlying credit and liquidity risks, and gain the spread income. Furthermore, thanks to the built-in protections, covered bonds benefit from high credit rating, often higher than that of the issuing institution, offering the latter lower funding costs than senior unsecured debt. As collateralized securities, covered bonds share some similarities with Asset and Mortgage-Backed Securities. The differences are however also significant. To start with, covered bonds require a specific and detailed framework to develop. They have mostly developed in Continental Europe, whereas the ABS and MBS are the dominant securitization technique in the U.S. and U.K. markets. Covered bonds and ABS/MBS have different risk profiles, resulting primarily from differences in the definition of eligible collateral assets, the location of these collateral assets,

sources of cash flows, the nature of risks transferred to bondholders and the organization of bondholders' protection (Table 5).

Table 5. Main Features of Covered Bonds, Danish Mortgage Bonds and Mortgage-Backed Securities

	Covered Bonds	Danish Mortgage Bonds	Asset/Mortgage-Backed Securities
Mortgage Loan Production	Bundled Process	Bundled Process	Unbundled Process
Type of Securitization	On-Balance sheet	On-Balance sheet	Off-Balance sheet Securitization
Source of Cash Flows	Issuer cash flows	Issuer cash flows	Collateral cash flows
Risk exposures:			
- Credit risk	Issuer	Issuer	Investor/credit enhancer
- Prepayment risk	Issuer	Investor	Investor
- Market risk	Investor	Investor	Investor
Structure of loan pools	- Dynamic pool, with substitutable and mainly heterogeneous assets - Eligible assets defined by law	- Dynamic pool, with substitutable, and mainly heterogeneous assets - Eligible assets defined by law	- Generally static pool, with not substitutable and mainly homogeneous assets - Eligible assets not necessarily defined by law
Over collateralization	Usually defined by law	Usually defined by law	Required to achieve high rating
Credit quality	Asset quality, strength of the originating institution and legal framework	Asset quality, strength of the originating institution and legal framework	Asset quality and over collateralization, Strength of the issuing structure, and quality of the guarantor
Investor protection (bankruptcy of the issuer /originator)	Bankruptcy privilege and asset segregation	Bankruptcy privilege and asset segregation	Bankruptcy Remoteness

29. **Covered bonds are not a homogeneous category, and their respective characteristics depend on the underlying legal framework.** Table 6 highlights the main features of selected covered bond frameworks in Europe.[15] For example, loans to the public sector and local authorities are considered eligible assets in most countries, and only Denmark and Latvia exclude them, unless there are collateralized by a mortgage on real property. In most countries, cover pools can include loans extended to and debt issued by foreign borrowers, usually from EEA countries and selected OECD countries. However, while foreign assets are excluded from the cover pools of *cedulas*, cover pools backing Luxembourg *lettres de gage* can include debt from all OECD countries, other European covered bonds, as well as unguaranteed debt issued by German Landesbanks and Sparkassen. More significantly, noticeable differences exist with regard to key risk management characteristics such as how collateral assets are valued, the degree of flexibility afforded in

[15] In Italy, Belgium, and Portugal, primary legislation regarding covered bonds has recently been passed or is being drafted. In early 2006, the UK FSA announced its intention to introduce a covered bond regime compliant with EU legislation. A similar move is expected in the Netherlands.

the balance principle (i.e., the management of mismatches between the collateral pool and the covered bonds), the requirement and legal treatment of over-collateralization.

Table 6. Covered Bond Legislation in Selected European Countries

	Denmark	Germany	Ireland	Finland	France	Latvia	Norway	Spain	Sweden
Entry into force	1850/1989/2003	1900/2004	2001/2004	2000	1999	1998/2002	2006	1981/2003	2004
Specialist Bank	Yes	No	Yes	Yes	Yes	No	Yes	No	No
Authorized assets	Any loan mortgaged on real property	PS, RM, CM	PS, RM and CM	PS, EM and CM	PS, CM, RM 1/	Any loan mortgaged on real property	PS, RM, CM	PS, RM, CM	PS, RM, CM 2/
Loan to value	40–80 percent	60 percent	60 and 75 percent	60 percent	60, 100 percent	60, 75 percent		70, 80 percent	60–75 percent
Basis for Valuation	Market value	Long-term sustainable value	Market value	Lending Value?	Lending value	Market value	Market value	Market value	Market value
Protection against mismatches	Currency, interest rate and liquidity, strict balance principle	Currency, maturity (nominal and NPV cover)	Interest rate, currency and duration (NPV cover)	Currency, duration + nominal cover	Currency + nominal cover	none		Cash flow matching	Cash flow matching
Over-Collateralization (pool level)	Coincidental, but protected by law	2 percent on a net present value basis	Required	Coincidental, but protected by law	Coincidental, but protected by law	Mandatory (10 percent of cover assets)		Mandatory (11-43 percent of cover assets)	
Asset pool after bankruptcy	Continues, legal segregation	Continues, legal segregation	Continues, insolvency privilege	Continues, legal segregation	Continues, insolvency privilege	Accelerates	Continues, insolvency privilege	Continues, insolvency privilege	Continues, legal segregation
Special pool administration (in bankruptcy)	No	Yes	Yes	Yes	No	No	No	No	No

Sources: Moody's; Fitch Ratings; Standard & Poors; Association of German Mortgage Banks; and London Economics.

Notes:

PS–Public sector loans; RM–residential mortgages, CM–commercial mortgages; LTV– loan-to-value.

1/ public sector loans, units of UCITS and MBSs.
2/ Eligible assets also comprise leasehold and tenancy ownership rights.

30. **Recent European Directives are important steps toward the creation of a more homogeneous European covered bond market.** The revised UCITS Directive and the Capital Requirement Directive provide, for the first time, a clearer definition of covered bonds and list the classes of assets that can be eligible as collateral for covered bonds (Box 2). The directives are about to bring two major changes to the covered bond market. In order for covered bonds to benefit from a privilege risk weighting, additional minimum requirements with respect to the type and credit quality of cover assets, the valuation and monitoring of loan collaterals have been introduced. Second, the uniform 10 percent privilege risk weighting applied to covered bonds until now will be discontinued.

Box 2: Covered Bonds in European Union Regulations

Covered bonds have been first defined by the UCITS directive. Its Art. 22 (4), as updated in 2001, defines covered bonds as bonds:
(i) Issued by a credit institution (with its registered offices in a member state).
(ii) Subject by law to a special public supervision designed to protect bond holders.
(iii) The proceeds of issuance must be invested in conformity with the law in assets capable of covering claims attaching to the bonds, during the full life of the bonds.
(iv) In the event of failure of the issuer, these assets would be used on a priority basis for the reimbursement of the principal of the bonds and the payment of accrued interest.

Bonds satisfying the preceding requirements may be granted preferred treatment:
(i) Member states can authorize UCITS to invest up to 25 percent of their assets in covered bonds issued by the same issuer (rather than the standard 5 percent limit).
(ii) The Directive on life insurance authorizes life insurers to invest up to 40 percent (rather than 5 percent) of "bound assets" in covered bonds (as defined by the UCITS directive) issued by a single issuer.
(iii) The Banking Coordination Directive permits member states to ascribe a 10 percent risk weighting to bonds that fall within the definition of Art 22(4), a privileged treatment.
(iv) The Capital Requirement Directive extends this preferential treatment: To take into account the specificity of covered bonds, in the RSA, a 50 percent reduction is given to the risk weight of issuing institution. In the Foundation Internal Risk-Based Approach, covered bonds are assigned LGD values of either 11.25 or 12.5 percent.

The UCITS directive fails to specify the type and credit quality of assets that can be used as collateral for covered bond issues. These shortcomings have been addressed by the Capital Requirement Directive, which defines the eligibility criteria of various types of securities for preferential risk-weighting. Covered bonds can be backed by:
(i) Exposures to (or guaranteed by) central banks, central and regional governments, local authorities and other public sector entities in the European Union,
(ii) Exposures to (or guaranteed by) non-EU central banks, central governments, public sector entities, regional government and local authorities, multilateral development banks, international organizations, with ratings equivalent to AA- or better. Exposures to issuers with lower ratings (A) should not exceed 20 percent of the nominal amount of outstanding covered bonds of issuing institutions,
(iii) Loans secured by residential real estate (or shares in Finnish housing companies, senior units issued by French Fonds Communs de Créances or equivalent securitization vehicles, provided that at least 90 percent of the assets of such FCC or equivalent securitization vehicles are composed of mortgages), for up to 80 percent of the value of the pledged properties.
(iv) Loans secured by commercial real estate (or shares in Finnish housing companies, senior units issued by French Fonds Communs de Créances or equivalent securitization vehicles, provided that at least 90 percent of the assets of such FCC or equivalent securitization vehicles are composed of mortgages), for up to 60 percent of the value of the pledged properties.
(v) Total exposure to financial institutions (rated between AA- and AAA), permitted as liquid, substitution assets, cannot exceed 15 percent of the nominal amount of outstanding covered bonds of the issuing institution.

31. **The variety of options allowed by the Capital Requirement Directive (CRD) will result in greater variations of risk weightings applied to bank claims, including covered bonds.** The risk weighting of covered bonds will primarily depend on the option chosen by national supervisors and investing banks, and could in theory range from 3 percent to 20 percent. Table 7 shows the variety of possible risk-weights, depending on the option chosen. The standardized approach allows for two different options to determine the risk-weight of the issuing bank, and leaves it at the discretion of each domestic regulator to decide which option to apply within its jurisdiction. In the central government based method (option 1), the issuer is assigned a risk weight one category below that of the central government of the country where it is located.

32. **All banks and their covered bond issues are therefore treated equally, irrespective of the creditworthiness of the issuer or the quality of the security backing the covered bonds**.[16] In the credit assessment based method (option 1), the risk weighting of covered bonds is determined by the external credit risk assessment of the issuing bank. Under this approach, covered bonds issued by banks with ratings below AA- will lose their 10 percent risk weighting privilege status. The foundation and advanced IRB approach differ with regard to loss given default (LGD). In the foundation IRB, banks use their own estimates of probability of default and rely on their supervisor for LGDs, whereas in the advanced IRB, banks need to provide also their own LGD estimates. The table below summarizes the range of possible risk-weighting for covered bonds resulting from these options (in the IRB approaches, because of the variety of possible parameters used in the estimations, the results are presented as a range).

Table 7. Risk-Weighting of Covered Bonds under the Capital Requirement Directive

	Standardized Approach (In percent)		IRB Approach (In percent)	
Issuer Rating	Option 1	Option 2	Foundation 1/	Advanced 2/
AAA	10	10	3.5-4.5	3-4
AA+ to AA-	10	10	4.5-7.5	4-6.5
A+ to A-	10	20	7.5-12.5	6.5-10.5
BBB+ to BBB-	10	20	12.5-20	10.5-16

Sources: Ixis CIB 2005; Deutsche Bank 2005; and Credit Suisse 2006.

1/ Assuming regulatory LGD of 11.25 percent.

2/ LGD estimated by the investing bank (9 percent in the current example).

33. **This increased variety of possible risk-weighting will affect the relative demand for covered bonds, and lead to increased spread differentiation between issues.** However, assessing the precise impact of CRD on the covered bond market remains a difficult exercise. For instance, credit institutions subject to the CRD are a major investor

[16] Given current sovereign ratings in Europe, all covered bonds would be 10 percent risk weighted, except Greek covered bonds (20 percent risk weight).

group in covered bonds (their share is estimate to represent around 40 percent), but are not the only one. Furthermore, the CRD applies only to investing banks located in E.U. countries.[17] Lastly, not all of them, obviously, will apply the IRB approach. Similarly, the evolution of the relative attractiveness of covered bonds and off-balance sheet securitization is not straightforward, in particular with regard to residential mortgage loans, as the Basel II/CRD framework provide little incentive to securitize these assets. Furthermore, capital charges for low-rated securitization tranches are high under Basel II, discouraging originators from retaining subordinated tranches. Therefore, it is likely that banks will find stronger incentives to securitize asset classes with more punitive treatment under Basel II (CMBS, SMEs, low-rated corporates).

IV. Concluding Remarks

34. **The Danish mortgage system may face transitional challenges stemming from the implementation of new European Directives.** In order for Danish mortgage bonds to be recognized and given the preferential treatment granted to covered bonds in the Directives and be able to compete on a level playing field with other European covered bond issuers, the Danish mortgage framework would need to be amended. In particular, loan-to-value requirements in the Danish system (as well as in other European jurisdictions) are based on the value of the covered assets at the origination of the loan, whereas the Directive requires that LTV calculations be performed, and the respect of the stated LTV limits be fulfilled, over the full life of the covered loan. Furthermore, in its current form, the Danish regulatory framework only recognizes mortgage loans as eligible collateral, whereas the Directives recognize a wider range of possible collateral.

35. **The Danish authorities are faced with the delicate task to strike the balance between diverging demands.** On the one hand, commercial banks see the current situation as an opportunity to enter the covered bond market and to create a level playing field with their European competitors, thus demand a significant reshuffle of the existing framework. On the other hand, mortgage banks insist on the need to preserve the essential characteristics of the current mortgage system, and advocate limited alterations to the current system.

36. **The extent to which the current system will be adapted (through new definitions of the balance principle and of eligible collateral in particular) remains unclear at this stage.** Careful attention will need to be given to the potential effects concerning consumer protection and the transparency and flexibility characterizing the existing system. In very broad terms, the strict application of the balance principle makes current Danish mortgage bonds true pass-through securities, and transfers market risk from mortgage borrowers to mortgage bond investors, limiting the risk for mortgage banks to credit risk. When the system is amended in accordance with the EU regulations, some of its attractive features would be traded off against the potential benefits. To fully realize these benefits, it would be important to ensure continued effective disclosure and transparency and a level playing field among market participants.

[17] Banks from outside the EU and investing in covered bonds will risk-weight covered bonds in accordance with Basel II.

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