Markets for Norwegian banks' long-term funding – implications of changes in market conditions and the regulatory framework

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Norwegian banks rely on market funding to a further extent than previously. Bond markets in Norway and abroad are important sources of bank funding. The composition of banks' wholesale funding is affected by changes in market conditions and the regulatory framework. Amendments to the rules on collateral for loans from Norges Bank and proposals for new international rules for banks' liquidity coverage and net stable funding ratios are affecting Norwegian banks' investment and funding structure. The ownership composition and liquidity in the Norwegian market for bank bonds may change in the period ahead as a consequence of new rules for pledging securities with Norges Bank and increased demand for covered bonds.

1. Introduction

Banks' funding sources primarily comprise customer deposits and various kinds of wholesale funding. The deposit-to-loan ratio[2] in Norwegian banking groups (banks and mortgage companies combined) has fallen from a good 100% in 1993 to a 60% in 2010. The reason for the sharp decline is that lending growth has outstripped deposit growth. Banks have therefore funded a growing portion of lending through market funding. Of Norwegian banks' market debt at end-March 2011, long-term wholesale funding[3] accounted for approximately 80%. For long-term wholesale funding, banks rely on the bond markets.

Long-term funding stabilises bank funding and reduces banks' risk of having insufficient funds for meeting their obligations when they fall due. This liquidity risk is normally due to maturity mismatches between banks' assets and liabilities. Norwegian banks were adversely affected during the financial crisis because they relied on short-term market funding to finance long-term lending and because their financial assets did not prove to be liquid during the crisis.[4] Short-term funding increases banks' refinancing needs, making them more vulnerable to access to and the price of funding.

In the wake of the financial crisis, the Basel Committee has proposed liquidity coverage and stable funding requirements (see Box 1). The net stable funding ratio will likely restrict the use of short-term wholesale funding. Norwegian banks' volume of outstanding certificates[5] denominated in NOK has fallen sharply since 2005, with the recent decline in volume possibly reflecting Norwegian banks' early adjustment to the proposed new stable funding rules. The proposed new rules for banks' liquidity coverage, new rules for collateral for loans with Norges Bank and new solvency rules for insurance companies (Solvency II) will also affect the ownership composition for bank bonds and covered bonds issued in NOK.

The present article describes Norwegian banks' long-term wholesale funding in the light of developments in credit markets and various regulatory changes. Section 2 discusses the Norwegian bond market and bonds as a funding source. Banks' and mortgage companies' funding structure is described in Section 3, where funding in different currencies and at different maturities is examined in detail. Section 4 provides an assessment of developments in the ownership structure of bank bonds and covered bonds and the extent to which various changes in regulations have impacted ownership composition. Section 5 assesses the liquidity in banks' funding markets by measuring the turnover velocity of outstanding bank bonds and covered bonds. The relationship between liquidity and risk premiums for bank bonds and covered bonds is an indication of the interaction of bond turnover and the cost of bond funding. This relationship is illustrated in further detail in Section 6. Section 7 provides a brief summary.

[1] The views in this article are the author's and not necessarily those of Norges Bank. I am grateful to Sindre Weme, Johannes Skjeltorp, Bjørne Syversten, Alexander Vik and Per Atle Aronsen (Norges Bank) for useful comments. I am also grateful to Jo Saakvitne (a student intern at Norges Bank) for assistance with the charts. This article is a translation of the Norwegian article called "Markeder for norske bankers langsiktige finansiering – betydningen av endringer i markedsforhold og regelverk" published in *Penger og Kreditt* 1/2011 in June 2011.

[2] Customer deposits in per cent of gross lending to customers.

[3] Long-term wholesale funding is securities debt issued in securities markets with maturities of at least one year.

[4] See speech by Gulbrandsen, K. (2010).

[5] Certificates resemble bonds, except that they have shorter maturities, up to 12 months, and are not traded on Oslo Børs (Oslo Stock Exchange).

2. The Norwegian bond market

The Norwegian bond market is a market for raising funds denominated in NOK. Bonds issued in foreign currency by Norwegian issuers abroad and bonds denominated in NOK issued abroad by Norwegian or foreign issuers are not considered part of the Norwegian bond market.

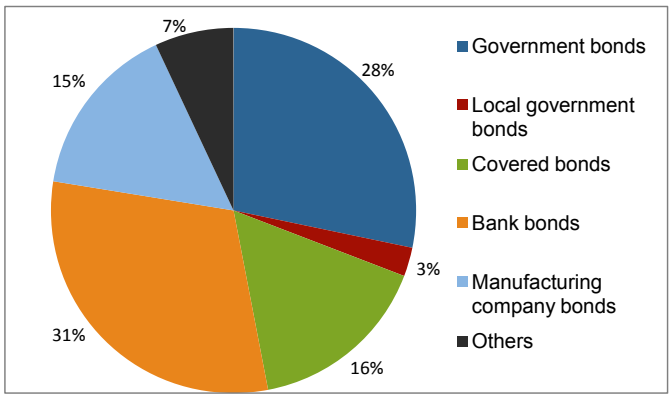
There was a total of NOK 837bn outstanding in the Norwegian bond market[6] at end-2010. Government bonds accounted for 28% of outstanding debt (see Chart 1). Owing to the Norwegian government's favourable financial position, government participation in the bond market is relatively modest. Norwegian banks had outstanding bonds totalling NOK 256bn in the Norwegian market at end-2010, which represents 31% of outstanding debt in the Norwegian bond market. For banks, bonds are a supplement to deposits from customers. Large banks also issue bonds in foreign currency, swapping the foreign currency for NOK through a combination of currency and interest rate swap contracts.

Establishment of the market for covered bonds (OMF market)

The establishment of the covered bond market in June 2007 has provided banks with a new and important source of funding. Covered bonds may be issued by mortgage companies, which primarily rely on such bonds for funding. All mortgage companies in Norway that issue covered bonds are owned by banks. Banks may either transfer residential mortgages or commercial property loans to their mortgage companies, which issue covered bonds collateralised by these loans, or they can provide loans directly from the mortgage company. In this way, banks fund their residential mortgage and commercial property lending though their mortgage companies. As covered bonds are generally highly secure, they can be issued on better terms than unsecured bonds or other paper.[7]

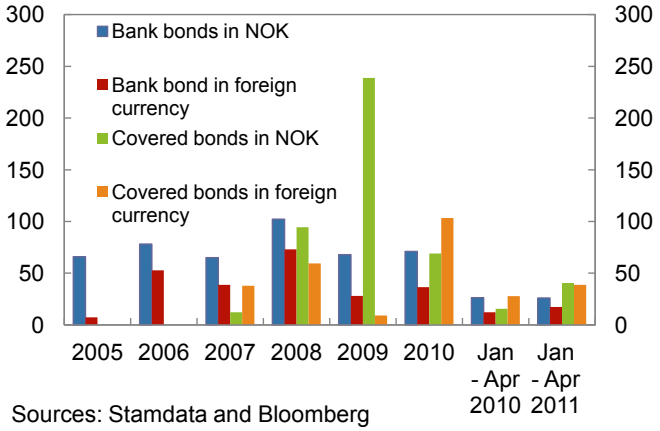
Mortgage companies account for 44% of total Norwegian bank and mortgage company lending secured on dwellings, a share that has grown quickly.[8] Issues of covered bonds accounted for 60% of the total volume of bank and mortgage company bond funding in NOK and foreign currency in 2010 (see Chart 2). This share was 33% in 2007 and 47% in 2008.[9]

Chart 1 The Norwegian bond market[1)] by issuer sector. Per cent. Yearly figures. As at 31 December 2010



[1)] Comprises bonds listed on Oslo Børs and Oslo ABM
Source: Oslo Børs

Chart 2 Issued amounts of bank bonds and covered bonds by Norwegian banks and mortgage companies. Billions of NOK. Yearly and monthly figures. 2005–2011 and January–April 2011



Sources: Stamdata and Bloomberg

3. What are the characteristics of Norwegian banks' capital issues in credit markets?

Issues in foreign currency

In recent years, Norwegian banks have diversified their wholesale funding. Norwegian investors lack sufficient investment capital to meet the largest banks' funding needs, and banks are able to issue larger volumes in foreign markets. Bonds denominated in foreign currency give Norwegian banks a broader range of funding options, and thus an alternative to funding in NOK. It can also be cheaper for banks to obtain funding in foreign currency than in NOK, even after the foreign currency funding has been swapped for NOK through interest rate and currency swaps. Half of Norwegian bank and mortgage company bond issues in 2010 were in foreign currency. By com-

[6] In the present article, statistics with figures from Oslo Børs for the Norwegian bond market comprise bonds listed on Oslo Børs or Oslo ABM. Oslo ABM was established in 2005 as alternative exchange for listing and trading bonds. This exchange has a less extensive listing process than Oslo Børs, with more lenient reporting requirements. Oslo ABM is administered and organised by Oslo Børs.

[7] For a more detailed account of the covered bond market, see Bakke, B., K. Rakkestad and G. Dahl (2010).

[8] The percentage of loans secured by dwellings transferred to mortgage companies comprises loans with and without a loan-to-value ratio that qualifies for securing a covered bond.

[9] On account of the swap arrangement (discussed below), capital issues in 2010 are not comparable with issues in 2009.

Box 1: Basel III – new rules for liquid assets and stable funding

In the wake of the financial crisis, the Basel Committee has proposed introducing two quantitative liquidity tests to supplement existing qualitative requirements. The first is a liquidity coverage ratio, and the other is a net stable funding ratio. The liquidity coverage ratio and net stable funding ratio are to be introduced in 2015[1] and 2018, respectively.

Liquidity coverage ratio (LCR)

Under the liquidity coverage ratio, each bank must have a sufficient stock of liquid assets to survive a 30-day period of considerable market stress featuring a substantial outflow of customer deposits, without having access to new market funding or a supply of new liquidity from the central bank.

The characteristics an asset must have to qualify for inclusion in the stock have not yet been finalised. However, an asset must be of high quality, highly liquid and unencumbered. Assets which otherwise qualify that have been pledged to the central bank or a public sector entity (PSE) but are not used as collateral may be included in the LCR.

Under the Basel Committee's proposal, "Level 2" assets, which are somewhat less liquid than the most highly liquid assets, may comprise a maximum of 40% of the stock. It is primarily covered bonds that may qualify as Level 2 assets in NOK.

The Basel Committee has proposed three options for financial institutions in jurisdictions with an insufficient supply of liquid assets in their domestic currency.[2] Since the government securities market in Norway is relatively small, financial institutions domiciled in Norway are likely to be eligible for this alternative treatment, if the Norwegian authorities allow it.[3]

Net stable funding ratio (NSFR)

To promote longer-term funding of banks, the Basel Committee has proposed a net stable funding ratio (NSFR). The purpose of this standard is to enhance the stability of banks' funding and to avoid maturity mismatches between assets and liabilities. The standard will ensure that long-term assets are funded by a minimum percentage of stable and long-term funding sources.

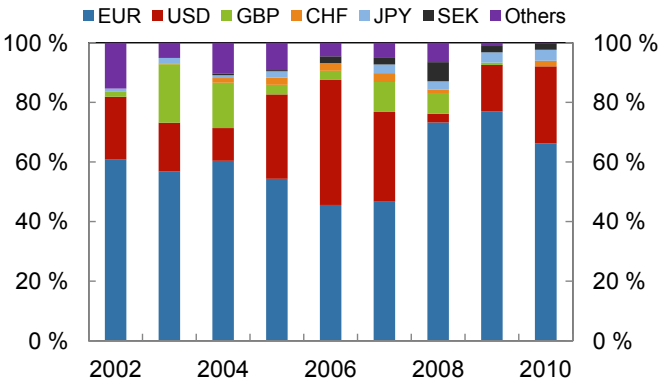
Under the NSFR standard, available stable funding must exceed required stable funding. "*Stable funding*" is defined as the portion of those types and amounts of equity and liability financing expected to be reliable sources of funds over one-year time horizon during a period of moderate market stress. The share that must be financed by stable funding depends on how liquid the asset is. Banks with long-term loans and a large share of other illiquid assets with long maturities will have to have a substantial portion of long-term funding.

[1] Finanstilsynet (the Financial Supervisory Authority of Norway) has directed Norwegian banks to report in accordance with a provisional liquidity coverage ratio as from 31 July 2011.

[2] The three options are: 1) Contractual committed liquidity facilities from the relevant central bank, 2) Foreign currency liquid assets and 3) Additional use of Level 2 assets with a higher haircut. These options are described in detail in *Financial Stability* 1/11 (Box 2), Norges Bank.

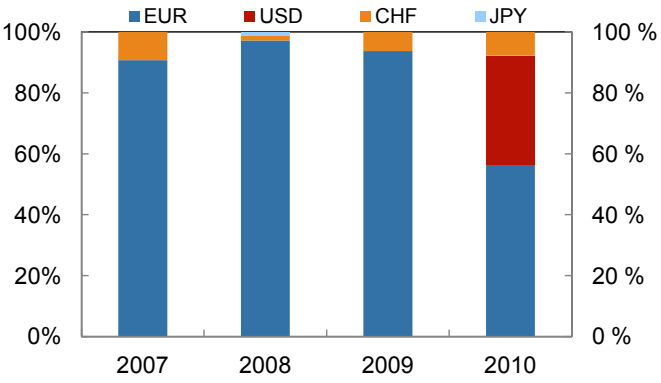
[3] In Norway, outstanding government securities amounted to around 24% of GDP in 2010. Excluding the amount of outstanding Treasury bills in the swap arrangement, the Norwegian government securities market amounts to around 14% of GDP. See Syed, H. (2010) for a more detailed description of the Norwegian market for government securities in view of new liquidity requirements.

Chart 3 The currency composition of bonds issued in foreign currency by Norwegian banks. Weighted by amount issued. Per cent. Yearly figures. 2002–2010



Source: Bloomberg

Chart 4 Currency composition of covered bonds issued in foreign currency by Norwegian mortgage companies. Weighted by amount issued. Per cent. Yearly figures. 2007–2010



Source: Bloomberg

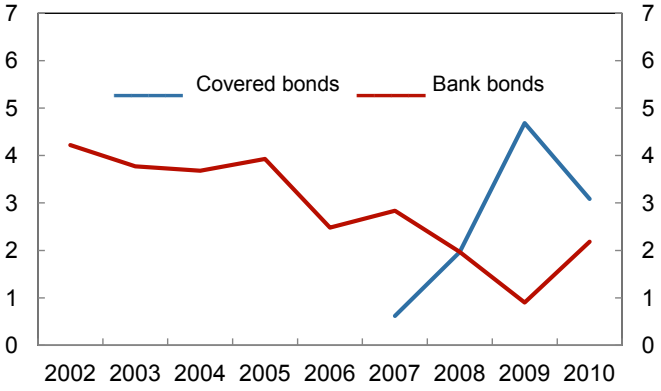
parison, only 10% of the volume of bonds had been issued in foreign currency in 2005. It is the largest banks and mortgage companies that issue foreign currency bonds.

For several years, European bond markets have been an important source of funding for Norwegian banks and mortgage companies. More than half of Norwegian bank and mortgage company foreign currency bond issues in 2010 were denominated in euros (see Charts 3 and 4). After 2008, Norwegian banks obtained larger portions of their foreign funding in USD, and beginning in 2010, mortgage companies also began to issue USD-denominated covered bonds. This is possibly related to the European sovereign debt crisis that began in spring 2010. Raising a smaller share of funding in euros enables Norwegian banks to reduce their vulnerability to developments in European credit markets. Another possible reason is that banks and mortgage companies wish to diversify their foreign sources of funding, on account of changes in the effective price of foreign funding and for the sake of diversification in principle. However, banks with a large element of funding in foreign currency will be more dependent on functioning foreign credit and interest rate and currency swap markets.

Maturity structure of Norwegian bank bonds and covered bonds

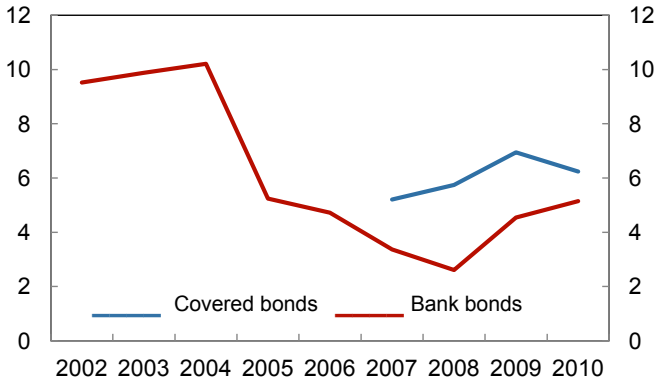
If maturities of bank bonds issued in NOK are weighted by issued volume, they show a downward trend from 2005 to 2009 (see Chart 5).[10] The weighted maturity of banks bonds issued in foreign currencies fell sharply from 2004 to 2008 (see Chart 6). A possible reason for the decline in maturity is that banks chose to rely more on short-term funding during good economic times. An upward sloping yield curve can make it cheaper to roll over short-term

Chart 5 Maturity of issued bonds denominated in NOK. Weighted by amount issued. Number of years. Yearly figures. 2002–2010



Sources: Stamdata and Norges Bank

Chart 6 Maturity of issued bonds denominated in foreign currency. Weighted by amount issued. Number of years. Yearly figures. 2002–2010



Sources: Bloomberg and Norges Bank

[10] The average unweighted maturity is longer than the weighted maturity. One possible reason is that smaller issues with long maturities are often private placements with individual investors on terms tailored to the investor, and not via a public exchange.

funding than to obtain long-term funding. The degree of banks' short-term funding depends among other things on being able to refinance at a relatively reasonable price. This may be one of the reasons that large banks rely more on short-term market funding than smaller banks. However, the maturity of bank bonds issued in NOK and foreign currency increased from 2009 and 2008, respectively. It cannot be ruled out that Norwegian banks will adjust to the new stable funding requirements by raising funds at longer maturities.

Mortgage companies fund their lending with long-term wholesale funding. The maturity of covered bonds is normally longer than those of bank bonds (see Charts 5 and 6). The weighted and unweighted maturity of covered bonds issued in NOK rose considerably from 2007 to 2009. Nearly all covered bonds issued in 2009 were used in the swap arrangement between the government and Norwegian banks.[11] Since the swap arrangement permitted swap with up to five-year maturities, the average maturity of covered bonds issued increased sharply in 2009. The average maturity fell the following year, which may be related to end of the auctions in the swap arrangement. Because of the financial crisis and swap arrangement, mortgage companies issued a very low volume of covered bonds in foreign currency in 2009 (see Chart 2). The following year mortgage companies issued a large portion of their covered bonds in foreign markets. In 2010, covered bonds accounted for around 75% of Norwegian bank and mortgage company funding in foreign currency, a substantially greater share than in previous years. The average maturity of larger covered bond issues changed little from 2009 to 2010, but increased somewhat for small issues.

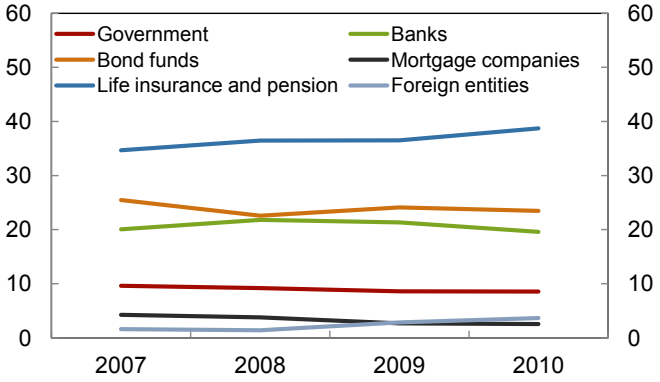
The covered bond market will likely remain an important source of funding for Norwegian banking groups ahead. This will be particularly true if covered bonds should qualify for inclusion in banks' stock of high-quality liquid assets (see Box 1). Under the Basel Committee's liquidity rules, only assets that can be easily and immediately converted to cash at little or no loss of value may be considered high-quality liquid assets. The Basel Committee has pointed out that low duration assets have higher liquidity than high duration assets.[12] This correlation has also been observed in the literature.[13] It is unclear whether and to what extent covered bonds issued by Norwegian mortgage companies will be accepted for inclusion in banks' stock of highly liquid assets. If only the most liquid covered bonds are approved, Norwegian banks may increase issuance of covered bonds with shorter maturities. This may reduce the maturity of covered bonds issued in the Norwegian market and increase mortgage companies' rollover risk.

4. Ownerships structure of bank bonds and covered bonds issued in the Norwegian market

Insurance companies and pension funds are major investors in bank bonds

In countries with fund-based pension plans, pension funds will typically account for the greatest demand for long-term interest-bearing investments in local currency. Insurance companies are the largest providers of local government and private pension plans in Norway. Life insurance companies' provisions for covering future benefits amounted to NOK 777bn at end-2010. Pension funds and life insurance companies owned approximately 40% of outstanding bank bonds in 2010 (see Chart 7). This stake rose by 4 percentage points from 2007 to 2010. In the same period, actuarial provisions increased by 26%. Life insurance companies' and pension funds' holdings of Norwegian covered bonds fell from 2007 to 2009 (see Chart 8).

Chart 7 Selected groups' holdings[1)] of bank bonds denominated in NOK. Per cent of total stock of bank bonds in NOK. Yearly figures. 2007–2010



[1)] Holdings of bank bonds traded on Oslo Børs and Oslo ABM are weighted by outstanding amount of bank bonds in the respective markets.

Source: Oslo Børs

[11] To improve Norwegian banks' funding situation during the financial crisis, on 24 October 2008, the Storting (Norwegian parliament) authorised the Ministry of Finance to establish a scheme whereby banks could swap covered bonds for government securities for an agreed period. See Circular No. 8/26. May 2009: "The arrangement for the exchange of government securities for covered bonds".

[12] Cf. *Basel III: International framework for liquidity risk measurement, standards and monitoring*, http://www.bis.org/publ/bcbs188.pdf. Duration is the weighted maturity of all cash flows pertaining to a fixed income instrument or portfolio.

[13] Bao et al. (2008) have shown that liquidity declines the higher the bond's age and the longer the residual maturity are.

The reason for the decline in holdings from 2008 to 2009 is the increase in the government's stake in 2009 as a consequence of the swap arrangement.[14] Because of insurance companies' obligations for future pension payments, these companies will need to invest large amounts in long-term securities, such as bank bonds and covered bonds.

New solvency rules may boost life insurance companies' share of covered bond holdings

Life insurance companies' new solvency rules, Solvency II, will be introduced on 1 January 2013. Solvency II will change the risk weights used for calculating solvency and the valuation principles for balance sheet items in insurance companies. Under current standards, some of the companies' assets are measured at market value, others at amortised cost[15]. At the same time, insurance obligations are discounted at an interest rate derived from the return on government securities.

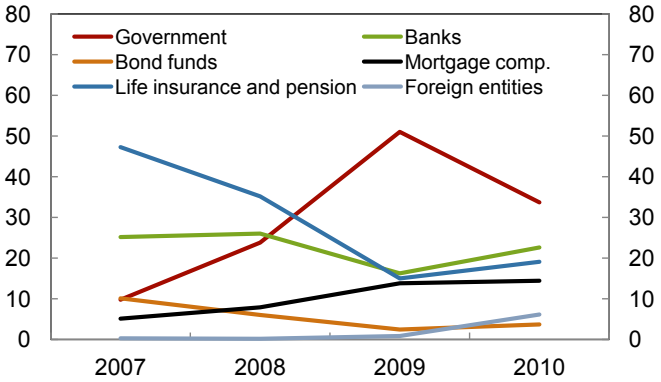
Under the new rules, insurance companies' assets and liabilities will be measured at market value. Pension benefit obligations are very long term, and are therefore sensitive to changes in interest rates under "mark-to-market" rules. Pension insurance undertakings normally have obligations with an average duration of at least 10–15 years, while the maturity of their interest-bearing investments is far shorter. The value of the obligations increases as the interest rate falls, and decreases as it rises. If the interest-rate sensitivity of the obligations is higher than the interest-rate sensitivity of the assets, companies incur losses when the interest rate falls. This gives insurance companies an incentive to invest in assets that have the same interest-rate sensitivity as their obligations. Solvency II will make bonds with long maturities and low credit risk attractive investments for pension insurance undertakings. Covered bonds and government bonds have long maturities and low credit risk. Under the new rules, pension insurance undertakings' demand may switch from bank bonds to covered bonds.

Banks' holdings of bank bonds and covered bonds

Lending is a core banking activity. Over half of Norwegian banks' assets at end-2010 comprised loans to commercial and retail customers. However, banks also held financial instruments on their balance sheets. Bonds owned by banks at end-2010 accounted for 15% of total assets. Of these bonds, 13% were bank bonds, and 53% covered bonds.[16]

Norwegian banks' shares of the Norwegian bank bond and covered bond market at 31 December 2010 were 20% and 23%, respectively (see Charts 7 and 8). Banks' share of the market for bank bonds is expected to decline, since under the Basel III proposal, bank bonds will not qualify for inclusion in liquidity portfolios. In addition, beginning in February 2012 bank bonds will not be accepted as collateral for loans from Norges Bank (see Box 2). Covered bonds will continue to be eligible as collateral in the central bank's borrowing facility and probably also in banks' liquidity buffers. Banks increased their holdings of outstanding covered bonds from 2009 to 2010, with holdings of bank bonds approximately unchanged. It thus appears that banks are adjusting to the new collateral rules by shifting demand from bank bonds to covered bonds. Nonetheless, if a bank owns covered bonds issued by the bank's associate[17] or entity in the same group, these covered bonds will not qualify for inclusion in the stock of high-quality liquid assets under Basel III. Around 90% of the covered bonds owned by banks as at March 2011 have been issued by mortgage companies that are either the bank's associate or part of the same corporate group as the bank. A substantial share of the outstanding volume of these covered bonds is employed in the swap arrange-

Chart 8 Selected groups' holdings[1)] of covered bonds denominated in NOK. Per cent of total stock of covered bonds in NOK. Yearly figures. 2007–2010



[1)] Holdings of covered bonds traded on Oslo Børs and Oslo ABM are weighted by outstanding amount of covered bonds in the respective markets.

Source: Oslo Børs

[14] VPS's (the Norwegian Central Securities Depository) statistics list the government as the owner of covered bonds issued under the swap arrangement. For accounting purposes, however, banks continue to carry covered bonds issued under the swap arrangement on their balance sheets, since under International Financial Reporting Standards (IFRS), banks retain both the risk and rewards incidental to ownership of these assets.

[15] Amortised cost means that a financial asset is measured at the present value of expected future cash flows over its residual maturity, discounted by the asset's effective interest rate. If the company revises its estimates of future cash flows, the asset's carrying amount is changed.

[16] Banks' holdings of covered bonds are primarily attributable to the swap arrangement (see footnote 14).

[17] An associate is an entity over which an investor has significant influence and is neither a subsidiary nor a joint venture. An investor is normally deemed to have significant influence if the investor controls between 20% and 50% of the entity's voting rights at its general meeting.

Box 2: Pledging securities as collateral with Norges Bank

Norwegian banks pledge a large proportion of their securities holdings as collateral for loans from Norges Bank, for access to the central bank borrowing facility and access to liquidity at short notice.

Norges Bank adopted changes to the rules for collateral for loans in October 2005, most of which involved tightened standards for collateral. The changes were intended to improve the quality and liquidity of pledged securities. Changes were also made to avoid situations where pledgor and collateral issuer belong to the same sector and for that reason experience financial problems simultaneously. Norges Bank reduced the quota for the amount of bank bonds an individual bank could pledge as collateral with Norges Bank (bank quota) from 50% to 35% over a one-year period[1], with a two-year transitional period for collateral already pledged.

In 2005, Norges Bank also introduced a volume requirement, whereby privately issued securities denominated in NOK had to have an outstanding minimum volume of NOK 300m to be pledged as collateral.[2] The volume requirement prompted banks to raise the share of issues with a minimum volume of NOK 300m permanently from 2005 to retain access to the central bank borrowing facility.[3] The requirement for new deposits of privately issued securities denominated in foreign currency pledged as collateral was set to an outstanding minimum volume of EUR 100m. At the same time, a bank could not pledge more than 20% of a security's outstanding volume in favour of Norges Bank. However, during the financial crisis in 2008, the collateral rules were temporarily relaxed. For example, the requirement for a minimum volume of NOK 300m for securities issued in NOK by private issuers was suspended.

In 2010, Norges Bank decided that securities issued by banks and other financial institutions would no longer be eligible as collateral for loans from the central bank as from 15 February 2012. The Bank also decided to enlarge the basis for calculating the bank quota to encompass securities issued by foreign banks and other Norwegian and foreign financial institutions. Developments in foreign financial institutions often correlate with developments in Norwegian banks. This enlargement of the basis for calculation was motivated by a desire for a level playing field between Norwegian and foreign financial institutions.

1 See B. Bakke and H. Tretvoll (2005) for a more detailed review of the changes in the collateral rules in 2005.

2 Securities issued by Norwegian banks and mortgage companies owned by Norwegian banks were granted a two-year transitional period, for new collateral pledges as well.

3 See Igland and Skjeltorp (2011) for a more detailed description of how the rules for collateral for loans from Norges Bank have affected the patterns of issuance in the Norwegian bond market.

ment. Should covered bonds prove to be accepted for inclusion in the stock, banks will probably invest in covered bonds issued by external mortgage companies that are neither in the same banking group nor are associates. This will entail a change in the ownership structure of covered bonds in the banking sector.

Foreign investor interest in Norwegian bonds

Foreign investor demand for Norwegian bonds is of both a long-term and short-term character. There are indications that most investors who are merely seeking positions in NOK will do so in a manner that minimises other risks, which makes government securities with short residual maturities the most suitable investments. Foreign investors have large holdings of Norwegian government bonds, and at end-2010 their share of Norwegian government bond holdings was 65%.[18] High demand from foreign investors may depress Norwegian government bond yields, affecting yields on other interest-bearing securities. Owing to the short supply of Norwegian government securities, foreign investors may be interested in investing in covered bonds, and perhaps in bank bonds paying

18 According to anecdotal information from Oslo Børs it cannot be ruled out that a number of foreign investors in reality are Norwegian investors who have invested in Norwegian bonds through nominee accounts with foreign investment banks. This would inflate foreigners' holdings of Norwegian securities. A number of Norwegian shareholders invest in Norwegian equities through these foreign nominee accounts, which do not appear in the company's register of shareholders in VPS (the Norwegian Central Securities Depository). Oslo Børs has created a service to uncover the beneficial owners of these equity investments. Save in circumstances where an exemption applies, information concerning holders of securities registered in the VPS is subject to a duty of confidentiality pursuant to Section 8-1 of the Securities Register Act. Unlike for equities, no such exemptions apply to information regarding bondholders.

a substantially higher coupon, yet still perceived as relatively safe. Foreign investors' holdings of bank bonds denominated in NOK increased from 2% in 2007 to 4% in 2010 (see Chart 7). Their holdings of covered bonds denominated in NOK rose from 1% to 6% in the course of 2010 (see Chart 8).

5. Liquidity in banks' Norwegian funding markets

Liquidity and secondary trading in general

A secondary bond market ensures that investors are not locked into their bond holdings until maturity. Secondary markets make the supply of capital more efficient. Secondary trading can take place through one or more intermediaries on a regulated exchange, such as Oslo Børs. Trading on regulated exchanges enhance the accuracy of pricing. Banks may need to invest in bonds in the secondary market. At the same time an active secondary market makes it easier for banks to issue bonds in the primary market. Liquidity in the secondary market is therefore important to banks.

A market is defined as liquid if participants can carry out large transactions quickly and at any time without an appreciable change in market price. If the market becomes illiquid, a difference between the fundamental value and market price of a security can more easily arise. However, there will always be reasons to doubt what the fundamental value actually is, which may itself reduce market liquidity.

Various methods for measuring liquidity

Measuring liquidity is important for judging how well secondary markets function. Bond market liquidity can be measured in several ways, such as transaction size (the median market value of all transactions in a given period), the turnover rate (the total market value of all trades in a given period divided by average outstanding volume in the same period), the bid-ask spread or the liquidity measure developed by Amihud (the price change in a given period divided by volume traded in the same period).

According to the literature, it is difficult to measure liquidity in a manner that captures all dimensions of liquidity.[19] Aitken and Comerton-Forde (2003) divide liquidity measures into transaction-based and order-based. Transaction size, turnover rate and Amihud's liquidity measure are examples of transaction-based measures. The bid-ask spread is an order-based measure. According to Aitken and Comerton-Forde there is a low correlation between transaction-based and order-based measures, and the liquidity measure chosen will determine results. Owing to the paucity of available liquidity data, in the present article, liquidity in the bond market is assessed only by measuring the turnover rate of bonds outstanding. The turnover rate is an expression of how large a share of outstanding volume that is traded. A higher turnover rate implies increased liquidity. However, Aitken and Comerton-Forde point out that transaction-based measures such as the turnover rate do not provide forward-looking measures of liquidity, since such measures provide a picture of historical transactions. In addition, transaction-based measures may have a tendency to indicate ample liquidity even in turbulent periods, because a large number of investors seek to sell bonds at a low price. For that reason it cannot be ruled out that estimating liquidity using the turnover rate neglects some relevant information about activity in the bond market.

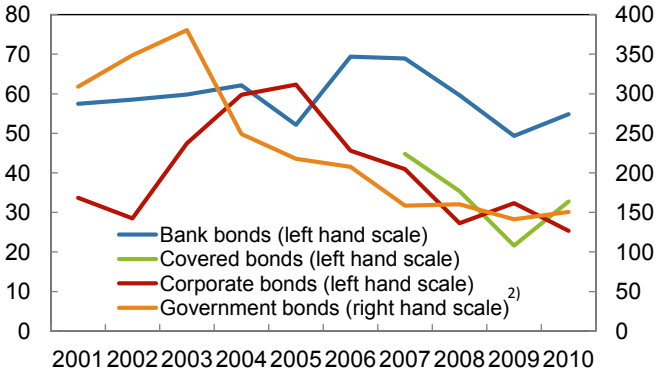
Liquidity in the market for Norwegian bank bonds

The liquidity of Norwegian bank bonds[20], measured by the turnover rate, fell from 69% in 2006 to 55% in 2010 (see Chart 9). Liquidity fell despite the increase in the volume of banks' individual issues beginning in 2005, in response to changes in the rules for collateral for loans from Norges Bank (see Box 2). A decomposition of the turnover rate shows that turnover and the volume of bank bonds outstand-

[19] For more detailed description of various liquidity dimensions, see Harris (1990).

[20] In the present article, the liquidity of bank bonds listed on Oslo Børs and Oslo ABM is estimated together (cf. footnote 6).

Chart 9 Turnover rate[1] in the Norwegian bond market. Per cent. Yearly figures. 2001–2010



[1] Turnover in year *t* divided by average outstanding amount in year *t*

[2] Excluding repo transactions

Source: Oslo Børs

ing have risen since 2005 (see Chart 10). At the beginning of 2010, Norges Bank announced that bank bonds would not be accepted as collateral from February 2012. Even though turnover and the volume of bank bonds outstanding increased from 2009 to 2010, it cannot be ruled out that the tightening of the deposit rules announced by Norges Bank is having an adverse impact on the liquidity and issue volume of bank bonds denominated in NOK.

Bank bonds owned by banks are largely held to maturity. A large share of bank bonds outstanding matures by 2012 (see Charts 11 and 12). If banks hold their bank bonds to maturity, banks' share of bank bonds will have fallen considerably before the new collateral rules go into effect, provided that banks do not invest in new bank bonds. In isolation, holding bank bonds to maturity can depress trading in the secondary market in the period to 2012.

Low credit market demand during the financial crisis resulted in substantial impairment losses on many securities carried at fair value. Securities designated at initial recognition as at fair value may not be reclassified under IFRS. [21] To prevent financial institutions from having to carry substantial unrealised losses on their books, the EU permitted reclassification of securities carried at fair value to the category *held-to-maturity*, with effect from 1 July 2008.[22] The Ministry of Finance followed up the EU decision, and allowed Norwegian financial institutions to reclassify their trading portfolios. As a consequence of this reclassification, bonds held by banks for trading purposes were redesignated as measured at amortised cost. The carrying amount of bonds measured at amortised cost does not fluctuate with their market value. Banks would also have to have the intention of holding their reclassified bond portfolios to maturity. Several Norwegian banks availed themselves of this opportunity and reclassified NOK 97bn worth of bonds to held-to-maturity in the 2008 financial year.[23] In isolation, this has likely had an adverse impact on turnover since 2008.

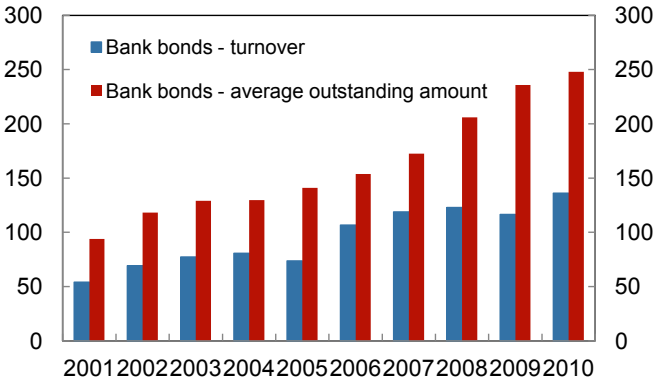
The ownership composition of the bond market is important in determining the share of bonds outstanding available for sale in the secondary market. It is assumed that foreign bondholders hold most of their Norwegian bank bond investments to maturity. Life insurance companies and pension funds had classified 24% of their fixed income investments to held-to-maturity by end-2010. Liquidity in the markets is reduced when investors hold bonds to maturity.

[21] Financial assets recognised in accordance with IFRS could be classified in four different categories (2008): 1) As at fair value through profit or loss, 2) As held-to-maturity, 3) As loans and receivables, and 4) As available for sale.

[22] Reclassification to the category *held-to-maturity* took place at the trading portfolio's carrying amount as at 30 June 2008.

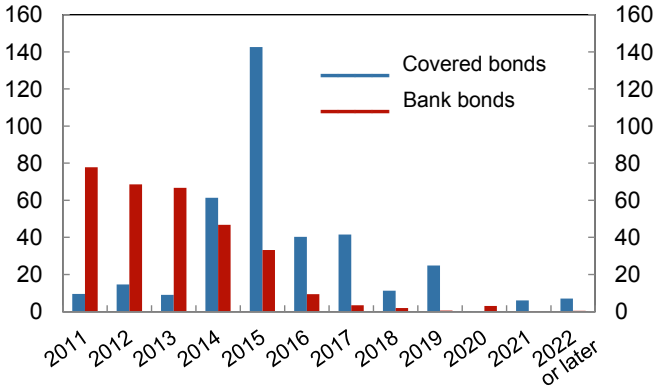
[23] The reclassified amount of NOK 97bn is based on disclosures from the 45 largest banks. Any reclassification of trading portfolios by small banks would not appreciably affect the total.

Chart 10 Decomposition of the turnover rate – Turnover and outstanding amount in the Norwegian bank bond market. Billions of NOK. Yearly figures. 2001–2010



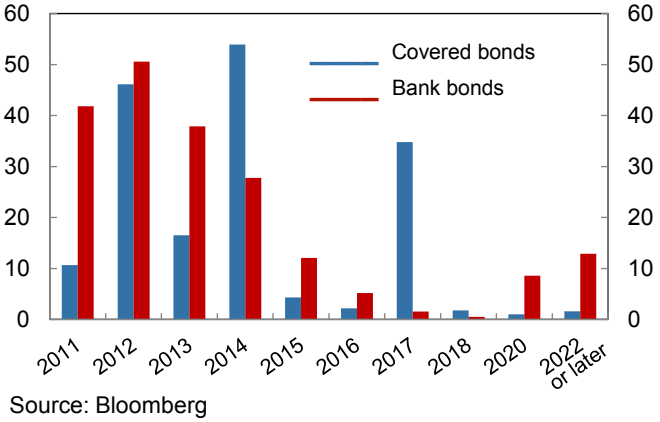
Source: Oslo Børs

Chart 11 Amounts of bank bonds and covered bonds issued by Norwegian banks and mortgage companies to be matured as at end-2010. Denominated in NOK. Billions of NOK. Yearly figures. 2011–2026



Source: Stamdata

Chart 12 Amounts of bank bonds and covered bonds issued by Norwegian banks and mortgage companies to be matured as at end-2010. Denominated in foreign currency. Translated into NOK. Billions of NOK. Yearly figures. 2011–2049



Source: Bloomberg

Effect of the swap arrangement on liquidity in the covered bond market

The financial crisis had reduced demand for covered bonds and other private securities to very low levels when the swap arrangement was announced. Since Treasury bills are more liquid than covered bonds, the swap arrangement substantially improved banks' liquidity positions. The volume of covered bonds outstanding increased sharply as a consequence of the swap arrangement. Mortgage companies issued covered bonds worth NOK 239bn, for which the government swapped Treasury bills. Of Norwegian mortgage companies' total covered bond issues, 96% were associated with the swap arrangement. Since these covered bonds were tied up in the swap arrangement, they were unavailable for trading in the secondary market. This led to a substantial fall in the turnover rate of covered bonds in 2009 (see Chart 9).

When the swap agreements expire, mortgage companies will replace these with covered bond funding from the market. In the event of investor demand for covered bonds ahead, the phasing out of the swap arrangement might make the covered bond market more liquid. As at June 2011, 20% of the outstanding volume of swaps under the swap arrangement matures by end-2011. By 2014 the arrangement will have expired in its entirety. Matured covered bonds from the swap arrangement that are replaced by newly issued covered bonds will be available for sale in the market before the Basel Committee's proposed new rules for liquid assets go into effect in 2015. This suggests that the supply of covered bonds in NOK will have increased before Norwegian banks have to meet the Basel III liquidity standards. However, the extent to which new covered bonds will be denominated in NOK is uncertain.

Large simultaneous expiries of swap agreements make banks vulnerable to market developments on the expiry date. To help bring about a more gradual phasing out of the swap arrangement and a steady development in banks' borrowing, the Ministry of Finance has offered the banks early termination of swap agreements.[24] So far in 2011 (June), agreements worth approximately NOK 20bn[25] have been terminated early. Choosing this option will increase banks' funding needs on the termination date and reduce them at the original maturity. This flexibility will reduce banks' liquidity risk. Banks opting for early termination of swap agreements will be able to raise fresh liquidity by issuing new covered bonds with long maturities when there is ample market demand.

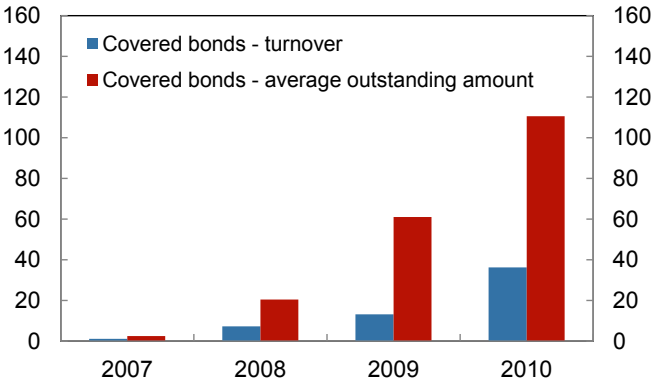
[24] Termination takes place in exchange for payment equal to the present value of the government's expected net cash flow for the remainder of the agreements' original time to maturity (0.4% of the nominal amount of the agreement per year). Banks must repurchase covered bonds through mortgage companies at the same price paid by the government. The entire volume of each agreement may be terminated only on agreements' rollover dates. Agreements are rolled over every six months.

[25] As at end-October 2011 approximately NOK 38bn.

Are covered bonds cannibalising bank bonds?

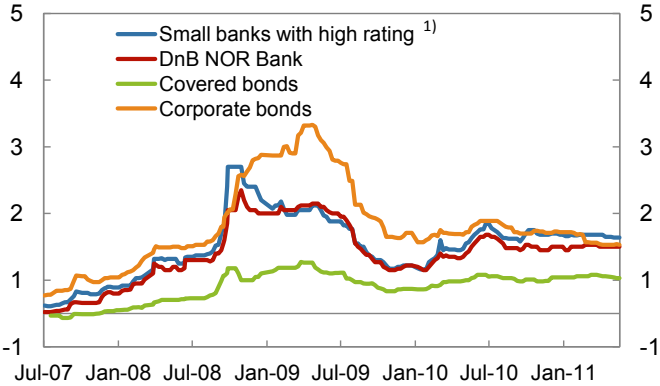
The combination of low credit risk and a higher current return than similarly rated government bonds make covered bonds a suitable investment for several categories of investor. A decomposition of the turnover rate shows that both trading in the secondary market in Norway and the outstanding volume of covered bonds have grown substantially since 2007 (see Chart 13). Mortgage companies initially founded to participate in the swap arrangement have also gradually begun to issue covered bonds in the Norwegian market. Covered bond trading increased by 177% from 2009 to 2010. Bank bond trading rose by 17% in the same period. This difference in the magnitude of the change in turnover may indicate that covered bonds are traded on more attractive terms than bank bonds. Investors do not require as high a return on an investment in covered bonds as on an investment in bank or corporate bonds (see Chart 14). Transferring large shares of residential mortgages to mortgage companies may make remaining bank bonds outstanding a less safe investment overall.

Chart 13 Decomposition of the turnover rate – Turnover and outstanding amount in the Norwegian covered bond market. Billions of NOK. Yearly figures. 2007–2010



Source: Oslo Børs

Chart 14 Indicative risk premiums on 5-year Norwegian corporate bonds, bank bonds and covered bonds. Spreads against swap rates. Percentage points. Weekly figures. 2 July 2007– 18 May 2011



[1] Banks with total assets between NOK 5bn and NOK 15bn and rated A by DnB NOR Markets

Source: DnB NOR Markets

This is because highly secured residential mortgages, those with loan-to-value ratios below 75%, are largely channelled to mortgage companies. The risk premium gap between bank bonds and covered bonds may thus widen further. However, the remaining security will be weakened only if higher capital requirements[26] fail to adequately compensate for the higher credit risk facing bank bondholders.

Other market and regulatory changes may also boost covered bond market liquidity ahead. If price-setters commit to setting two-way prices on acceptable volumes, investors will always be able to buy or sell covered bonds at known prices, which will also increase trading in the covered bond market. The authorities can also facilitate improved liquidity in the covered bond market by revoking the issue regulation[27]. The regulation limits issuers' ability to issue bonds at a discount. Revoking this regulation will make larger bond issues possible, in turn improving the liquidity in the market.

House prices may affect liquidity in the covered bond market

One reason for the high demand for covered bonds is the good quality of the cover pool[28]. However, a fall in house prises will in isolation increase the loan-to-value ratio of the residential mortgages in the cover pool. If the loan-to-value ratio exceeds the 75% maximum, the cover pool will have to be reduced in proportion to the percentage above this threshold. Even so, the remainder of the loan may remain on the mortgage company's balance sheet. Liquidity in the covered bond market appears to rest on an implicit assumption that house prices will not fall so far as to push the loan-to-value ratio of a large portion of residential mortgages above the threshold. The share of residential mortgages with a loan-to-value ratio above the threshold will increase with the magnitude of the fall in house prices.[29] Thus, steep declines in house prices can conceivably reduce the outstanding volume of and trading in covered bonds. Liquidity in the covered bond market is potentially vulnerable to substantial declines in house prices. When new residential mortgages with a maximum loan-to-value ratio are required to fill the existing cover pool, they will not be available to back new covered bond issues. If the mortgage companies increase their substitute collateral[30] or repurchase issued bonds to maintain the quality of the cover pool, activity in the covered bond market will also decline.

[26] Capital requirements are raised if the bank reinvests the proceeds from the sale of transferred residential mortgages in riskier assets, increasing risk-weighted total assets.

[27] Cf. Issue regulation: http://www.lovdata.no/for/sf/fd/td-19961220-1247-001.html#2 (in Norwegian)

[28] The cover pool may primarily comprise residential mortgages with a loan-to-value ratio of up to 75% or commercial property loans within a loan-to-value ratio of up to 60%.

6. Relationship between liquidity and risk premium in funding markets

Liquidity and risk premium in general

Liquidity of funding markets has a sizeable impact on the cost of market funding for banks. Investors will normally require compensation for investing in a relatively illiquid instrument. This element of the risk premium is called the *liquidity premium*. When liquidity falls, liquidity premiums rise, since investors become more fearful that their securities may not find buyers. The assumption that liquidity has a direct impact on bond market risk premiums is a reasonable one. The empirical research of Acharya and Pedersen (2005) shows that the risk premiums set by investors depend on the expected liquidity of the securities concerned. Brunnermeier and Pedersen (2008) have also shown that low market liquidity increases volatility, and thereby risk premiums, in securities markets.

Liquidity premiums in bond markets

Investors use risk premiums to price in both credit and liquidity risk. It is difficult to estimate how much of the risk premium each risk element represents. If a proxy for credit risk is subtracted from the total risk premium, the difference is a risk premium that may roughly represent liquidity risk. The price of credit default swaps (CDS) can be used as proxy for measuring credit risk. In this article, the liquidity premium for European financial institutions in the bond market is estimated by measuring the deviation between an index that measures total risk premiums and an index of CDS prices (see Chart 15). The chart shows that the increase in risk premiums in European credit markets during the financial crisis is largely attributable to high liquidity premiums, even though credit risk also increased in this period. The sovereign debt problems that began in European credit markets in 2010 also caused a substantial rise in risk premiums in the market. As Chart 15 shows, it was primarily higher credit risk that pushed up risk premiums in 2010. This may be because the turbulence in Europe unleashed a fear of both bank and sovereign default. Liquidity premiums did not change to the same extent during this period.

Risk premiums on Norwegian bank bonds also rose sharply during the financial crisis (see Chart 14), primarily reflecting high liquidity premiums in this period. Norwegian banks did not experience solvency problems

[29] See Bakke, B., K. Rakkestad and G. Dahl (2010).

[30] Up to 20% of the cover pool may consist of substitute collateral, which is defined as particularly liquid and secure bonds or bank deposits. Substitute collateral may be increased to 30% upon authorisation by the Ministry of Finance.

during the financial crisis. Banks in Norway were well capitalised compared with those in other countries and thus had larger capital buffers to draw on.[31] However, extensive liquidity problems arose in Norwegian banks, owing to investor uncertainty as to which banks had problems and thus reluctance to fund banks in general.

The increase in risk premiums from 2006 to 2009 coincides with a downward trend in the turnover rate in the same period (see Chart 16). From 2009 to 2010, risk premiums fell as the turnover rate rose. The decline in risk premiums in this period was due to improvements in banks' funding situation owing to a recovery in credit markets. It also shows that Norwegian banks were little affected by the turmoil in Europe in 2010. However, if new collateral rules at Norges Bank result in a less liquid bank bond market ahead, this may raise the risk premium on bank bond investments.

From 2008 to 2010, covered bonds' turnover rate moved in the opposite direction of the risk premium on covered bonds (see Chart 17). In the wake of the financial crisis, the risk premium on covered bonds rose substantially from 2008 to 2009. The turnover rate fell in the same period, which as discussed above is connected with the swap arrangement. The following year, the movement in both the risk premium and turnover rate reversed somewhat. However, the increase in the turnover rate and related decline in the risk premium from 2009 to 2010 cannot be related exclusively to a positive shift in the economy. Liquidity in the covered bond market is profoundly affected by the swap arrangement. As indicated above, developments from 2009 to 2010 were related to the fact that banks, as both investors and borrowers, largely favour covered bonds over bank bonds.

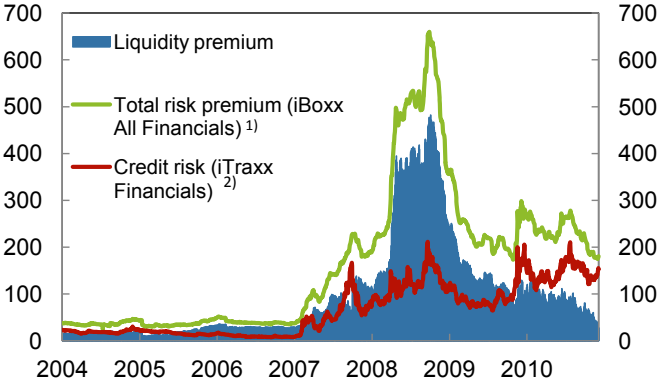
7. Summary

The bond market offers banks several options for funding their lending. In the light of market and regulatory changes, we have seen how the Norwegian bank bond and covered bond market has developed in recent years, and how it may develop in the period ahead. The maturity structure of banks' market funding is affected by proposals for new stable funding requirements. Norwegian banks have increased the maturity of bank bonds issued in NOK and foreign currency since 2009 and 2008, respectively.

The currency composition of banks' market funding is influenced by changes in credit markets. In recent years, Norwegian banks have been issuing more bonds denominated in foreign currency. While banks diversify their market funding in this way, they expose themselves at the same time to disturbances in swap markets and foreign funding markets.

[31] See lecture, Gulbrandsen (2010).

Chart 15 Liquidity premium in the European credit market. Basis points. Daily figures. 21 June 2004 – 24 May 2011

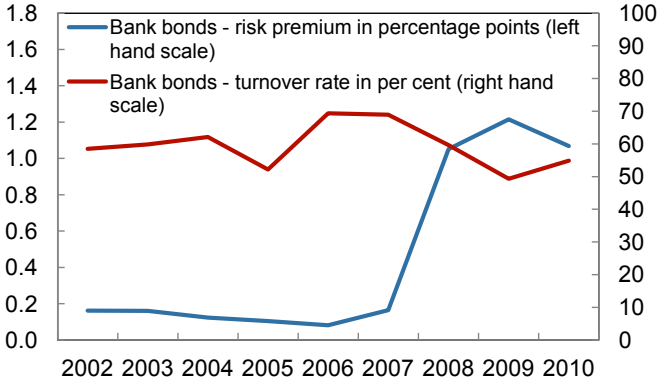


1) Comprises 20 bonds issued by European financial institutions, with maturity of three to five years

2) Index for the CDS-price of 25 large European financial institutions, with five-year maturity

Source: Thomson Reuters

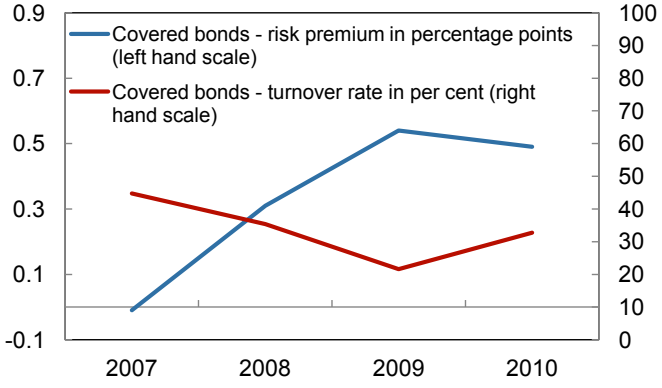
Chart 16 Correlation between risk premium[1)] and the liquidity in the Norwegian bank bond market. Per cent and percentage points. Yearly figures. 2002–2010



1) Indicative risk premiums for bank bonds with five-year maturity, estimated as spreads against swap rates

Sources: Oslo Børs and DnB NOR Markets

Chart 17 Correlation between risk premium[1)] and the liquidity in the Norwegian covered bond market. Per cent and percentage points. Yearly figures. 2007–2010



1) Indicative risk premiums for covered bonds with five-year maturity, estimated as spreads against swap rates

Sources: Oslo Børs and DnB NOR Markets

Changes in the regulatory framework have a sizeable impact on the ownership composition of bank bonds and covered bonds. New solvency rules for insurance companies are likely to redirect pension insurance undertakings' demand from bank bonds to covered bonds. Banks' holdings in the Norwegian bank bond market are expected to fall, since such assets will not qualify for inclusion under banks' liquidity coverage ratio and because beginning in 2012, they will not be accepted as collateral for loans from Norges Bank. Banks' holdings of covered banks will increase further if covered bonds qualify as high-quality liquid assets under Basel III.

New collateral rules at Norges Bank with effect from 2012 may induce banks to hold a greater share of their bank bonds to maturity. In isolation, this reduces trading in the secondary market. The liquidity of Norwegian bank bonds, measured by turnover rate, trended downward from 2006 to 2009. The swap arrangement led to a sharp decline in covered bonds' turnover rate in 2009. Provided there is greater investor demand for covered bonds ahead, the phasing-out of the swap arrangement may increase the liquidity of the covered bond market. A number of market and regulatory changes indicate that covered bonds will become more liquid through increased supply and demand. Such a development may come at the expense of the liquidity of bank bonds. We have also seen that liquidity in the markets for bank bonds and covered bonds are normally negatively correlated with the risk premiums in the respective markets.

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