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AEGON INSIGHTS

The Dutch mortgage market from a Nordic perspective

We analyse the mortgage markets in the Netherlands and the Nordic countries. We provide a broad overview and cover a wide range of topics, such as market size, house price developments, yield levels, funding, loan characteristics, risk and capital requirements.

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The Netherlands, Denmark and Sweden all have large and mature mortgage markets, supported by well-developed economies and borrowers with a high average net wealth. Mortgage spreads are currently attractive and the risk profile of mortgages in the Netherlands and the Nordic countries is low. We can also conclude that Dutch mortgage loans, with their long fixed-interest terms, are suitable for the interest-rate matching portfolio of institutional investors with long-term liabilities.

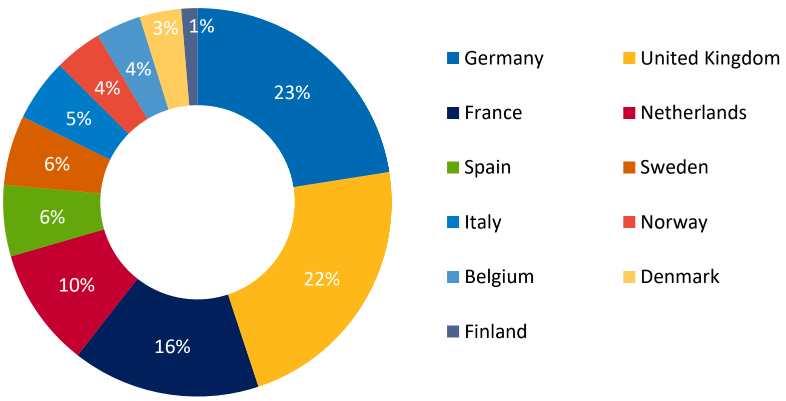
The NHG guarantee by the Dutch central government can offer additional protection. Some Nordic countries also offer state guarantees, for example for social housing loans, but not with the same accessibility and coverage.

Contents

Global market overview

We start with a broad overview of different European mortgage markets.[1]

Figure 1: Total outstanding residential mortgage loans



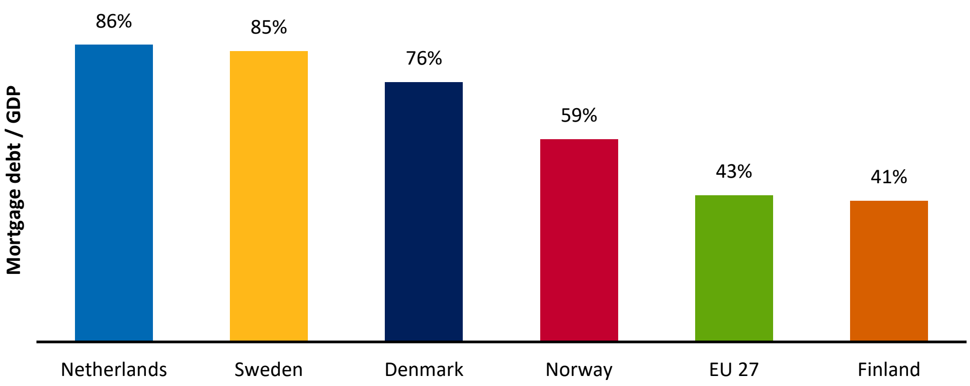
Total outstanding residential mortgage loans (selected EU countries plus the United Kingdom and Norway). The total size of the residential mortgage market in the EU, the United Kingdom and Norway was €8.9tn in 2022. Source: EMF (2023, Statistical Table 1), as of December 31, 2022.

[1] Note that we focus on the owner-occupied residential mortgage market here (so not buy-to-let).

The size of the mortgage market is of course related to the size of the economy. As a result, the United Kingdom, Germany and France together already account for 62% of the European market. The Netherlands (10%), Sweden (6%), Denmark (4%) and Norway (4%) have a relatively large mortgage market, also compared to the size of their economy. Finland has a small share (1%) of the European market.

The figure below compares the mortgage market with the gross domestic product (GDP) of the country in question.

Figure 2: Total outstanding residential mortgage loans to GDP ratio



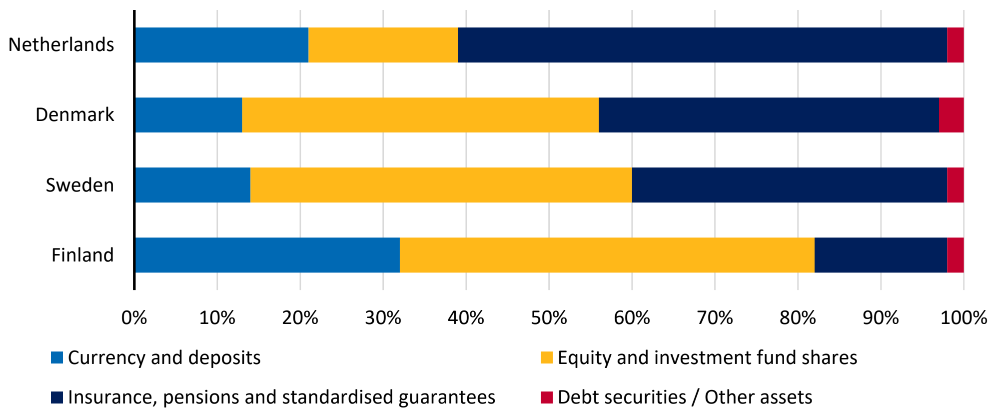
Source: EMF (2023, Statistical Table 8), as of December 31, 2022.

This ratio is relatively high for the Netherlands, Denmark and Sweden, compared to the EU average of 43%. The ratio for Finland is slightly below average.

Note that the figure above does not represent all items on a consumer's personal balance sheet. In the Netherlands, for example, consumers generally have low consumer debts (apart from mortgage debt). In addition, future pension assets in the Netherlands are also much higher than in countries with a pay-as-you-go system.

This is shown in more detail in the next figure.

Figure 3: Financial wealth composition of households



Source: Eurostat, as of December 31, 2022.[2] N.B. Data for Norway are not available via Eurostat.

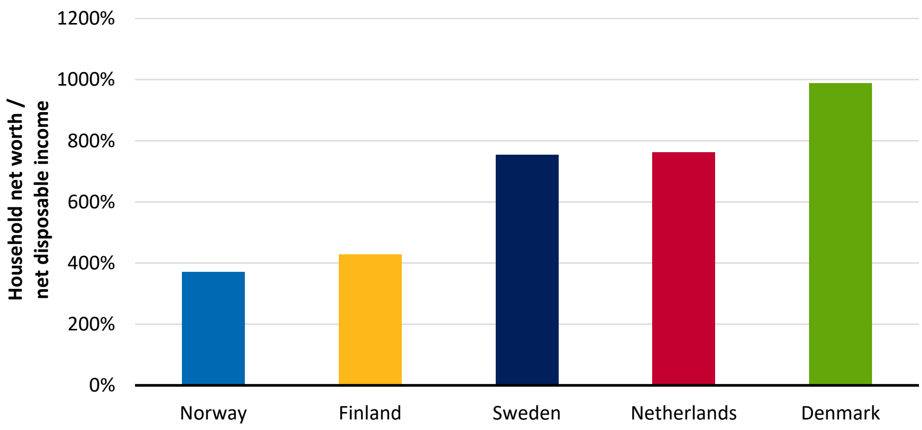
[2] See https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Households_-_statistics_on_financial_assets_and_liabilities#Assets_and_liabilities.

For the Netherlands, pension and insurance assets account for 59% of total financial assets, compared to 41% and 38% respectively for Denmark and Sweden. In Finland, pension and insurance assets account for only 16% of total financial assets.

For the Netherlands, pension and insurance assets account for 59% of total financial assets.

In the figure below we show household net wealth, i.e. total assets minus total liabilities, as a percentage of net disposable income.

Figure 4: Household net worth as a percentage of total net disposable income

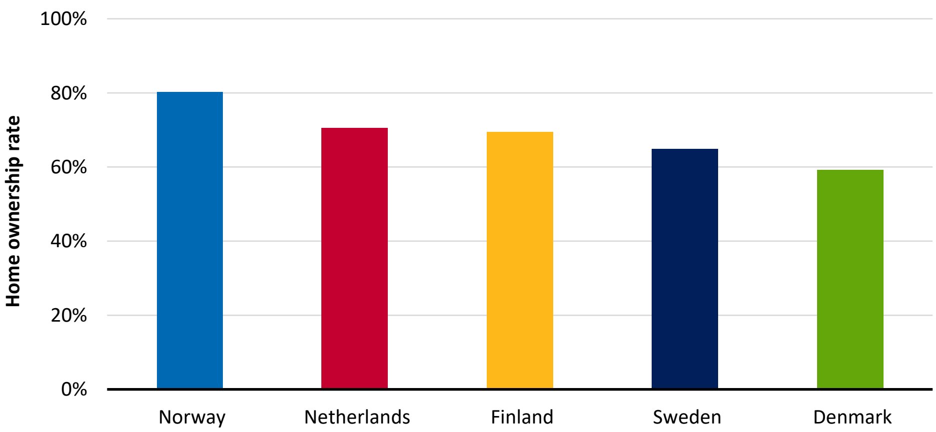


Source: OECD as of December, 2022 (or latest available).

The Netherlands, Sweden and Denmark thus have a large and well-developed mortgage market, which is supported by households with a high average net wealth. Finland and Norway score lower in this respect.

Figure 5 shows the homeownership rate for these countries. Despite the large housing market, the Netherlands has an average homeownership rate (approximately 71%). This percentage is not higher due to the large number of social housing associations that offer affordable rental housing for lower incomes: 28% of the total housing stock and approximately 66% of the total rental sector consists of social rental housing.[3]

Figure 5: Homeownership rate



Source: https://en.wikipedia.org/wiki/List_of_countries_by_home_ownership_rate, as of 2022 (or latest available).

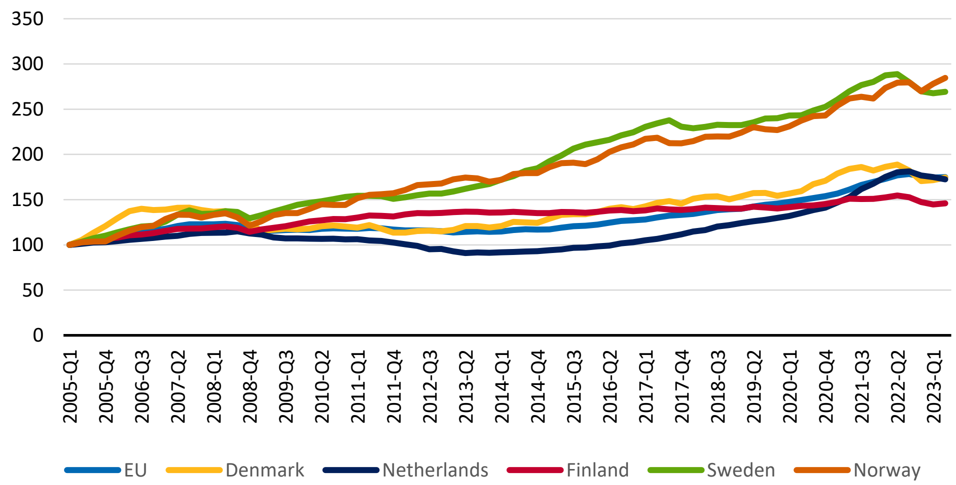
[3] See https://www.cbs.nl/nl-nl/cijfers/detail/82900NED.

Public Housing Sweden governs the municipal social housing companies in Sweden. Sweden has a significant amount of social housing: 20% of the total housing stock and approximately 50% of the total rental sector consists of social housing.[4] Likewise, Denmark has a long history of providing social housing to its citizens. Interestingly, in principle all income groups are eligible for this type of housing, so not just the lower income segment. In Denmark, 19% of the total housing stock and approximately 43% of the total rental sector consists of social housing.[5] The Housing Finance and Development Centre of Finland (Ara) implements social housing policy in Finland.[6] Affordable social housing is mainly provided by municipal companies and some national non-profit organizations. The focus is on low-income people and people who are currently homeless. Sustainability objectives have also become increasingly important in recent years. About a third of all apartments in Finland were built with government subsidies.[7]

House price developments

Figure 6 below shows house price developments for the Nordic countries and the Netherlands.

Figure 6: House price developments



Source: Eurostat, as of October 31, 2022.

For convenience, the index starts at 100 for all countries in the first quarter of 2005. Figure 6 shows quite large differences between countries over this period. The most striking observation is that house price increases in Norway and Sweden have been much larger during this period. For Sweden, this is mainly due to sharply rising costs for land purchase and home construction (see Bergman and Nyberg, 2021). Furthermore, the construction of new houses (per capita or relative to GDP) in Sweden is relatively low compared to the other Nordic countries. As would be expected, the largest price increases have occurred in urban areas in Sweden, where demand exceeds supply and opportunities for new housing projects are more limited (Swedish Bankers Association, 2023).

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[4] See https://www.sverigesallmannytta.se/in-english.
[5] See https://urbanlifecopenhagen.weebly.com/housing.html.
[6] See https://www.ara.fi/en-US.
[7] See https://www.munifin.fi/whats-new/finnish-system-for-affordable-social-housing-supports-social-mixing-and-brings-down-homelessness.

The effect of the global financial crisis in 2007-2008 is also clearly visible in Figure 6, especially for Norway, Sweden and Denmark. After 2008, most countries show an increasing trend, with the Netherlands being an exception. After the credit crisis, Dutch banks imposed strict requirements on mortgage lending. In addition, there was uncertainty about the tax treatment of mortgage payments, higher unemployment rates and an historically low consumer confidence. As a result, house prices in the Netherlands gradually declined until 2013, with a low point in the second quarter of 2013 that was 21% lower than the previous peak in the third quarter of 2008. After 2013, the Dutch housing market recovered, mainly due to a greater confidence in the economy, falling mortgage rates and a shortage of available homes.

After the second quarter of 2022, most countries saw falling house prices, mainly caused by central banks raising interest rates in their attempt to dampen rising inflation. This also caused mortgage interest rates to rise rapidly. For example, the 10-year mortgage interest rate in the Netherlands rose from approximately 1% at the beginning of 2022 to approximately 4% at the end of that year, making the costs of buying a new home much more expensive. Uncertainty about economic developments and the impact of rising inflation and higher energy costs also played a role. All in all, this led to less interest among potential buyers.

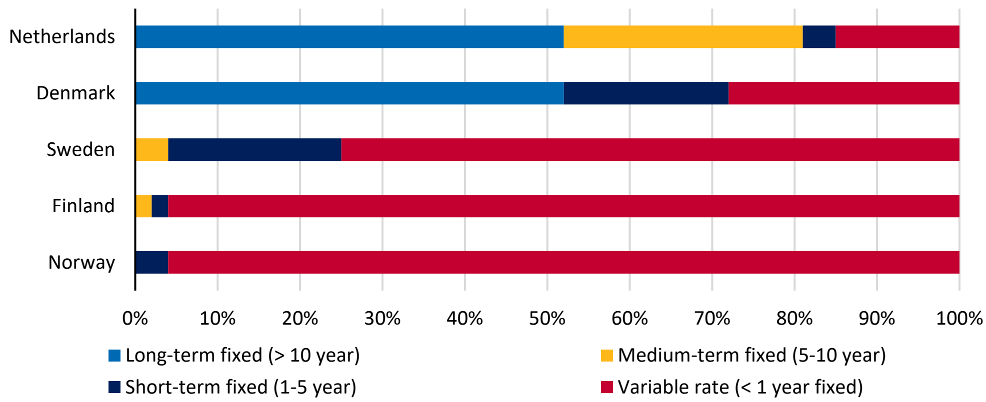
The Nordic housing markets have been particularly hard hit; in Finland, Sweden and Denmark prices have fallen significantly. For example, Danish house prices have fallen by 10% in the second part of 2022. Swedish house prices decreased 7% between the second quarter of 2022 and the first quarter of 2023. The number of new homes in Sweden is also expected to fall by 55% in Sweden in 2023, the largest decline since the 1990s (Swedish Bankers Association, 2023). House prices in the Netherlands also took a step back (by 5%) after the previous peak in the third quarter of 2022. Note that the negative effect of rising market rates has been tempered in the Netherlands due to the longer fixed rate periods compared to e.g. Sweden (see also the next section).

For most countries, a stabilization, or even a small recovery, is visible recently.

Fixed-rate maturities

The figure below shows the distribution of new mortgages in 2022 across four different segments of fixed-rate terms.

Figure 7: Mortgage market issuance in 2022 - breakdown by interest rate type



Source: EMF (2023, Chart 31) except for the Netherlands: DNB. As of December 31, 2022.

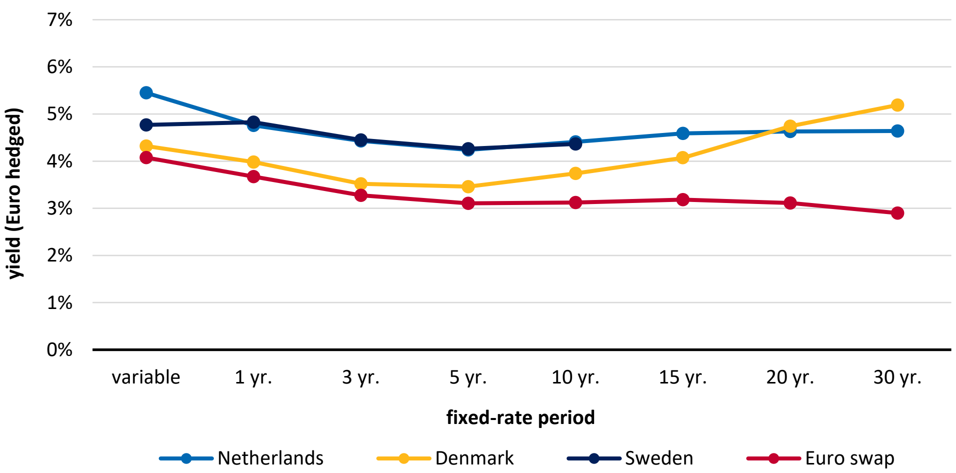
In Sweden, 75% of all new mortgages have a variable interest rate. In Finland and Norway this percentage is even higher. In the Netherlands, the majority of new mortgages have a fixed interest rate period of more than 10 years. This makes Dutch mortgages more suitable as an investment category for the interest rate hedging portfolio of investors with long-term liabilities.

Danish mortgages also typically have a longer fixed-rate term (most more than 10 years). These mortgages offer a less effective interest rate hedge, however, because callable Danish mortgages allow penalty-free early repayment. This can cause significant fluctuations of the duration of these bonds. For example, if interest rates fall, prepayment rates can increase rapidly. This in turn leads to a lower duration of the callable bonds and lower hedge effectiveness, precisely at the time when the interest rate hedge is most needed from a risk management perspective.[8]

Mortgage rates

Figure 8 compares the interest rates for new mortgage loans with different fixed-rate terms in the Netherlands, Denmark and Sweden. Note that the different characteristics of the underlying mortgages (such as the loan-to-value ratio, early repayment options, government guarantees, etc.) make a precise comparison difficult.

Figure 8: Mortgage yields for different fixed-rate terms



Mortgage rates for newly-issued loans. For Denmark we show the yield on non-callable mortgage bonds for fixed-rate terms up to and including 5 years and yields for callable bonds for longer maturities. The yields in Danish krone and Swedish krona have been converted to euro-hedged yields using FX forward contracts with the same maturity as the fixed-rate term.

Source for Sweden: Bloomberg and https://www.handelsbanken.se/sv/privat/bolan/bolanerantor (average interest rate). Source for Denmark: Bloomberg and Danske Bank. Source for the Netherlands: https://www.hypotheek-rentetarieven.nl (average of 10 most competitive rates for a loan-to-value below 80%). Source for the Euro swap curve: Bloomberg. As of 15 November 2023.

For the longer maturities, both Denmark and the Netherlands show attractive yields at the moment.

We should also mention that these mortgage interest rates are sometimes only representative of a small part of the market. For example, in Sweden, most mortgages are financed with variable or fixed interest rates with a short term, while fixed interest rates with a long term are more common in the Netherlands and Denmark. For this reason, this figure only shows maturities up to 10 years for Sweden, while we also include longer maturities for Denmark and the Netherlands. Variable rate mortgages are dominant in Finland and Norway.

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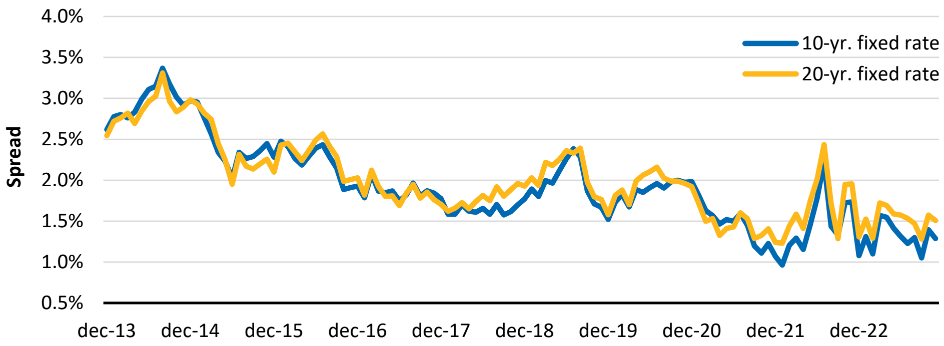
[8] See Van Bragt and Caplain (2018) for more information.

Some differences are visible between these countries, depending on the fixed-rate term. For the Swedish market the shorter maturities are most relevant. The variable mortgage rate is currently lower in Sweden than in the Netherlands; for fixed-rate mortgages up to 10 years the differences between these countries are small. For the longer maturities, both Denmark and the Netherlands show attractive yields at the moment (around 4-5%), with some differences depending on the exact maturity. Spreads relative to the euro swap curve depend on the maturity and are currently approximately 1.3% for 10-year Dutch mortgages, increasing to 1.7% for 30 year.

In recent years, mortgage spreads in the Netherlands fluctuated between 1 and 2%, with a significant volatility due to rapidly changing swap rates. Over the longer term (the last 10 years), mortgage spreads have gradually decreased from around 2.5% to 3% in 2014 to around 1.5% now, see Figure 9.

Figure 9: Historical mortgage spreads in the Netherlands

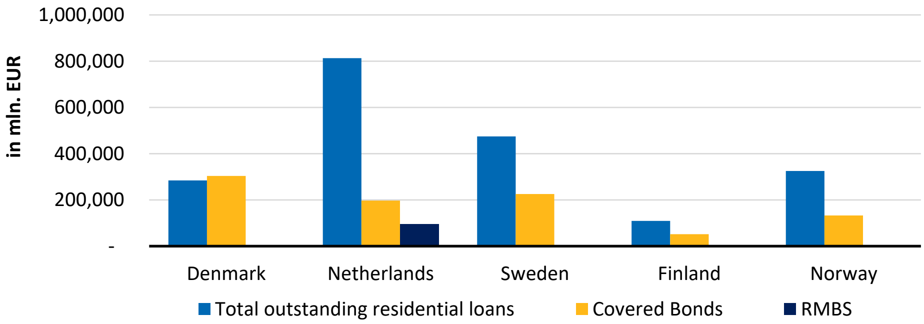


Spreads relative to the euro swap curve of Dutch mortgage loans with a fixed-rate term of 10 respectively 20 years and a loan-to-value of 80% or lower. Source: Bloomberg, Aegon, as of 15 November 2023.

Mortgage funding

Figure 10 provides more information about the financing of the mortgage market. Mortgages are mainly provided by banks, but the market share of (life) insurers, specialized credit institutions and other parties (such as pension funds) is gradually increasing.

Figure 10: Funding of the residential mortgage market



Source: EMF (2023, Statistical Table 1, 22 and 25), as of December 31, 2022.
N.B. We have excluded non-residential covered bonds for Denmark by subtracting the outstanding amount of non-residential loans (€126bn, see EMF, Statistical Table 7). We also excluded covered bonds linked to ship finance and supranationals (approximately (€10bn). [9]Some double counting also occurs at the end of each quarter due to refinancing of existing loans.

We here distinguish three forms of funding:

[9] Source: Danske Bank.

- Direct funding (balance sheet/loan)
- Mortgage bonds / covered bonds
- Residential mortgage backed securities (RMBSs)

The traditional form is direct funding, e.g. using deposits from a bank or the premium income from an insurer or pension fund. In this case, the mortgage loan remains on the issuing institution's balance sheet. This is the most common way of mortgage financing in the Netherlands, although the issuance of covered bonds by banks is also substantial. Mortgage lenders can also choose to distribute, where institutional investors can gain direct access to a pool of underlying mortgages through an investment fund or separate pools. In this case, the credit risk of the mortgage is transferred to the party investing in the fund. Direct mortgage loans, or mortgage fund participations, are privately traded (without a public market) and therefore generally have low liquidity.

Institutional investors can gain direct access to a pool of underlying mortgages through an investment fund or separate pools.

A mortgage loan can also serve as collateral for a mortgage bond or covered bond. The covered mortgage bond market is sizeable in the Netherlands and (especially) Sweden, see Figure 10. New issuance was €38bn in 2022 for the Netherlands, €48bn in Sweden, €11bn in Finland and €34bn in Norway. In Denmark covered bonds are the dominant form of mortgage funding, with a new issuance of €149bn in 2022.[10]

Danish mortgage bonds are publicly traded and offer the investor the benefit of much higher liquidity. These bonds are mainly issued by specialized mortgage credit institutions: Nordea Kredit, Realkredit Danmark (a subsidiary of Danske Bank), BRF Kredit, Nykredit, DLR Kredit, etc. These institutions retain the credit risk, but pass on the interest and prepayment risk to the bondholders. The ratings for Danish mortgage bonds are generally high (most are AAA rated) and there is a liquid secondary market (which in practice provides daily liquidity). Note that a normal covered bond is always a bank loan, while a Danish mortgage bond is a consumer loan made available to the capital market, which is a unique feature.

Danish mortgage bonds share a number of features with covered bonds. The most important is that they are issued by a credit institution, listed and often eligible for UCITS funds. However, in reality they differ from Eurozone covered bonds for the following reasons:

- Pass-through principle: the cash flows of Danish mortgage bonds match those of the underlying mortgages so there is a "balance principle" between the mortgage bonds and the underlying mortgages;
- Like mortgages or mortgage-backed securities, callable Danish mortgage bonds carry a risk of prepayment. With covered bonds, the issuer and not the investor bears this risk;
- The rules for overcollateralization are not the same: the security is generally larger when it comes to covered bonds.

More information about the Danish mortgage market and a detailed comparison with the Dutch mortgage market can be found in Van Bragt and Caplain (2018).

A third form of funding mortgages is through a so-called residential mortgage backed security (RMBS). This accounts for approximately 10% of the mortgage market in the Netherlands. This type of funding is not used in the Nordic countries. RMBSs are listed

[10] See EMF (2023, Statistical Table 23).

instruments backed by a pool of mortgage loans. The proceeds from the mortgage pool are then divided among different risk tranches (with different credit ratings). Investors in an RMBS can select a risk tranche of their choice, in line with the investor's objective and risk tolerance.

Table 1 summarizes the main differences between these three forms of funding. Note that differences may exist for a specific loan, covered bond or RMBS in a particular country. To analyse the differences between countries, we look at portfolios of multiple mortgages, covered mortgage bonds, Danish mortgage bonds and RMBSs. Bonds and highly-rated RMBSs have a lower yield than the underlying direct loans, due to their higher liquidity. On the other hand, these forms of financing generally have a shorter maturity and lower credit, prepayment and liquidity risk.

Note that we distinguish between Standard, Simple and Transparent (STS) RMBSs and non-STS RMBSs in this table due to the impact of this classification on capital requirements. Capital requirements will be discussed in more detail in a later section.

Table 1: Mortgage funding

Characteristic	Mortgage loan	Covered mortgage bond	Danish mortgage bond	RMBS (senior, STS)	RMBS (senior, non STS)
Yield	+	+	+	+/-	+/-
Duration (interest rate risk)	5-20 yr.	5-20 yr.	5-20 yr.	0-5 yr.	0-5 yr.
Credit risk	Low[11]	Low	Very low	Low[12]	Low
Prepayment risk	Average[13]	Zero	High[14]	Low	Low
Liquidity risk	High	Low	Low	Low	Low
Capital charge Solvency II	Very low	Low	Low	Low	Average

Source: Aegon Asset Management, as of October 31, 2023.

Risk analysis

For more insight into the risk profile of the different mortgage markets, we look at the following variables: loan-to-value ratio, debt service-to-income, and historical losses. See Table 1 for the overview.

The loan-to-value ratio is the ratio between the notional amount of the mortgage loan and the value of the underlying home. From a risk perspective, a low ratio is of course preferable. For the Dutch mortgage market, the loan-to-value ratio for new mortgages is capped at 100%; A maximum of 106% applies when financing energy saving measures. A lower maximum (of 80% and 85% respectively) applies for Denmark and Sweden. The maximum loan-to-value is 85% in Finland, except for first-time home buyers.

[11] An individual mortgage loan has no external credit rating. For a portfolio of several mortgages, an estimate can however be made of the creditworthiness on the basis of historical losses.
[12] This refers to a senior tranche of an RMBS with a high credit rating. It is also possible to invest in RMBS tranches with a lower creditworthiness.
[13] See Table 3 for an overview of the options and limitations for early prepayment per country.
[14] The risk of early redemption is high for callable Danish mortgage bonds. For more information see Van Bragt and Caplain (2018).

Table 2: Risk measures mortgage market

Country	Loan-to-value (max.)	Loan-to-value (2022, new loans)	Debt service to income	Historical losses
Netherlands	100%	76%	17.8%	Max. 0.1%
Denmark	80%	<80%	17.3%	Max. 0.2%
Sweden	85%	65%	18.8%	Max. 0.1%
Finland	85%	60-80%	12.0%	Max. 0.1%

Sources: Loan-to-value: EMF (2023, Country Reports); Debt service-to-income: ESRB (2022, Table 1); Historical losses: Kales and Van der Wal (2019, Figure 1); Denmark: Copenhagen Economics (2022, Figure 12); Sweden: Scope Ratings (2022)15; Finland: Bank of Finland (2023)[16].

The debt service to income ratio (i.e. total debt payments divided by the gross disposable income) provides additional information on the affordability of household debt (including mortgage debt). These numbers are comparable for the Netherlands, Denmark and Sweden, but relatively high compared to most other European countries. Finland scores significantly better in this regard, with a debt service to income ratio of 12%, close to the average value in Europe (11%).

However, from a European perspective, historical losses are very low for the countries considered in Table 2.[17] Kakes and Van der Wal (2019) have conducted an extensive analysis of historical losses for the Dutch mortgage market. Their dataset starts in 1970 and shows that losses on Dutch mortgage loans have remained well below 0.1% in most years, except during the Dutch housing crisis in the 1980's and in the wake of the financial crisis (2013-2017). After the financial crisis losses peaked at 0.1% in 2013. Since then lending restrictions have become tighter, however: new amortization requirements started in 2013, (see the box below) and a loan-to-value cap of 100% was introduced in 2018.[18]

For Denmark, aggregate losses on residential mortgages (with data available since 2005) peaked at 0.2% in 2010, in the wake of the financial crisis (see Copenhagen Economics, 2022). After 2014, losses became smaller, but with an uptick to 0.1% in 2020. Swedish banks currently hold net provisions for mortgage losses significantly below the 0.1% level, see Scope Ratings (2022). This data series goes back to 1998; provisions were closer to 0.1% in the earlier years. The Bank of Finland (2023) reports that in 2022 about 0.2% of all mortgage loans were non-performing. This means that the net losses are probably significantly below the 0.1% level, because the bank has the property as collateral in case of default.[19]

The box below provides country-specific information about amortization restrictions and the tax treatment of mortgage interest payments. Most countries have tightened amortization requirements and/or reduced tax deductions in recent years to reduce mortgage credit risk and cool the housing market.

[15] Swedish banks currently hold net provisions for mortgage losses significantly below the 0.1% level. See Figure 3 of Scope Ratings (2022).
[16] Finnish banks report that in 2022 approximately 0.2% of all mortgage loans were non-performing. This means that net losses will probably lie significantly below the 0.1% level because the bank has the home as collateral in case of a default. See Chart 4 of Bank of Finland (2023).
[17] See Van Bragt and Swagers (2022).
[18] We expect losses below 2 basis points and have experienced a cumulative loss of less than 1 basis point for our mortgage strategy since 2013.
[19] Only data after 2018 are available, with the percentage of non-performing loans peaking at 0.8% in 2020.

Amortization restrictions and tax treatment

In **the Netherlands** there are three types of mortgage: annuity, linear and interest-only. Interest-only mortgages were the most popular in the past, mainly to maximize tax benefits. Mortgage payments are tax deductible in the Netherlands, but the maximum deduction decreases over time. Currently, a maximum deduction of 36.93% applies. For new mortgages, the tax benefit only applies to annuity and linear mortgages that are fully repaid within 30 years. The maximum interest-only mortgage available is now typically 50% of the property value.

In **Sweden**, mortgage loans are typically amortizing as well, but the amortization level depends on the loan-to-value: 2% per year above 70% loan-to-value and 1% for 50-70% loan-to-value. If the loan-to-income ratio is larger than 450%, an additional 1% per year applies. A important difference with the Dutch and Danish mortgage markets is that variable or short-term fixed rate mortgages are the dominant type (compared to longer fixed rates in the Netherlands and Denmark). Interest payments are subject to a tax deduction of 30%.

From July, 2023, mortgages in **Finland** must be repaid in a maximum of 30 years and loans without amortization will no longer be allowed. The tax deduction for mortgage interest payments has been gradually phased out for owner-occupied homes since 2012. From 2023 there will be no more tax deductions.

Mortgages issuers in **Denmark** match the cash flows of Danish mortgages with mortgage bonds available on a liquid public market. This means that there is a unique 'balance principle' between the mortgage bonds and the underlying mortgages, as we will explain in more detail in this article. The most common are callable fixed-rate annuity bonds, although non-callable bonds are a sizable part of the market for shorter fixed rates. Mortgage payments are also tax deductible in Denmark (currently 33.5%).

Table 3 shows the forms of government support that exists. Dutch mortgages can be secured by the Dutch government through the NHG guarantee structure, see the next section for more information. Denmark also has such a state guarantee, but only for social housing mortgages.[20] Sweden currently does not have government backed mortgages. However, in 2022 a government study proposed that Swedish banks should be able to provide a government-guaranteed loan to first-time home buyers.[21] In Finland, a partial government guarantee is possible: up to 20% of the mortgage loan with a maximum of €60,000 per home.[22]

This table also provides more information about prepayment penalties. In most cases a prepayment penalty applies. In the Netherlands, however, it is possible to repay up to 10-20% (of the original nominal amount) per year free of charge. Prepayment without a fee is also possible in the event of special circumstances (e.g., sale, death or unemployment).

[20] See https://www.globenewswire.com/news-release/2017/11/23/1205547/0/en/New-agreement-on-social-housing-financing.html.
[21] The loan could amount to 10% of the home's value or SEK 250,000, whichever is lower. See Swedish Bankers' Association, 2022, p. 18.
[22] See https://www.valtiokonttori.fi/en/services/financing-and-loans/state-guarantee-for-a-housing-loan/#general-information-on-government-guarantee_amount-of-the-government-guarantee.

Callable Danish mortgages can, as discussed earlier, be prepaid by the customer without penalty. In Sweden and Finland there is usually a prepayment penalty.[23]

Table 3: Government guarantees and prepayment policies

Country	Government support	Prepayment policies
Denmark	Yes, but only for social housing	For callable bonds prepayment is possible (penalty free)
Netherlands	Yes, via NHG	Maximum of 10-20% prepayment per year without penalty. Prepayment in case of a sale is also possible without penalty.
Sweden	No	A penalty typically applies in case of prepayment
Finland	Yes, but max. 20% of the loan (max. €60,000 per home)	A penalty typically applies in case of prepayment

The NHG guarantee scheme

Since 1995, the Netherlands has had a unique national mortgage guarantee scheme, called 'NHG' or 'National Mortgage Guarantee' in Dutch. The purpose of the NHG scheme is to provide a safety net if a mortgage borrower can no longer pay the mortgage beyond his or her control. An NHG mortgage must meet the criteria for responsible lending and borrowing, drawn up by the National Institute for Family Finance in the Netherlands (NIBUD).

The specific circumstances under which the NHG guarantee is activated are:

- If the mortgage borrower loses his/her job
- If the mortgage borrower's relationship ends
- If the mortgage borrower is incapacitated for work
- If the mortgage borrower's partner dies

If you have an NHG mortgage and can no longer pay the mortgage due to one of these circumstances, the mortgage borrower and the mortgage lender can contact NHG for support. However, it is required that the mortgage borrower fully cooperates with NHG when financial problems arise and does everything possible to limit the residual debt as much as possible. This means that one must make every effort to prevent or limit payment arrears and that one has no other income or assets with which the losses can be prevented or limited. In addition, the home must be well maintained before and during the sales process and one must try to sell the home for the highest possible amount.

There is also a 10% own risk clause, which means that the mortgage lender is only entitled to 90% of the residual loss (after sale of the home). From January 1, 2023, the NHG limit for new mortgages will be €405,000. For homes with energy-saving facilities, the NHG limit is 6% higher, i.e. €429,300. When you take out a mortgage with NHG, you pay one-off costs. This NHG percentage is 0.6% of the mortgage amount in 2024.

An NHG guarantee is mainly used for new mortgages with a high loan-to-value (on average 86% in 2022). With a higher loan-to-value, the need for the extra security that NHG offers plays a major role. In exchange for the lower risk, the mortgage interest rate on an NHG mortgage is lower. The average interest rate discount that lenders offer for an NHG loan (with a loan-to-value of 100%) was an average of 0.39 percentage points in 2022.

The purpose of the NHG scheme is to provide a safety net if a mortgage borrower can no longer pay the mortgage beyond his or her control.

[23] See https://www.kkv.fi/en/consumer-affairs/credit-and-payments/credit/early-repayment-of-a-loan.

The NHG guarantee scheme is managed by the Home Ownership Guarantee Fund (WEW). The WEW is fully guaranteed by the Dutch government. This means that the Dutch government will provide a subordinated interest-free loan to the WEW as soon as the WEW has insufficient assets to pay claims on the guarantee. In 2022, 62% of all new Dutch mortgages (with a notional lower than the NHG limit at that time) had an NHG guarantee. NHG's guaranteed capital has increased to €1,634m in 2022. The total NHG fee amounted to €101m in 2022 and the losses paid out were very small (only €0.1m in 2022). See NHG (2022) for more information.

Capital requirements

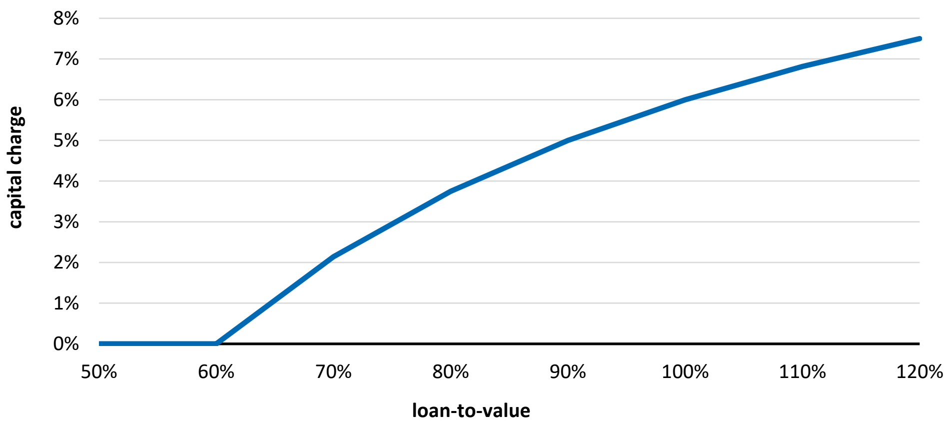
In this section we discuss the Solvency II Capital Requirement (SCR) for the different types of mortgage-backed loans. The Solvency II framework is relevant for European insurance companies and many pension providers in the Nordic countries. Below we take a closer look at the capital requirements for mortgage loans, covered mortgage bonds and RMBSs.

Mortgage loans

Under Solvency II, residential mortgage loans can be treated using the counterparty default risk module, provided that the loans meet 13 specific requirements.[24] Figure 11 shows the SCR as a function of the loan-to-value of the mortgage loan. With a loan-to-value of 100%, the SCR is equal to 6%, gradually decreasing to zero for a loan-to-value of 60%.[25] Importantly, Dutch mortgage loans with a state guarantee (NHG) do not receive a lower capital charge.

As mentioned, the SCR for mortgage loans is calculated using the counterparty default risk module. This risk category has a low correlation with the other main risk modules (like market risk and insurance risk), which means that the contribution to the total capital requirement is typically very small.

Figure 11: Required solvency capital (SCR) for a residential mortgage loan



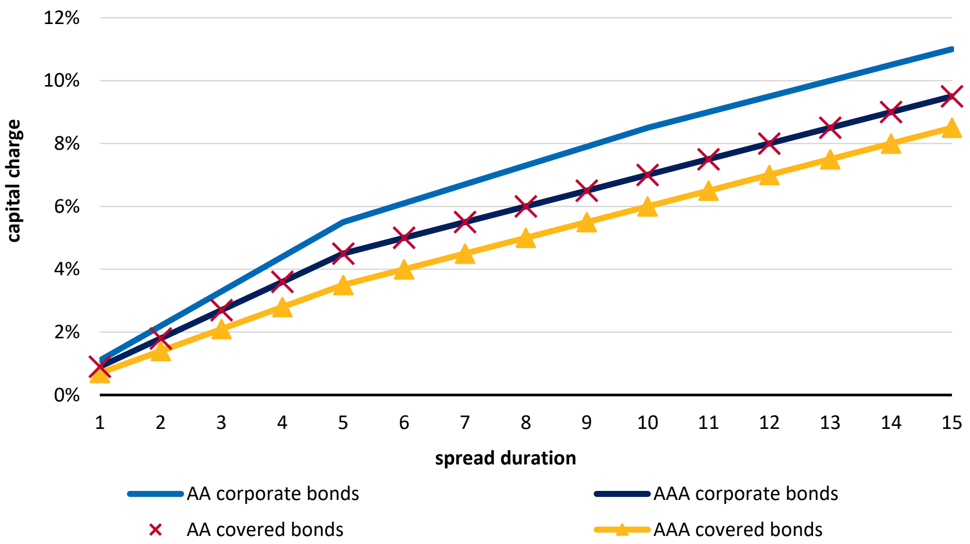
Source: Van Bragt and Caplain (2018).

[24] See EU (2015), Article 191.
[25] For more information, see Van Bragt and Caplain (2018).

Covered mortgage bonds

The Solvency II capital charge (for spread risk) for covered mortgage bonds depends on the bond's rating and the (spread) duration, see Figure 12. Note that the capital requirements for covered bonds are lower than for corporate bonds with similar ratings and maturities. For example, the figure shows that the capital requirements for AAA corporate bonds and AA covered bonds are the same. Danish mortgage bonds generally have a AAA rating. If we assume that the (spread) duration is approximately 5, this leads to a capital requirement for the spread risk of approximately 3.5%. By comparison, Danish government bonds under Solvency II have a capital requirement for spread risk of zero, while Danish corporate bonds with a rating of BBB and a maturity of 5 would have a spread capital requirement of around 12.5%. The capital requirement for Danish mortgage bonds is therefore at the lower end.

Figure 12: Required solvency capital (SCR) for a covered mortgage bond



Source: EU (2015), Article 180(1).

Residential mortgage-backed securities

The Solvency II capital requirement for the spread risk for RMBS depends on the rating and the (spread) duration, with assets with a high rating and a short duration having the lowest capital requirement. Depending on the specific type of RMBS, capital requirements can be much higher than for corporate loans and bonds with a comparable rating and term. When calculating the capital requirement, a distinction is made between three different types of RMBS:[26]

1. Senior simple, transparent and standardized (STS) securitizations
2. Non-senior STS securitizations
3. Other securitizations

A simple, transparent and standardized (STS) securitization should be used in accordance with the requirements set out in Article 18 of EU (2017). A comprehensive checklist for STS

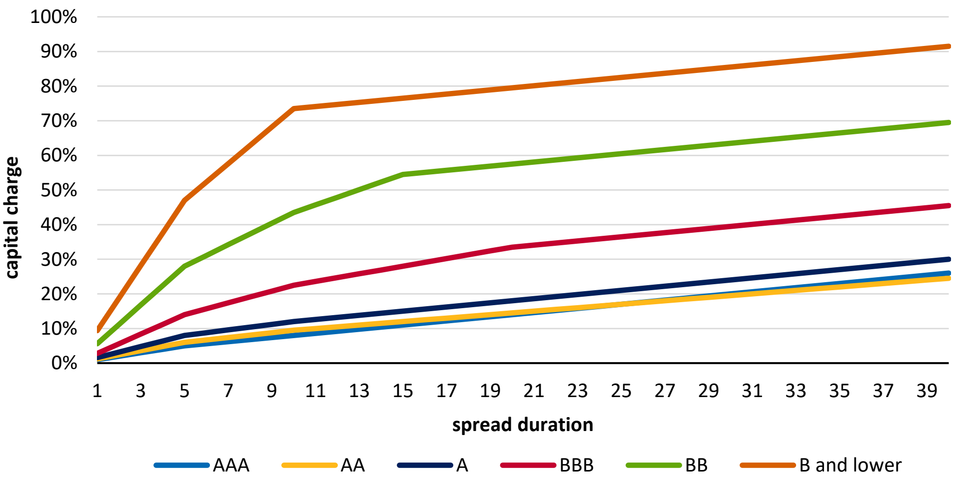
[26] This replaces the earlier distinction under Solvency II between "Type 1" and "Type 2" securitizations.

securities can also be found in Norton Rose Fulbright (2018). STS securitizations should be notified to the regulator and ESMA. If approved, ESMA will publish the STS notification on a register on its website.[27] Importantly, for mortgage-backed securitizations it is required that the originator retains 5% of the exposure ('skin in the game'), that the underlying pool consists of a homogeneous collection of mortgage loans (and no 'cherry picking') and that a sufficiently long history is available to calculate expected losses.

Solvency II capital-efficient securitisations are mainly found in the senior STS universe.

The capital requirements for senior and non-senior STS securitisations are shown in the figures below. The word 'senior' means that the exposure is the highest tranche of a given securitization structure. The capital requirements for non-senior STS are approximately two to three times higher than those for senior STS securitisations. Other securitisations (not shown here) have a much higher capital requirement (approximately three to four times before reaching the 100% cap) than non-senior STS securitisations. It is clear that Solvency II capital-efficient securitisations are mainly found in the senior STS universe, especially for high ratings and low maturities.

Figure 13: Required solvency capital (SCR) for a senior STS RMBS

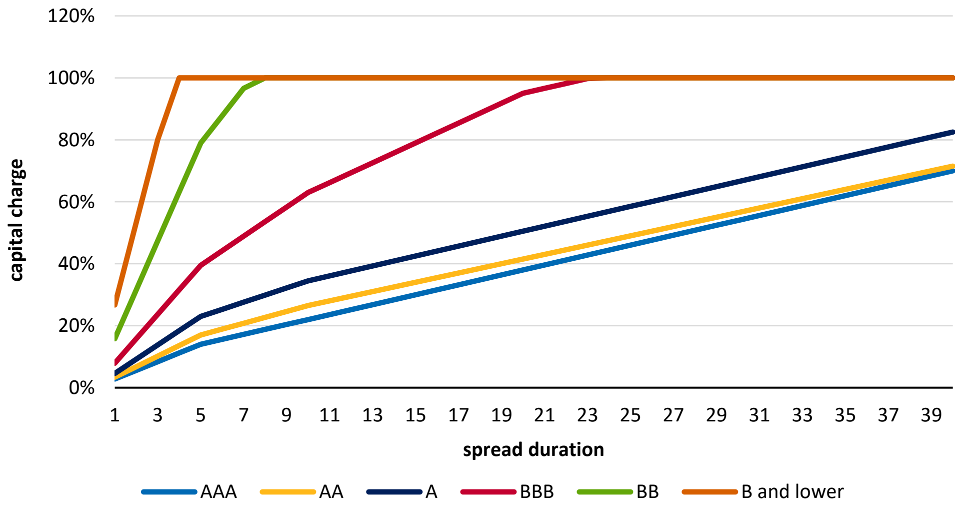


Source: EU (2018), Article 178(3).

For a senior tranche of RMBS that can be classified as STS, the Solvency II capital requirement is relatively low. For example, for a AAA senior STS RMBS with a spread duration of 3 years the SCR for spread risk is only 3%. However, the SCR is much higher for non-senior or non-STS RMBSs. For example, the SCR would increase to 8.4% for a non-senior STS RMBS for the same rating and duration.

[27] See https://www.esma.europa.eu/policy-activities/securitisation/simple-transparent-and-standardised-sts-securitisation.

Figure 14: Required solvency capital (SCR) for a non-senior STS RMBS

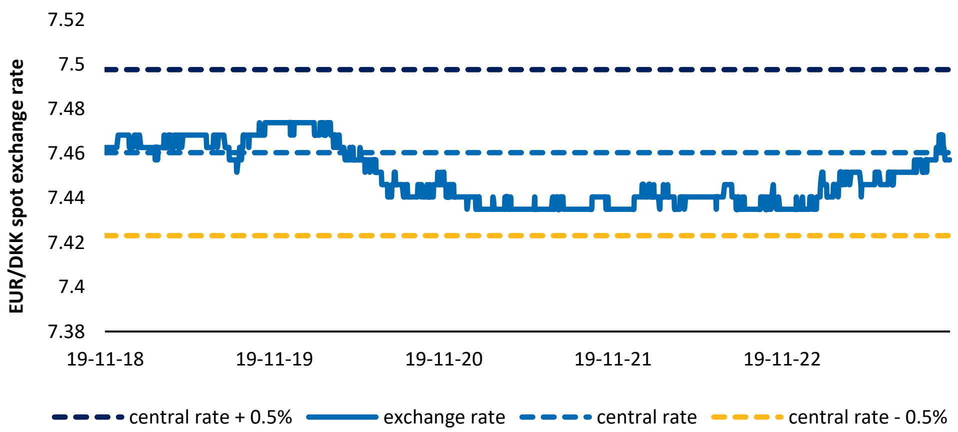


Source: EU (2018), Article 178(4).

Currency risk

Most Danish mortgages are denominated in Danish kroner. The Danish krone is pegged to the euro in the Exchange Rate Mechanism II (ERM II) at a central rate of 7.46038 Danish krone per euro. ERM II was set up on 1 January 1999 to couple non-euro currencies within the European Union to the euro.[28] The fluctuation band of the euro / Danish krone exchange rate is equal to ± 2.25%. This bandwidth has not been breached in the past five years, but smaller deviations occur, see the figure below. The Danish central bank (in cooperation with the ECB) does intervene, if necessary, to keep the Danish krone within the bandwidth.

Figure 15: Exchange rate of the Danish krone and the euro



Source: Bloomberg, as of November 15, 2023.

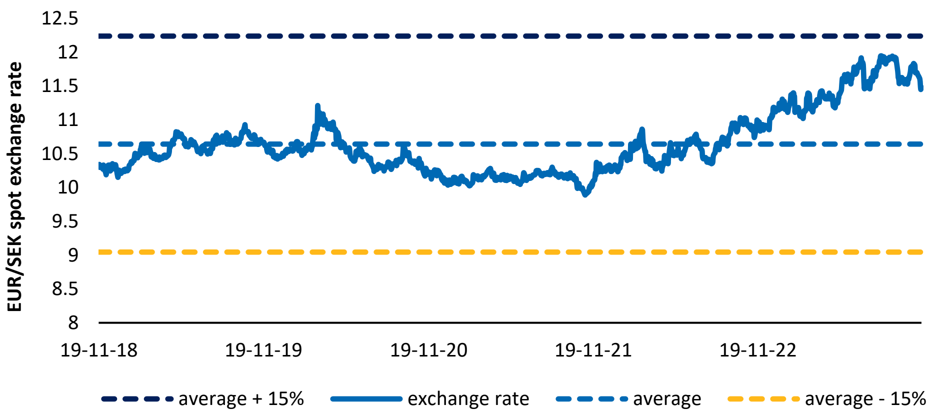
Because of the tight link between the Danish Krone and the euro, the Solvency II capital charge for Danish currency risk is much lower than for currencies with a floating exchange

[28] See https://ec.europa.eu/info/business-economy-euro/euro-area/enlargement-euro-area/introducing-euro/adoption-fixed-euro-conversion-rate/erm-ii-eus-exchange-rate-mechanism_en for more information.

rate against the euro: 0.39%, instead of the standard value of 20%.[29] The Swedish krona, however, is not pegged to the euro, which results in significant exchange rate volatility, as is visible in Figure 16.

Under Solvency II it is attractive to hedge the Swedish krona, to avoid a capital charge for currency risk.

Figure 16: Exchange rate of the Swedish krona and the euro



Source: Bloomberg, as of November 15, 2023.

Under Solvency II it is thus attractive to hedge this currency risk, to avoid the additional capital charge of 20%.

[29] See EIOPA (2015), Article 1.

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Conclusions

We have analysed the mortgage markets in the Netherlands and the Nordic countries. We provide a broad overview and cover a wide range of topics, such as market size, house price developments, yield levels, funding, loan characteristics, risk and capital requirements. The table below summarizes the key characteristics for investors in these markets.

Table 4: Main characteristics mortgage markets

Country	Yield	Risk	Government support	Matching portfolio
Netherlands	+	+	+	+
Denmark	+	+	+/-	-
Sweden	+	+	-	-
Finland	+	+	+/-	-

Overview of the main characteristics of different mortgage markets. (+) and (-) indicate an relatively high and low score; (+/-) indicates a neutral assessment. Source: Aegon Asset Management, as of November 15, 2023.

The relevance of each criterion will depend on an institutional investor's return objective, risk tolerance, liabilities, illiquidity budget and other constraints. This table therefore only serves as an aid to make a choice between the different countries based on your own preferences. But given this information, and from the perspective of an institutional investor with long-term liabilities, we can conclude the following:

- The Netherlands, Denmark and Sweden all have large and mature mortgage markets, supported by well-developed economies and mortgage lenders with a high average net worth. The Finnish market shares some of these characteristics, but is much smaller in size.
- Mortgage spreads are currently attractive and the risk profile for mortgages in the Netherlands, Denmark, Sweden and Finland is low.
- Dutch mortgage loans, with their longer fixed-interest terms, fit well into the interest-rate matching portfolio of institutional investors with long-term liabilities.
- Danish mortgages also generally offer longer fixed-rate maturities. However, Danish mortgage bonds provide a less effective interest rate hedge due to their callable nature that allows early repayment without penalty.
- For Sweden and Finland, the match with long-term liabilities is also less effective, with mainly variable or short-term fixed mortgage rates.
- The NHG guarantee by the Dutch central government can offer additional protection. Some Nordic countries also offer state guarantees, for example for social housing loans, but not with the same accessibility and coverage.

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