

Summary

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In Sweden, the largest part of banks' lending to households consists of mortgages where the home is used as collateral. Swedish banks finance a large portion of this lending by issuing covered bonds. A bond is an interest-bearing, current debt instrument. An important difference between covered bonds and other bonds is that the holder of a covered bond has a special right of priority in a cover pool in addition to the claim on the bank if the bank were to fail. This cover pool consists of assets, primarily mortgages, listed on the bank's balance sheet but that by law are held separate from the bank's other assets.

Investors that invest in covered bonds have several layers of protection. The key components in the credit risk of covered bonds are, in order of importance, the issuer's ability to make its payments, the borrower's ability to make its payments, and the value of the underlying collateral, i.e. the residential properties pledged as collateral.

As the cover pool largely consists of Swedish mortgages, its value is affected by developments on the housing market. A sharp fall in house prices would affect the value of the cover pool for the covered bonds. If the cover pool is insufficient, the bank may take measures, such as adding new loans or substitute assets. However, the bank's access to market funding can be affected by developments on the housing market, which in turn could have an impact on financial stability.

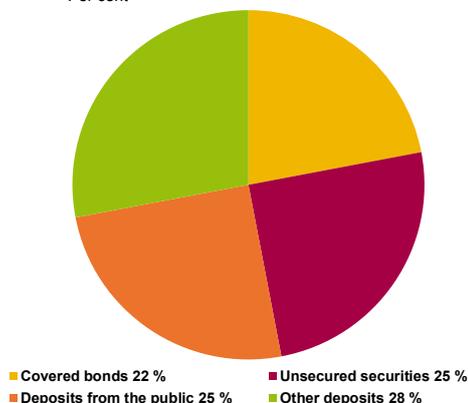
This FI Analysis describes how Swedish covered bonds function, how the regulation governing the cover pool is designed and how the cover pool is affected by a fall in house prices.



Covered bonds are an important source of funding for Swedish banks

1. Major banks' liabilities

Per cent

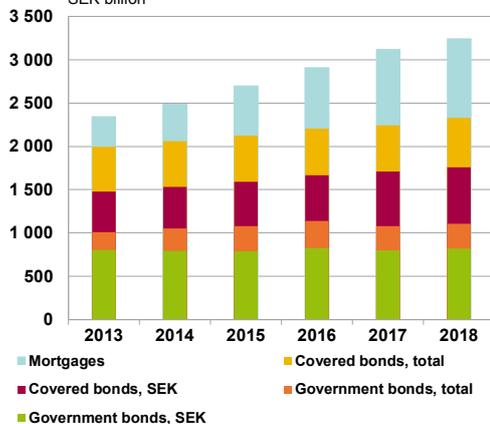


Source: FI.

Note: SEB, Swedbank and Handelsbanken. Equity and liabilities in insurance business are not included in the calculation of the banks' liabilities. The period refers to Q2 2018.

2. Covered bonds in relation to government bonds and the mortgage stock

SEK billion



Source: Statistics Sweden.

Note: Bonds issued in SEK and total currency. Outstanding nominal issued amount at year-end 2018, refers to the end of September. Mortgages refer to the lending of monetary financial institutions to households using residential property as collateral.

The difference between a bank's lending and deposits is usually referred to as a deposit deficit. In Sweden, private individuals save to a greater extent in shares, funds and pension schemes that fall outside of the bank's balance sheets and to a lesser extent in savings accounts. A long period of low interest rates has enhanced this structure, and the percentage of bank deposits in total savings has decreased. The banks therefore have a large deposit deficit that they cover by borrowing on the capital market. Covered bonds are an important source of market financing for Swedish banks (Diagram 1). At the end of Q3 2018, outstanding covered bonds amounted to around SEK 2,300 billion, which corresponds to approximately 50 per cent of GDP. This was roughly twice as large as the value of the outstanding government bonds, which amounted to approximately SEK 1,100 billion (Diagram 2).

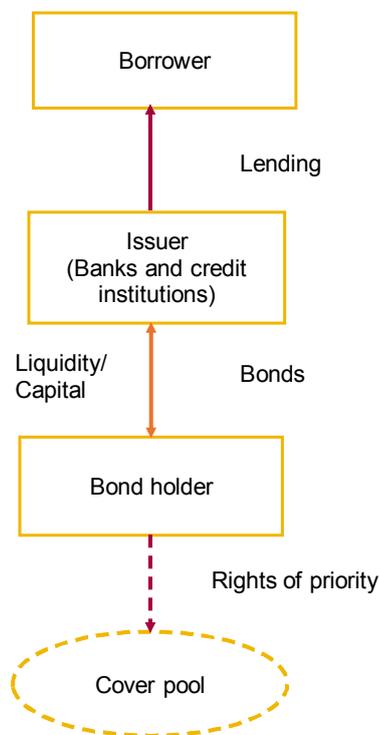
There are two main factors as to why the market for covered bonds has grown. First, there is high demand for covered bonds from investors. This is because covered bonds receive high credit ratings from credit rating institutions, offer a relatively long investment horizon and are subject to beneficial treatment by financial regulations. This makes them a relatively inexpensive source of funding for the banks. Both international and national investors invest in covered bonds, including general pension funds, pension and insurance companies and also the banks themselves.

The rapid increase in mortgages and house prices has also played an important role in the growth of the market. Mortgages are used as collateral when issuing covered bonds. When the volume of mortgages increases, the banks' possibilities for issuing covered bonds increases. The volume of mortgages in Sweden currently amounts to more than SEK 3,000 billion.¹ Because mortgages constitute the majority of the underlying collateral for covered bonds, there is a link between the bonds and the development on the Swedish housing market.

¹ Statistic Sweden's financial market statistics, November 2018.

What is a covered bond?

3. Covered bonds – an overview



Source: FI.

Note: When a covered bond is issued, the bond holder receives a right of priority to a separate cover pool. This cover pool normally consists of mortgages but can also consist of agricultural loans and loans for commercial property. The value of the mortgages in turn is matched to the value of the bond.

A bond is an interest-bearing, current debt instrument. Covered bonds can be issued by banks given that certain conditions are met. They are different from other bonds in that the bond holders (investors, holders) have not only a claim on the bank but also a special right of priority to a cover pool.² This cover pool consists of assets that are held on the bank's balance sheet but must be separate from the other assets of the business (Diagram 3). Assets can be loans collateralised by tenant-owned apartments or single-family homes. The interest rate on a covered bond must be paid by the issuer, but investors also have additional layers of protection in the form of the loans in the cover pool and the collateral pledged for these loans.

“Covered bonds” is a protected name, and the bonds are governed by the Covered Bonds (Issuance) Act (2003:1223) and Finansinspektionen's regulations and general guidelines (FFFS 2013:1) regarding covered bonds. That act and the regulations (the regulations) establish the requirement for when a security may be called a covered bond. All Swedish covered bonds are considered covered bonds in the international interpretation of the word. But different countries have developed different rules for covered bonds. As a result, negotiations are under way to harmonize a framework for covered bonds within the European Union.³

Finansinspektionen (FI) has currently granted authorisation to ten issuer institutions (issuers) to issue covered bonds.⁴ If an issuer of a covered bond does not comply with the regulations, it can lose its authorisation and be required to wind down its issuance activities. FI is responsible for the supervision of covered bonds and appoints an independent inspector for each issuer. The independent inspector shall monitor on a regular basis, for example, the register of covered bonds, the cover pool and, where applicable, derivative agreements, as well as the regulatory compliance of the cover pool. FI, in turn, evaluates the work of the independent inspectors on an ongoing basis.

COVERED BOND HOLDERS HAVE DUAL RECOURSE

Covered bond holders have a claim on the issuer as well as a special right of priority to assets in the cover pool. This combination is called dual recourse and distinguishes covered bonds from other bonds.

If the issuer of a covered bond cannot meet its payment obligations to investors, there is a risk that it will be placed in bankruptcy. In such a situation, the assets in the cover pool are kept together and separate from the other assets and liabilities of the bankruptcy estate in order to be able to pay interest and nominal amounts as contractually agreed. If the value of the cover pool does not cover the outstanding value of the bonds, investors also have a claim on the bankruptcy estate equivalent

² Section 3a of the Swedish Rights of Priority Act (1970:979).

³ The European Commission's proposal on a minimum harmonisation for covered bonds was presented on 12 March 2008 as part of the Commission's initiative within the capital market union. The proposal specifies core characteristics of covered bonds and contains rules for supervision, rules governing the use of the European covered bonds label, etc.

⁴ The issuers are: Swedbank/Swedbank Hypotek, Handelsbanken/Stadshypotek, SEB, Nordea/Nordea Hypotek, SBAB/Swedish Covered Bond Corporation, Länsförsäkringar Hypotek, Landshypotek, Skandiabanken, Danske bank/Danske Hypotek and Sparbanken Skåne.

to other non-prioritised, uncovered claims. This means there is a lower risk of losses than the risk associated with unsecured bonds.

The key components in the credit risk of covered bonds are therefore

- first, the issuer's ability to meet its payment obligations;
- second, the borrowers' ability to meet their payment obligations; and
- third, the value of the underlying collateral for the loans.

In order for a credit loss to arise, the bank must first become insolvent and not be able to meet its payment obligations. In practice, the claim then moves from the bank to the loans in the collateral pool. As long as the borrowers continue to pay off their loans, the investors will receive their money. If the borrowers are not able to pay off their loans, investors are secured by the collateral for the loans.

Swedish right of priority structure

The Swedish right of priority structure is arranged as follows:

1. Claims with a special right of priority, e.g. covered bonds
 2. Claims with a general right of priority, e.g. guaranteed deposits
 3. Claims with no right of priority, non-prioritised claims, e.g. senior bonds.
 4. Some claims with no right of priority that are attributable to debt instruments pursuant to Chapter 21, section 15, point 3a of the Resolution Act (2015:1016).⁵
 5. Subordinated debt and capital instruments.
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If the bank's operations are critical for the financial system⁶ and the bank were to fail, or there is risk that it will fail, the bank is entered into resolution instead of being wound down through bankruptcy.⁷ In resolution, the government conducts an orderly reconstruction or liquidation of the bank in order to maintain critical functions and avoid major negative consequences for society. One of the objectives of resolution is for shareholders and lenders to carry losses so the government will not need to inject capital. If a lack of capital were to arise, the holdings of the bank's shareholders and lenders (the bank's liabilities) would be written down or converted to share capital, or a combination of the two, in accordance with the right of priority structure. Covered bonds are exempt from being written down up to the value of the assets in the cover pool. Any remaining claim becomes an unprioritised claim and can be written down if necessary.

COMPONENTS OF THE COVER POOL

In order for assets to be included in the cover pool, the loans must meet certain requirements. Most of the assets in the Swedish issuers' cover pools consist of different types of residential mortgages, i.e. loans collateralised by tenant-owned apartments, single-family homes

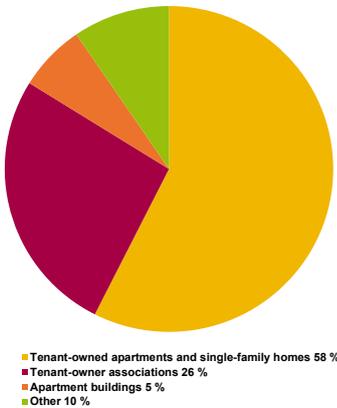
⁵ Section 18 of the Swedish Rights of Priority Act (1970:979), see also Bill 2017/18:292.

⁶ All banks that issue covered bonds are currently subject to resolution.

⁷ Cf. the Resolution Act (2015:1016).

4. Types of collateral underlying the loans in the cover pool

Per cent



Source: FI and the issuers.

Note: "Other" includes collateral pledged for loans granted for forestry and agricultural purposes. Substitute assets are not included. The period refers to Q3 2018. For Danske Bank the data refers to Q2 2018.

or apartment buildings. Some issuers also have a large percentage of agricultural properties in their cover pools due to their core operations (Diagram 4).

Loans that are permitted in the cover pool

The cover pool may consist of loans granted against

- real property intended for residential, agricultural, office or commercial purposes;
- site leasehold rights intended for residential, office or commercial purposes; or
- tenant-owner rights.

The cover pool may also include public loans, i.e. loans guaranteed, for example, by the Swedish state.

The market value of the underlying collateral (for example a tenant-owned apartment) can vary during the maturity of the loan and the value of the loan is thus affected if the borrower no longer makes interest payments or amortisation payments on the loan. In order for the loans in the cover pool to be of high quality, the regulations limit the percentage of the loans that may be included in the cover pool. This limitation is based on the loan-to-value ratio of the loans, i.e. the size of the loan in relation to the value of the underlying collateral:

$$LTV \text{ ratio} = \frac{\text{loan}}{\text{market value of property}}$$

A higher loan-to-value ratio means a greater risk that the market value will fall below the amount of the loan. The regulation specifies limitations for the loan-to-value ratio based on the type of collateral pledged for the loan:

- 75 percent for real property, site leasehold rights and tenant-owner rights intended for residential purposes
- 70 percent for real property intended for agricultural purposes
- 60 percent for real property, site leasehold rights and tenant-owner rights intended for commercial or office purposes.

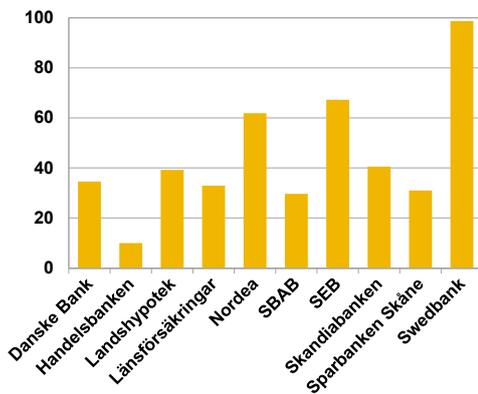
ASSETS MUST ALWAYS BE GREATER THAN LIABILITIES

In order to guarantee the value of the cover pool exceeds the value of the issued bonds, the regulations establish so-called matching rules. This matching is important for the cover pool to be able to cover interest rate payments and repayment of bonds in the event of the bank's insolvency or resolution. Every bond is not matched by an individual asset in the cover pool, but rather all bonds are covered by the total cover pool.

The part of the cover pool that exceeds the value of the issued bonds can be viewed as a buffer for fluctuations in the price of the cover pool. This is because falling house prices lead to rising loan-to-value ratios, which can lead to parts of the loans not being allowed to be included in the value of the cover pool. The value of the cover pool

5. Banks' over-collateralisation

Per cent



Source: FI and the issuers.

Note: The period refers to Q3 2018.

can also decrease due to loans past due⁸ by 60 days or more, which may not be included. This buffer is often called over-collateralisation. Its size is dependent on the difference between the value of the assets (the loans) in the cover pool and the covered bonds that were issued. Over-collateralisation is normally given as a per cent of outstanding bonds. The regulatory framework specifies three different matching requirements to ensure that there are enough assets in the cover pool given the issued covered bonds. Under the first two requirements, the cover pool must exceed the total value of the liabilities (i.e. that there is an over-collateralisation) by at least 2 per cent.⁹

The minimum requirements established by the regulations are the same for all issuers. However, there are differences in the size of each issuer's management of the size of their over-collateralisation. As long as the matching requirements are met, the over-collateralisation is a strategic decision for the issuer. Because the cover pool is dynamic and it is possible to add new loans, the bank can influence the ratio between the share of issued bonds and loans in the cover pool based on what is considered to be most appropriate for its operations.

Issuers have different strategies for over-collateralisation

The level of voluntary over-collateralisation currently varies from around 10 to 90 per cent between the Swedish issuers (Diagram 5). On average, Swedish issuers have over-collateralisation of around 40 per cent. Since the cover pool is dynamic, and the bond volume also varies over time, over-collateralisation can both increase and decrease.

There are advantages and disadvantages to having a large over-collateralisation. The advantages are, for example, that it can be practical to have a large amount of loans in the cover pool, which enables quick issues of new covered bonds based on the same cover pool. Disadvantages arise, for example, when a large part of the asset pool is restricted by the cover pool and thus is not available as protection for unprioritised creditors, depositors and investors in the bank's unsecured bonds.

The issuers can meet the regulation's matching requirements in part by ensuring that there are enough eligible loans in the cover pool in relation to the value of the issued bonds and in part by adding so-called substitute assets.

Substitute assets consist of secure assets, for example cash or claims on the Swedish state or Swedish municipalities. Substitute assets may normally constitute at the most 20 per cent of the total cover pool and can be added and removed over time. The level and composition of substitute assets varies among the Swedish issuers. The majority of the issuers have no substitute collateral in the cover pool.

⁸ For example, if the borrower has not paid the interest rate expense or made amortisation payments on time.

⁹ The three matching requirements are 1. The nominal outstanding amounts of the bonds must be covered by the nominal amounts of the assets in the cover pool. 2. The present value of the bond pool must be covered by the cover pool. The measure is a present value calculation of future cash flows using a discount rate set in the regulation. 3. Cash flow matching. This means that the issuer at all times must be able to meet its payment obligations to the bond holder.

Since the cover pool must be able to be monitored at all times, the regulation requires that the issuer maintain a register of the covered bonds, cover pool and, where relevant, derivative agreements. The register shows the nominal value of the covered bonds as well as the cover pool that is tied to such bonds and derivative agreements.

KEY COMPONENT IS VALUATION OF RESIDENTIAL PROPERTIES

The quality and size of the cover pool are dependent on the value of the underlying collateral for the loans. Therefore, the regulations determines that the valuation of collateral should be carried out in a reliable manner. This means that the market value of the residential properties in question must refer to the prices that could be achieved during a sale on the open market without taking into consideration speculative or temporary conditions.

Example 1: how is the loan-to-value ratio affected by a fall in house prices?

Fia buys a home for SEK 3 million and takes a loan of SEK 1.6 million from the bank. The loan-to-value ratio is given by

$$LTV \text{ ratio} = \frac{1\,600\,000}{3\,000\,000} = 53 \text{ per cent}$$

The bank issues a covered bond that includes Fia's mortgage in the cover pool. Fia's entire mortgage, i.e. SEK 1.6 million, may be included since the loan-to-value ratio is below 75 per cent.

If house prices fall by 30 per cent, the market value for Fia's home would be SEK 2.1 million. The new loan-to-value ratio would be

$$LTV \text{ ratio} = \frac{1\,600\,000}{2\,100\,000} = 76 \text{ per cent}$$

Fia's loan-to-value ratio has therefore risen as a result of the home falling in value. Since the loan-to-value ratio exceeds 75 per cent, the entire loan may not be included in the cover pool; only the part that is less than 75 per cent. In this example, this means that SEK 1.575 million may be included in the cover pool. The rest of the loan, i.e. SEK 25,000, may not be included.

If house prices fall sharply, the bank must add new loans to its cover pool or in some other way take measures to restore the balance to meet the regulatory requirements.

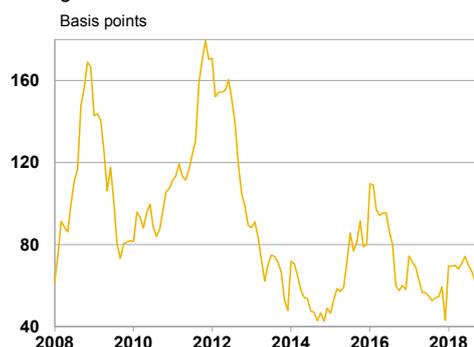
6. Non-performing mortgages in relation to total mortgage volume



Source: FI.

Note: Quarterly data, non-performing loans. Weighted average at the group level for Handelsbanken, SEB, Swedbank, Nordea, Landshypotek, Länsförsäkringar Bank, and SBAB.

7. The difference between the interest rate on government bonds and covered bonds



Source: Sveriges Riksbank and Thomson Reuters.

Note: Monthly data, interest rate different 5-year maturity.

The issuer is responsible for regularly controlling the market value of property included in the cover pool. The issuer should also regularly revalue and monitor changes in value in the cover pool and document at least annually the positions of the issuer regarding the revaluations. If the prices fall, the issuer should check whether it is the original or most recent valuation that will be used. Where the market conditions for comparable properties at the locality or in the region have seriously declined, the valuation must be reassessed. The independent inspector is also tasked with reviewing the reassessments of underlying collateral conducted by the issuer during the year.

In practice, the property's market value plays a central role in determining the value of the cover pool. As the borrower makes amortisation payments, the quality of the cover pool also increases since the loan-to-value ratios fall.

SWEDISH COVERED BONDS HAVE HIGH CREDIT RATINGS

All of the Swedish covered bond programs have the highest possible credit rating from credit rating institutions. A high credit rating shows that the credit rating institutions consider the bond to have a low credit risk; they consider the risk that the investor will lose invested amounts to be low. Therefore, a high credit rating for Swedish covered bonds affects the price and interest from investors for the bonds.

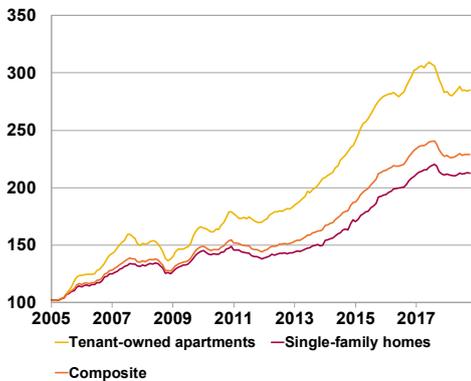
The credit rating institutions consider several factors when setting the credit rating, including the issuer's creditworthiness, the company's structure, current legislation, cash flows, any over-collateralisation in the cover pool and the quality of the cover pool. The good credit quality of the underlying cover pool for Swedish covered bonds is one of the reasons for why they have been given a high credit rating. Loans in the Swedish issuers' credit pools consist largely of Swedish mortgages, which historically have had a low default rate (Diagram 4 and Diagram 6).

An additional indication that investors assess the risk as relatively low is the low interest rate differential (risk premium) with regard to government bonds (Diagram 7). Because Swedish government bonds are widely considered a risk-free investment, a low interest rate differential shows that investors do not require a lot of compensation for accepting the risk associated with covered bonds. A low risk premium on covered bonds and a low absolute interest rate level have contributed to more inexpensive financing for the banks.

Fall in house prices affects the cover pool

8. House prices have risen sharply

Index, 2005-01-31=100

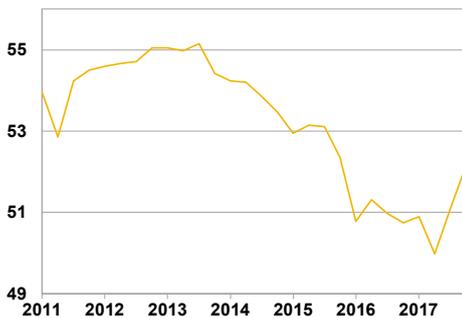


Source: Thomson Reuters Datastream and Valueguard's HOX Index.

Note: Monthly data, seasonally adjusted.

9. Loan-to-value ratio has decreased over time

Per cent



Source: FI and the issuers.

Note: Quarterly data, average loan-to-value ratio in the issuers' cover pools.

10. Loan-to-value ratio increases when house prices fall

Per cent



Source: FI and the issuers.

Note: Weighted loan-to-value ratio based on Q3 2018.

House prices have risen sharply in recent years, and today they are approximately 60 per cent higher than they were ten years ago (Diagram 8). As prices have increased, so has the volume of mortgages. Household mortgages have grown by approximately 6 per cent per year. Mortgages constitutes approximately 80 per cent of households' total debt at the end of Q3 2018. The rising house prices have increased the value of the collateral and thus contributed to a decrease in the average loan-to-value ratios in the cover pools (Diagram 9).

Sensitivity analysis according to the regulations

The issuers are obligated by law to analyse how future changes in market values may affect the loan-to-value ratios and the value of the cover pool.

The issuers must regularly and at least once a year conduct tests of all property that forms collateral for mortgage loans in the cover pool. The tests should include the effect a fall in prices of at least 5, 10, 15, 20, 25 and 30 per cent has on the loan-to-value ratios, value of the cover pool and matching requirements.

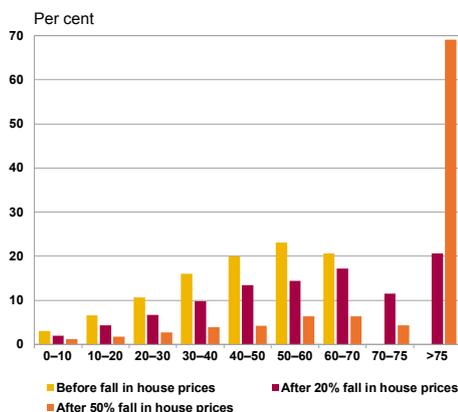
Below we illustrate a sensitivity analysis of how a fall in house prices affects the cover pool. The sensitivity analysis is based on data from the Swedish issuers and only illustrates how falling house prices affect the loan-to-value ratio in the cover pool. In other words, the analysis is static and no assumptions are made regarding measures the issuers may have taken to counteract an impairment to the cover pool. All assumptions are presented in Appendix 1.

If house prices were to fall sharply, the bank may need to act to meet the matching requirements set out in the regulatory framework. The impact of a fall in house prices on the cover pool is primarily dependent on the loan-to-value ratio of the loans in the cover pool, the type of assets in the cover pool, the amount of available substitute assets and the size of the initial over-collateralisation. It is also important to note that the credit quality in the cover pool is largely dependent on the borrowers' repayment capacity and not the value of the collateral.

FALL IN HOUSE PRICES INCREASES THE LOAN-TO-VALUE RATIO

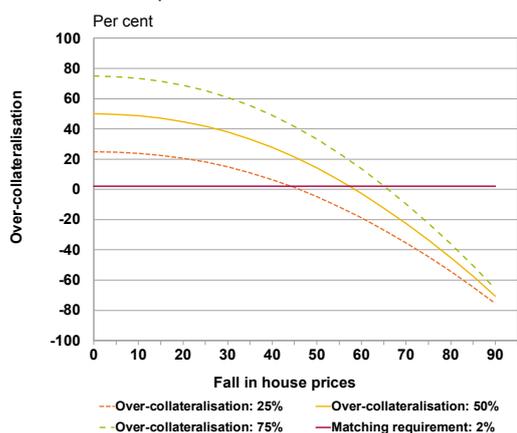
The sensitivity analysis stresses the aggregate cover pool by simulating a fall in house prices of up to 90 per cent. When house prices fall, the loan-to-value ratio increases. The example shows that if house prices fall by 35 per cent, the average loan-to-value ratio in the cover pool amounts to around 75 per cent (Diagram 10). In this scenario, there are still mortgages in the cover pool that are below 75 per cent, even if the part of the loan that exceeds this threshold may no longer be included in the cover pool as per the requirements set out in the regulations limiting the loan-to-value ratios. The greater the fall in house prices, the greater the number of loans with a loan-to-value ratio of more than 75 per cent. Therefore, a greater share of the loans may

11. Loan-to-value ratio given a fall in house prices



Source: FI and the issuers.
Note: Starting point Q3 2018.

12. Over-collateralisation decreases when house prices fall



Source: FI and the issuers.
Note: Over-collateralisation based on Q3 2018. The slope of the curve is determined by the distribution of the loan-to-value ratio within the cover pool. Only some of the loans in the cover pool will be affected by a small fall in house prices, but a larger number will be affected by a steep fall in house prices.

not be included in the cover pool. This means that the average loan-to-value ratio increases faster the greater the fall in house prices (Diagram 11).

OVER-COLLATERALISATION PROVIDES BUFFER AGAINST FALLING HOUSE PRICES

When house prices fall, over-collateralisation also decreases. Diagram 12 shows this under different assumptions regarding the initial over-collateralisation and if the cover pool consists solely of mortgages. We assume that the entire cover pool consists of mortgages and that there are no substitute assets. As a result, over-collateralisation is affected in the same manner as other loans when house prices fall. Given over-collateralisation of 50 per cent, house prices can fall almost 60 per cent before the statutory matching requirement of 2 per cent is breached. If over-collateralisation is lower, the matching requirement is breached earlier given the same fall in house prices, and vice versa. The resilience of the cover pool is also affected by the initial distribution of the loans' loan-to-value ratios.

The results can both overestimate and underestimate the resilience of individual issuers since the cover pool differs between issuers and can change over time. No assumptions are made in the sensitivity analysis regarding the borrower's possibility for repaying interest rate expenses and making amortisation payments following a sharp fall in house prices. When loans are past due by more than 60 days, they may no longer be included in the cover pool, regardless of the loan-to-value ratio. If we also would assume that more borrowers experienced repayment problems, more loans would need to be removed from the cover pool and over-collateralisation would decrease even more.

In the sensitivity analysis, the assumption is also made that the issuer does not take any measures to maintain the quality of the cover pool in a weaker market, which in practice is unlikely. Depending on the types of problems the bank needs to manage in a stressed scenario, it can take different measures to reduce the effects of a negative development. If the quality or size of the cover pool deteriorates, the bank can try to add new loans to the cover pool or increase the percentage of substitute assets. The bank could also buy back covered bonds to ensure that it meets the matching requirement. In order for sensitivity analyses of this type to provide an accurate overview, it is important for the issuers to regularly update the valuation of the underlying collateral in order to follow the development on the market.

CONCLUDING REMARKS

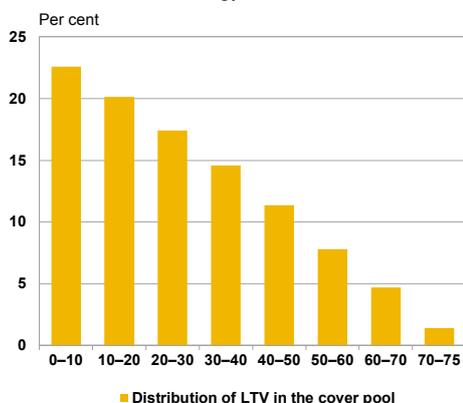
This FI Analysis describes how Swedish covered bonds function and the regulatory requirements for including loans in the cover pool. We illustrate in a sensitivity analysis how the cover pool is affected by falling house prices and how, for example, over-collateralisation is affected when the matching requirement is breached.

When house prices fall, the issuers' possibilities for taking measures are dependent on several factors; for example, the bank's economic state in general, how well the financial markets are functioning, the assessment of the rating firms, the overall macroeconomic situation and the borrowers' ability and willingness to make interest and amortisation payments. Since the Swedish banking system is interconnected, problems in one bank can quickly spread to and affect

other banks. It is therefore important to follow not only the development of the market for covered bonds but also the underlying risk in the banks and the Swedish housing market.

Appendix 1: Sensitivity analysis

13. Distribution of loan-to-value ratios using ASCB's methodology

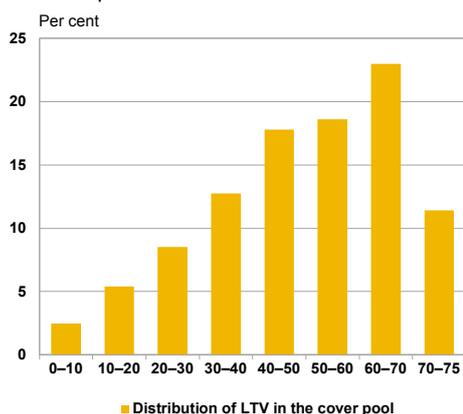


Source: FI and the issuers.

Note: Compilation of the loans in the issuers' cover pools.

Period: Q3 2018, Nordea: Q4 2017.

14. Distribution of loan-to-value ratios in the cover pool



Source: FI and the issuers.

Note: Compilation of the loans in the issuers' cover pools.

Period: Q3 2018, Nordea: Q4 2017

DATA IN THE SENSITIVITY ANALYSIS

The underlying data for the sensitivity analysis has been obtained from each issuer's website for Q3 2018.¹⁰ The report that is used is public and is called National Transparency Template. The report shows the loan-to-value ratios as per the definition established by the Association of Swedish Covered Bond Issuers (ASCB)¹¹.

In the template, the loans in the cover pool are uniformly distributed in loan-to-value buckets of 10 percentage points. For example, a loan with a loan-to-value ratio of 65 per cent is divided into equal parts in all intervals up to the interval 60-70 percentage points (Diagram 13). To enable an analysis of how falling prices can affect the value of the cover pool, we created an alternative distribution of loan-to-value ratios for individual loans (Diagram 14). This method, for example, includes the above loan only in the interval 60-70 percentage points. In order to increase the precision in the sensitivity analysis, we then refined this distribution into intervals of 1 percentage point.

CALCULATION OF LOAN-TO-VALUE RATIO WHEN HOUSE PRICES FALL

The loan-to-value ratio specifies the size of the loans used to finance the purchase of the residential properties divided by their market value, and is given by

$$LTV \text{ ratio} = \frac{\text{loan}}{\text{market value of property}}$$

When the loan-to-value ratio increases, a larger share of the loans will not be included according to the restrictions established in the regulatory framework (compare Example 1). To simplify the sensitivity analysis, we assume that all loans have been granted against collateral in real property, site leasehold rights or tenant-owner rights that are intended for residential purposes, which limits the loan-to-value ratio at 75 per cent (compare Diagram 4 and the section entitled Components of the cover pool).

Given the limitation of the regulations, when house prices fall and the loan becomes larger in relation to the market value of the residential property, the part of the loan that exceeds 75 per cent may not be included in the cover pool. The part of the loan that is less than 75 per cent may still be included. If house prices fall sharply, a larger share of the loans will not be included in the cover pool.

The sensitivity analysis is then conducted per institute based on the assumption that the volume in each interval consists of one single loan with the specified loan-to-value ratio. Since the value of the loan and the loan-to-value ratio is assumed to be known, the market value of the property can then be calculated (see below for the calculation of the loan-to-value ratio). The calculated market value is stressed in the sensitivity analysis to illustrate how the cover pool is affected by a fall

¹⁰ Nordea: data for Q4 2017 due to missing reported data.

¹¹ ASCB is an industry organisation for Swedish issuers of covered bonds.

in house prices. In the sensitivity analysis we make the assumption that house prices will fall instantaneously between 5 and 90 per cent.¹²

ESTIMATING OVER-COLLATERALISATION IN THE COVER POOL

The regulations specify matching rules to guarantee that the value of the cover pool exceeds the value of the issued bonds. Over-collateralisation can thereby be viewed as a buffer that protects the cover pool from negative events. Over-collateralisation is given by

$$\text{over-collateralisation} = \frac{\text{loans in the cover pool}}{\text{issued covered bonds}} - 1$$

We assume in the sensitivity analysis that over-collateralisation consists only of mortgages and therefore is affected in the same manner as the other loans in the cover pool. The initial distribution across loan-to-value ratios reflects an average cover pool. We achieve this by normalising the value of each individual cover pool to 1 and then calculate the average at every given fall in house prices.

The initial over-collateralisation can then be varied based on various assumptions regarding the issued volume of bonds. We assume that the volume of issued bonds is unchanged during the stressed period. It is only the volume of loans that may be included in the cover pool that is affected by the fall in house prices. When house prices fall, the loan-to-value ratio increases, which means that the share of loans in the cover pool that may be included decreases. This means that over-collateralisation also decreases when the loan-to-value ratio increases.

¹² The regulations specify that a fall in prices of up to 30 per cent must be analysed. In 2018, the EBA conducted a stress test of the banking system within the EU based on a crisis scenario developed by the European Systemic Risk Board (ESRB). ESRB makes the assessment that Swedish house prices are sharply overvalued. House prices in Sweden are estimated in the strongly negative scenario in the stress test to fall by 49 per cent over the three-year test scenario.

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