



Financial Stability Report 2015:1

The Riksbank and financial stability

- The Riksbank defines financial stability as meaning that the financial system is able to maintain its three basic functions – the mediation of payments, the conversion of savings into funding and risk management – and is also resilient to disruptions that threaten these functions.
- The financial system plays a vital role in the economy. It is necessary to have a stable and smoothly-running financial system for the economy to function and grow. A serious crisis in the financial system could entail extensive economic and social costs.
- The Riksbank has the Riksdag's (the Swedish parliament) mandate to promote a safe and efficient payment system. In practice, this task means that the Riksbank is responsible for promoting financial stability.
- The Riksbank is also the authority that has the capacity to grant emergency liquidity assistance to individual institutions if problems arise that threaten financial stability. The Riksbank therefore needs to be well prepared for crises by having an efficient crisis organisation.
- We share responsibility for promoting financial stability with Finansinspektionen (the Swedish Financial Supervisory Authority), the Ministry of Finance and the National Debt Office. The Ministry of Finance is responsible for the regulation of financial enterprises and Finansinspektionen is responsible for micro- and macroprudential policy. The Swedish National Debt Office is, in turn, a support and resolution authority. The interaction between the authorities is important both in the preventive work, for example in the Financial Stability Council, and in the event of crisis management. The same also applies internationally as financial enterprises increasingly operate across national borders.
- The Riksbank analyses the financial system's stability on a continuous basis for the early detection of risks and vulnerabilities that could lead to socio-economic costs. The Riksbank publishes the results of its analysis in various publications. By doing this, the Riksbank can bring attention to issues that may pose a threat to the financial system, and also contribute to the debate on the subject.

The Riksbank's Financial Stability Report

- The Riksbank's Financial Stability Report is published twice a year. In the report, the Executive Board of the Riksbank gives an overall assessment of the vulnerabilities and risks that can threaten the stability of the financial system and evaluates the system's resilience to them. In some cases the Executive Board recommends specific measures to counteract risks and increase resilience. These recommendations may be based on the current economic situation, but they may also relate to more structural circumstances. The recommendations can be aimed at banks as well as other market participants, or at legislators and other authorities.

The Executive Board of the Riksbank discussed the Report on two occasions; 18 May and 1 June 2015. The Report takes into account data available as of 25 May 2015. The report is available on Sveriges Riksbank's website, www.riksbank.se. It is also possible to order a printed version of the report free of charge on the website, or to download the report as a PDF.

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■ Summary

THE FINANCIAL SYSTEM IS WORKING WELL BUT THE RISKS ARE INCREASING

The Riksbank's assessment is that the Swedish financial system is working well at present. Swedish banks, companies and households have good opportunities to get funding and the financial infrastructure is considered to be safe and efficient. But the Swedish banking system is large and closely interlinked. Moreover, the Swedish banks have a large proportion of market funding and a low proportion of equity capital in relation to their assets. This makes the banking system, and the financial system as a whole, sensitive to various economic shocks. At present, it is primarily the high level of risk-taking on the financial markets and the high indebtedness of Swedish households that could initiate and reinforce the consequences of such shocks. Since December 2014, when the previous Financial Stability Report was published, investor risk-taking has continued to be high and household indebtedness has risen. All-in-all, this entails an increase in the risks to both financial and macroeconomic stability.

IMPORTANT TO URGENTLY CLARIFY THE MACROPRUDENTIAL POLICY MANDATE

It is important that action is taken as soon as possible to strengthen resilience to shocks and counteract the risks relating to high household indebtedness. However, it has become apparent that Finansinspektionen does not have a sufficiently clear mandate or clearly-defined tools to take macroprudential policy measures. This lack of clarity is delaying and hindering the introduction of necessary measures. It is therefore of the utmost importance that Finansinspektionen's mandate and instruments for macroprudential policy are clarified in law as soon as possible.

MEASURES ARE NEEDED TO DAMPEN THE RISKS LINKED TO HOUSEHOLD INDEBTEDNESS

In order to reduce vulnerabilities and risks in the household sector, measures are needed that address the underlying causes of increased indebtedness. Reforms are needed to reduce the willingness of households to take on debt, such as changes to tax relief and reforms to increase the supply of housing. However, it may take time to implement and see the effects of such measures. It is therefore important that the pace of such reform work is accelerated. The Riksbank also considers that other measures are needed. An amortisation requirement at least in line with Finansinspektionen's proposal should be introduced as soon as possible. Examples of other potential complementary measures include a debt-to-value limit and stricter requirements for the banks' credit assessments of individual households.

THE RESILIENCE OF THE MAJOR BANKS NEEDS TO BE STRENGTHENED

In recent years, the major Swedish banks have improved their resilience to both credit and liquidity risks. This is a positive development, but the Riksbank considers that the resilience of the major banks needs to be improved further. The capital requirements for the banks should be tightened, for example by introducing a minimum leverage-ratio requirement. In addition, the major banks should reduce their structural liquidity risks and increase their resilience to short-term liquidity stress in Swedish kronor.

NEW FORMAT OF THE FINANCIAL STABILITY REPORT

This issue of the Financial Stability Report introduces a new structure which will apply from now on. The report is now more focused. It consists of three chapters. The first describes the current situation, the second analyses risks and vulnerabilities and the third chapter presents the Riksbank's recommendations. The report also contains three in-depth articles.

This issue focuses on the risks relating to household indebtedness, which are described in more detail in Chapter 2. The first article discusses the measures that can be taken to reduce the risks associated with household indebtedness and the potential economic effects of such measures. The second article discusses in more detail how a debt-to-income limit could dampen household indebtedness and the advantages and disadvantages of such a measure. Finally, the third article analyses why Swedish households choose variable interest rate mortgages to such a great extent and the risks this may entail, both to the individual household and to macroeconomic and financial stability.

1. Assessment of the current situation

Monetary policy has become even more expansionary in several countries over the last six months. This has contributed to investor demand for higher-risk assets remaining strong, resulting in rising prices for assets such as equities and corporate bonds. In Sweden, the low interest rates have also contributed to rapidly rising housing prices and ever-increasing household indebtedness. The major Swedish banks are continuing to report high profits and good profitability. The debt-servicing ability of the major banks' borrowers is sound and loan losses are very low. The assessment is that the Swedish financial system is working well at present. At the same time, high investor risk-taking and rising household indebtedness mean that the stability risks have increased.

EXPANSIONARY MONETARY POLICY OVER A LONG PERIOD

Since the financial crisis of 2008, resource utilisation has been weak and inflation low in many countries. This has led many central banks to cut their policy rates to historically low levels. Some central banks have also begun programmes of asset purchases to make monetary policy even more expansionary. This pattern has continued during 2015.

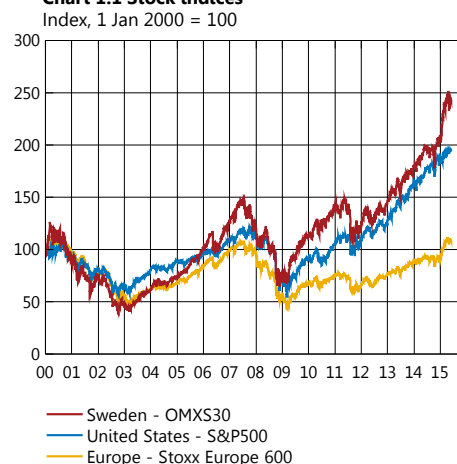
The expansionary monetary policy has contributed to a fall in yields on safe assets such as government bonds. Instead, demand has increased for assets that are considered to be of higher-risk and therefore have a higher expected return. Consequently, equity prices, for example, have increased (see chart 1:1)¹. Even though the increased risk-taking is partly an intended effect of the monetary policy conducted, it can lead to the financial system developing in such a way that makes it more vulnerable. For example, there are risks of inflated balance sheets, of overvalued assets or of risks not being fully priced (see chapter 2). This increases the risk of rapid and substantial price fluctuations. Recent, relatively substantial price fluctuations on the equity and bond markets may partly be a result of this (see chart 1:1 and chart 1:2).

SLOW ECONOMIC RECOVERY

Global economic activity has continued to slowly improve during this year.² However, the increased risk-taking on the financial markets does not seem to have reached the real economy in all countries. The development of investment and the demand for credit are still weak in the euro area, for example. This may be because there is uncertainty about the economic outlook. Structural problems remain despite the fact that several economic-policy measures have been taken; both private and public debt is high in several countries, for example. Moreover, many banks are still burdened by a large proportion of problem loans.

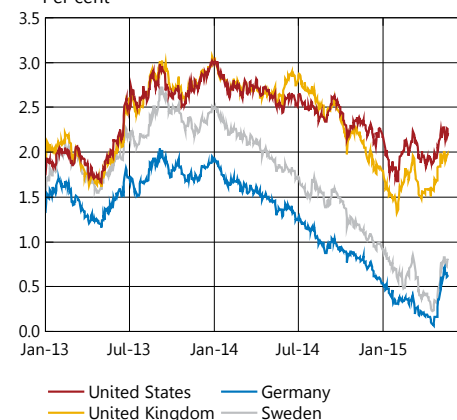
The acute refinancing crisis in Greece has also fuelled uncertainty about economic outlook in the euro area. In addition, the situation

Chart 1:1 Stock indices



Sources: Bloomberg and the Riksbank

Chart 1:2 Ten year government bond rates
Per cent



Note. Benchmark bonds. The maturity could therefore potentially be different.

Source: Macrobond

¹ See the Appendix for additional charts on developments on the financial markets, the Swedish banking groups' borrowers and the Swedish banks (www.riksbank.com).

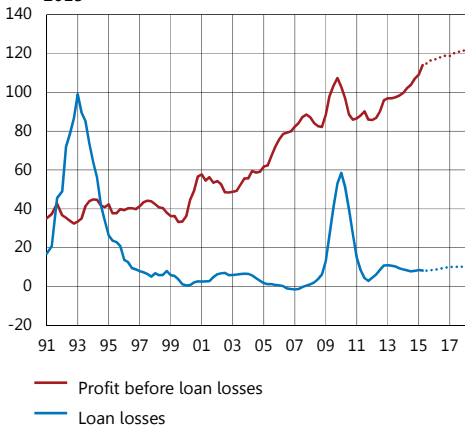
² *Monetary Policy Report*, April 2015. Sveriges Riksbank.

Chart 1:3 Housing prices in Sweden
Index, January 2005=100



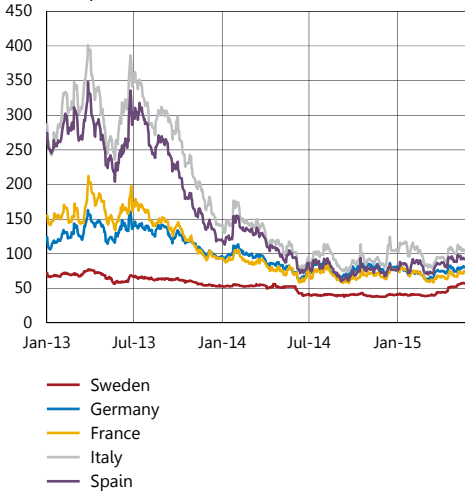
Note: Seasonally-adjusted housing prices.
Sources: Valueguard and the Riksbank

Chart 1:4 Profits before loan losses and loan losses in the major Swedish banks
Rolling four quarters, SEK billion, fixed prices, March 2015



Note: The broken lines refer to a forecast.
Sources: Bank reports and the Riksbank

Chart 1:5 Five year CDS-spreads for banks
Basis points



Note: Average of comparable large banks domiciled in the respective country.
Sources: Bloomberg, Reuters EcoWin and Fitch

in Russia and Ukraine has had a negative effect on the economic outlook in Europe, especially in countries with large exports to Russia.

However, the Riksbank's assessment is that the problems gradually will be managed and that growth will continue to strengthen in both the euro area and the global economy as a whole.³

SWEDISH BORROWERS' DEBT IS INCREASING

The development of economic activity in Sweden is positive. The low interest rates have increased households' scope for consumption, and as the economy is expected to continue to strengthen, corporate investment will also begin to pick up speed.⁴ One sign of this is that corporate borrowing has increased over the last 12 months. Moreover, companies' funding conditions from banks have improved.⁵

The low interest rates are also an important explanation of why household debt has continued to increase and why housing prices have risen at an increasingly rapid rate (see chart 1:3). Although the Riksbank's assessment is that households have sufficient margins to be able to service their loans, growing indebtedness means that resilience in the household sector has weakened and that the risks have increased (see chapter 2). Moreover, indebtedness and housing prices are expected to continue increasing in the period ahead.

THE MAJOR SWEDISH BANKS ARE REPORTING GOOD RESULTS

The major Swedish banks have continued to report good results and high profitability. In addition, the debt-servicing ability of the banks' customers is good and their loan losses are very low (see chart 1:4). Consequently, the banks are still considered to be sound, which is reflected in high credit ratings and low CDS premiums (chart 1:5). This means that they can access inexpensive funding on the market and also provide Swedish households and companies with loans at low interest rates. The Riksbank's assessment is that the major banks will continue to report increased profits and low loan losses going forward (chart 1:4). Profits are expected to rise primarily as a result of higher lending volumes.

In recent years, the major Swedish banks have improved their resilience to both liquidity risks and credit risks, as confirmed, for example, by the Riksbank's stress tests⁶. This development is positive, but the Riksbank's assessment is that resilience needs to be strengthened further, among other things as a consequence of the vulnerabilities that exist in the banking system (see chapter 2). The financial infrastructure is deemed to be safe and efficient. However, there is also room for improvement, both in terms of the systems and the regulations in the field.⁷

³ *Monetary Policy Report*, April 2015. Sveriges Riksbank.

⁴ *Monetary Policy Report*, April 2015. Sveriges Riksbank.

⁵ *The Business Tendency Survey*, April 2015 National Institute of Economic Research.

⁶ For the results of the Riksbank's stress test, see Chapter 3 in the Appendix. However, the stress tests do not capture contagion risks and the consequences of, for example, lowered credit ratings.

⁷ *Financial Infrastructure Report 2015*. Sveriges Riksbank.

■ 2. Vulnerabilities and risks in the financial system

Investors' demand for high-risk assets risks resulting in assets becoming overvalued on several markets. A sudden re-evaluation by investors of their view of risk could lead to a rapid fall in asset prices and an increase of stress on the financial markets. This, in turn, could lead to a deterioration in Swedish banks' access to funding, with funding becoming more expensive. Swedish non-financial companies obtaining funding on the financial markets could also be affected in such a scenario. The low interest rates have also contributed to rapidly rising housing prices and increasing indebtedness among Swedish households. The risks associated with this development have thereby continued to increase.

Vulnerabilities in the financial system

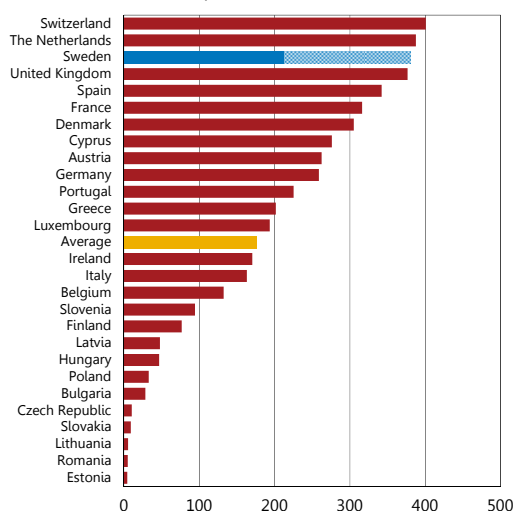
The Swedish financial system is working well at present but there are vulnerabilities that increase sensitivity to various economic shocks.

Firstly, the Swedish banking system is large in relation to the size of the Swedish economy (see chart 2:1). This means that potential problems may be expensive to deal with. In addition, the banking system is highly concentrated around the four major banks (Nordea, Handelsbanken, SEB and Swedbank), which are closely interlinked, among other things through their exposures towards the Swedish housing market.⁸ The major banks also have significant exposures towards each other through their holdings in each other's securities. The banks' holdings of each others' securities have almost doubled since 2007 (see chart 2:2). Holdings are now equivalent to over 30 per cent of the major banks' combined equity. Consequently, should problems arise in one of the banks, it is likely that the entire Swedish banking system, and thereby the entire financial system, would be negatively affected.

Furthermore, the major banks are dependent on wholesale funding, a large part of which is in foreign currency. This makes them more sensitive to both shocks on the global financial markets and to impaired confidence in the Swedish banking system. In addition, the major banks have wide maturity differentials in their assets and liabilities and some banks also have small liquidity buffers in Swedish kronor at times. All in all, this means that they are exposed to major liquidity risks. Funding problems may therefore arise faster than would otherwise have been the case.

The resilience of the Swedish banking system has improved in recent years. The major banks have built up liquidity buffers in foreign currency and have increased their CET 1 capital ratios. This has resulted in them now having both CET 1 capital ratios and liquidity coverage ratios (LCRs) that exceed, by a good margin, the minimum requirements determined under the framework of the Basel III Accord (see chart 2:3). However, the major banks' high CET 1 capital ratios are largely dependent on the banks' low risk weighted assets, which, in turn, is due to the banks increasingly using so-called internal models to calculate their risk weights. This is in accordance with the regu-

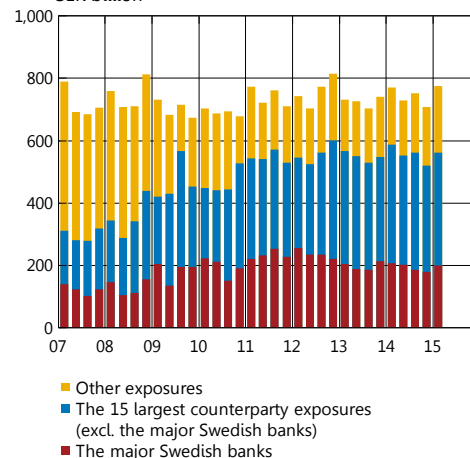
Chart 2:1 The banks' assets in relation to GDP
December 2013, per cent



Note. Refers to all assets in the country's banking groups. The shadowed blue bar shows the major banks' assets abroad in relation to GDP.

Sources: The ECB, the European Commission, the Swiss National Bank and the Riksbank

Chart 2:2 The major Swedish banks' counterparty exposures through securities holdings
SEK billion

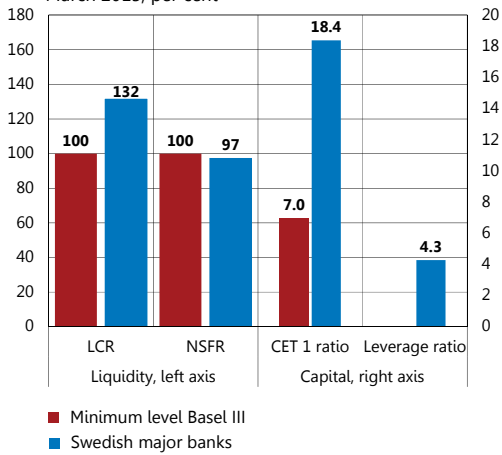


Note. The chart shows the breakdown of the major banks' total securities holdings on the basis of who issued the securities.

Source: The Riksbank

⁸ For more information on the major Swedish banks' mutual exposures, see *Financial Stability Report 2014:1*. Sveriges Riksbank.

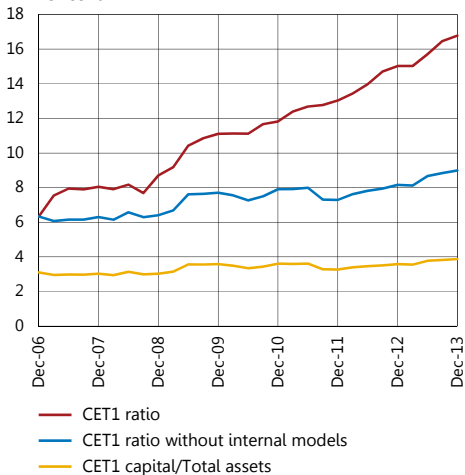
Chart 2:3 The four Basel III measures
March 2015, per cent



Note. The minimum level for leverage ratio is not yet determined.

Sources: Bank reports, the BIS and the Riksbank

Chart 2:4 The major Swedish banks' CET1 ratios, with and without risk-weight effects from internal models
Per cent



Note. The red line shows the major banks' CET 1 capital ratios with the banks' reported risk weights, while the blue line shows how high the ratio would have been if the part of the risk-weight reduction driven by the transition to internal models over the period covered by the diagram had been excluded. The chart assumes that the effect is evenly spread over the entire period in such a way that the internal models reduce the risk weights equally each quarter.

Sources: Bank reports, Finansinspektionen and the Riksbank

lations, but simultaneously means that the risk weights become very low in some cases.⁹ Without this transition to internal models, the major banks' CET 1 capital ratios would only have increased by a few percentage points over the period 2006 to 2013 (see chart 2:4).¹⁰ If the non risk-weighted capital measure leverage ratio is also examined, the major Swedish banks have relatively low levels, for example in comparison with other European banks. In addition, the major banks' leverage ratio is still below the minimum level of 5 per cent that the Riksbank has recommended should apply from 2018 (see chapter 3).

All in all, the vulnerabilities in the banking system contribute to sensitivity to shocks. At present, it is primarily the high level of risk-taking on the financial markets and the high indebtedness of Swedish households that could initiate and reinforce such shocks.

Low interest rates lead to increased risk-taking on the financial markets

The low interest rates have contributed to an increase in investor demand for high-risk assets in recent years. Among other things, this has led to rising share prices and smaller interest rate spreads between corporate bonds with higher and lower credit worthiness (see chart 2:5). One reason for this increased risk-taking could be that households and companies have received lower returns on their savings and have therefore chosen to reallocate their savings to higher-risk assets with higher expected returns. In addition to this, institutional investors could also have certain nominal yield requirements to meet. However, it is also possible that the long period of low interest rates has affected investors' future expectations and that they have therefore become more inclined to take risks.¹¹

The increased risk-taking promotes real investments and economic growth but, at the same time, could risk leading to increased vulnerability in the financial system if, for example, it were to cause assets to become overvalued or different types of risk not to be fully priced. The surveyed market participants in the Riksbank's risk survey also point out that the effects of the expansionary monetary policy could cause such risks (see chart 2:6). If investors, for some reason, wish to redistribute their asset portfolios and reduce their risk-taking, this could lead to asset prices falling faster and volatility increasing above what would otherwise have been the case. Although it is difficult to determine at which point assets become overvalued, one circumstance that could indicate that risks have not been priced in full is the fact that premiums for liquidity risk on, for example, the corporate bond market in several countries have declined in recent years, even though market liquidity seems to have deteriorated simultane-

⁹ The possibility of using internal models was introduced in 2007 in conjunction with the implementation of the Basel II regulations in Sweden.

¹⁰ This calculation is based on the investigation made by Finansinspektionen of the factors driving the decrease of the major banks' risk weights in its report *Stability in the financial system*, December 2015. The investigation only concerned the banks' credit risk. However, as credit risk is responsible for most of the banks' capital requirements, the result is assumed to form a reasonable estimate for the banks' entire operations.

¹¹ Apel, M. and Claussen, C.A. (2012), "Monetary policy, interest rates and risk taking". *Economic Review 2012:2* Sveriges Riksbank.

ously.¹² This reduced market liquidity could, in itself, amplify the effects of a reallocation, as individual transactions have a greater impact on market prices if sales pressure builds up among investors.

The financial stress index has also risen since the start of the year (see chart 2:7). One reason for this is that the covariation between different markets and assets has increased. Increased covariation means that a downturn on one market can rapidly spread to other markets. In addition, increased volatility, above all on the foreign exchange market and the commodity market, has also contributed to the rising index.

A NUMBER OF EVENTS CAN LEAD TO A CHANGE IN THE VIEW OF RISK AMONG INVESTORS

There are several plausible scenarios where the vulnerabilities that have accrued on the financial markets could contribute to increased financial stress. Regardless of origin, these would be unexpected events not reflected in the present pricing or in expectations of future trends. These could include, for example, the situation in Greece worsening, Swedish housing prices falling or the conflict in Ukraine intensifying. Market participants also highlight such events in the Riksbank's risk survey as factors that could influence development in the future (see chart 2:6).

Major problems remain in Greece and uncertainty has increased over the Greek government's debt-servicing ability. Substantial requirements regarding interest payments and repayments on its sovereign debt await in the near term. During the spring, the Greek government has therefore wanted to substantially renegotiate the lending program with the euro area countries and IMF, to negotiate debt relief and to remove some of the most fundamental saving reforms previously adopted. At the same time, the country is dependent on external funding. If the parties fail to agree and Greece cancel payments on its debts, this will risk causing an economic collapse in the country, probably with negative contagion effects to the euro area in particular.

This, in turn, could result in banks and sovereigns in the euro area finding it harder to obtain funding on the financial markets, which could influence credit granting to households and companies and thereby the development of the real economy in the euro area. Such a development should be seen in the light of the continuing persistence of structural problems in large parts of the euro area. The public finances in many euro area countries are still weak and would be weakened by a cancellation of payments by Greece as Greek government bonds are held, to a large extent, by European sovereigns. Furthermore, monetary policy in the euro area is expansionary, which further limits the scope for stimulating the economy. The economic recovery of the euro area will be more extended if the situation in Greece develops negatively.

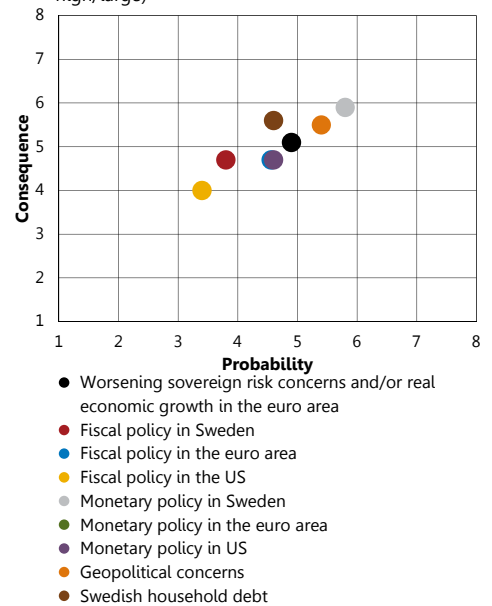
Chart 2:5 Difference in yield between corporate bonds with higher and lower credit worthiness
Basis points



Note. The series shows the spread between corporate bonds with different credit worthiness issued in different currencies. The dashed lines show the mean of the series since January 2010.

Source: Bloomberg

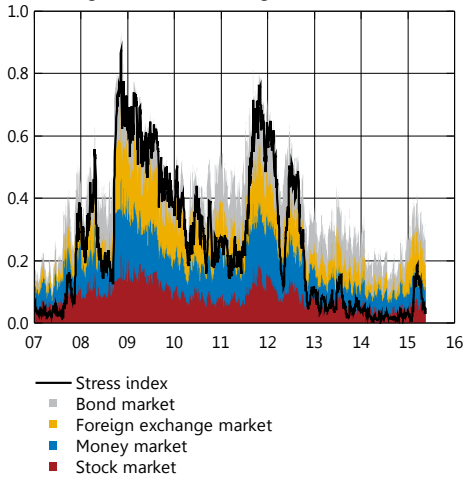
Chart 2:6 The participants' assessment of selected risks that may affect the Swedish financial system
Ranking (1 = extremely low/small, 8 = extremely high/large)



Source: the Riksbank's Risk Survey spring 2015

¹² See, for example, *Global Financial Stability Report*, April 2015. International Monetary Fund (IMF). And *Financial Stability Report*, December 2014. Bank of England.

Chart 2:7 Swedish stress index
Ranking (0=low stress, 1=high stress)



Note. The Swedish stress index has been produced by the Riksbank using a method similar to that used by the ECB for the European stress index. See Johansson, Tor and Bonthron, Fredrik (2013), Further development of the index for financial stress in Sweden, Sveriges Riksbank Economic Review 2013:1. Sveriges Riksbank.

Sources: Bloomberg and the Riksbank

Other potential factors could also lead to increased stress on the financial markets. One of these would be a revision of investor expectations of monetary policy in the United States. This could lead investors to reconsider their investments and rapidly choose to reallocate their portfolios. In such a situation, asset markets that have previously benefited from large inflows, such as markets in emerging economies or markets for corporate bonds in a number of countries, could experience large capital outflows.

INCREASED RISK-TAKING COULD IMPACT STABILITY IN SWEDEN

Rapid and unexpected price fluctuations on the asset markets, with increased stress on the international financial markets as a consequence, could impact the stability of the Swedish financial system. Among other reasons, this is due to the dependence of the major Swedish banks on wholesale funding in foreign currencies. In a stress situation, it is likely that the banks would have impaired access to funding and that this would become more expensive. This would be particularly true if investors simultaneously deemed that the risks in Sweden had increased, for example due to the development of the housing market. Higher funding costs for the banks, in turn, affect the interest rates households and companies pay for their loans. As the Swedish households are highly indebted and a large part of their loans are at variable interest rates, interest rate increases can rapidly impact households' scope for consumption (see the article Interest-rate fixation periods for Swedish mortgages). This risks affecting the development of the macroeconomy and, ultimately, also financial stability (see the section below).

Increased stress on the financial markets can also lead to problems for non-financial companies obtaining funding for parts of their operations on the market via corporate bonds. In a stress situation, these companies may find it difficult to refinance their outstanding bonds once these have matured. In such a situation, it is likely that the companies would utilise their lines of credit with the banks. Those companies lacking lines of credit could possibly raise further bank loans. This could affect both the capital adequacy and liquidity situation of the banks.

STABILITY RISKS LINKED WITH A NEGATIVE REPO RATE

In February of this year, the Riksbank introduced a negative repo rate and started to purchase government bonds with the aim of pushing down market rates and stimulating inflation.¹³ As a consequence, some market rates in Sweden have become negative. This is the case, for instance, for the Stibor reference rate. This has had repercussions on the market for bonds with variable coupons. A variable coupon is an interest payment that is not determined in advance but is linked to some kind of reference rate, such as Stibor. Now that the three-month Stibor rate has become negative, the coupon may also be-

¹³ For more information on the Riksbank's measures, see *Monetary Policy Report*, February 2015. Sveriges Riksbank.

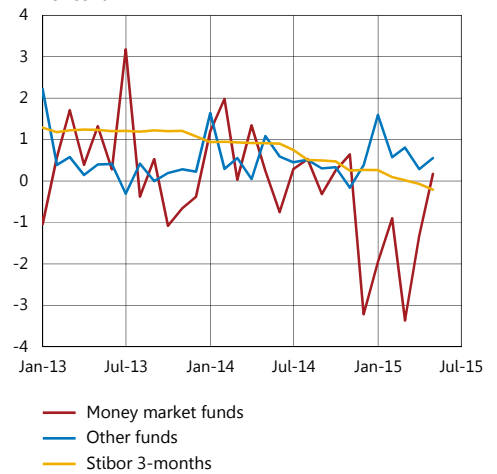
come negative. This means that the investor would have to pay the coupon to the issuer, instead of the other way round, which is the normal situation. This has led to a degree of uncertainty over how the negative coupons should be managed.¹⁴ Consequently, the Riksbank's *Financial Infrastructure Report* emphasises how important it is for every issuer of outstanding bonds with variable coupons, or those intending to issue such bonds, to make it clear to other market participants how these bonds are adapted to a negative interest-rate environment. This should be done in close dialogue with Euroclear Sweden. However, all in all, the Riksbank deems that the negative interest rate has not, as yet, led to any impaired functionality of the financial system.

The negative interest rates may also entail a change in risk-taking and saving by households and companies. One example of this is the outflow of just over 10 per cent of fund wealth experienced by Swedish money market funds (i.e. funds investing in interest-bearing assets with short maturities) since November (see chart 2:8).¹⁵ In the present interest-rate environment, these low-risk funds have found it difficult to achieve returns and investors have instead turned to higher-risk funds.

Households could be further affected if deposit rates become negative, which is to say if households and companies have to pay to have money in their deposit accounts. At present, the major Swedish banks have only introduced negative interest rates for a few larger companies. If the banks choose to introduce negative interest rates for households and smaller companies, there is a risk that they will choose to move their savings from deposit accounts to other forms of saving, from the major banks to other agents or to retain cash instead. If this were to happen rapidly, it could entail a risk to financial stability. For example, individual banks could then be exposed to liquidity stress, which could damage confidence in the entire Swedish banking system.

Other financial institutions, such as insurance companies, are also affected by negative interest rates. For the insurance companies, the low, partly negative interest rate situation means that they must reinvest in bonds with lower yields than before when their holdings of bonds mature. If interest rates are low for an extended period, this could mean that the insurance companies will find it difficult to fulfil their guaranteed commitments to their policyholders. The stress test that the European Insurance and Occupational Pensions Authority (EIOPA) carried out in 2014 showed that Swedish insurance companies are more sensitive to an extended period of low interest rates than many companies in the rest of the EU.¹⁶ The Swedish insurance

Chart 2:8 Monthly fund flows in relation to the fund's net assets for Swedish investors
Per cent



Note. "Other funds" refers to equity funds, mixed funds and bond funds.

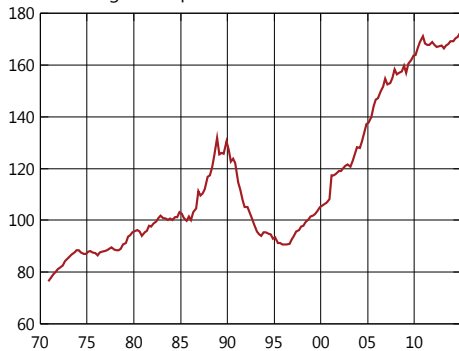
Sources: Swedish Investment Fund Association and Macrobond

¹⁴ Many market participants believe that the issuers will not demand negative coupons from the investors. However, there is still a lack of clarity over how the issuers will finally act when the negative coupons have to be paid.

¹⁵ For more information on money market funds, see "Shadow banking and the Swedish financial system", article in *Financial Stability Report 2014:1*. Sveriges Riksbank. However, in April, a certain inflow to the money market funds took place.

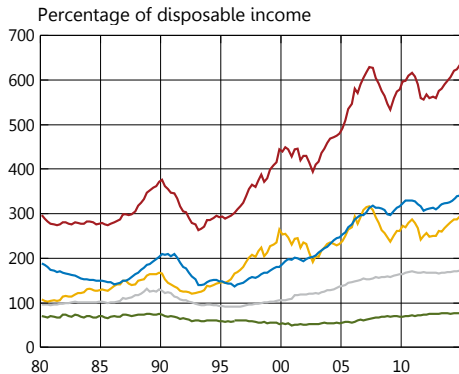
¹⁶ This is also noted by the International Monetary Fund (IMF) in its *Global Financial Stability Report*, 2015:1, pages 22–24. The sensitivity of Swedish insurance companies to low interest rates is due to their holdings of debt securities having, on average, shorter maturities than those of their commitments. Swedish insurance companies, together with German and Austrian ones, have the greatest differentials in the maturity of commitments and assets of all insurance companies in the EU.

Chart 2:9 Household debt in Sweden
Percentage of disposable income



Sources: Statistics Sweden and the Riksbank

Chart 2:10 Household assets and liabilities in Sweden
Percentage of disposable income



— Total assets
— Real assets
— Financial assets
— Debt
— Cash and deposits

Note. Total assets exclude collective insurance. Financial assets refers mainly to cash, bank deposits, bonds, mutual funds and shares. Real assets refers to single-family houses, tenant-owned apartments and second homes.

Sources: Statistics Sweden and the Riksbank

companies' relatively large holdings of shares, together with the low interest rates, also make them vulnerable to falling share prices.¹⁷ This vulnerability means that the companies, in the event of a fall in share prices, could sell parts of their shareholdings and thereby exacerbate the fall in prices.

The high level of household indebtedness entails risks to the macroeconomy and financial stability

Housing prices and household indebtedness have been increasing dramatically for many years in Sweden. Sweden's aggregate household debt ratio is currently just over 170 per cent, which is high from both historical (see chart 2:9) and international perspectives. For mortgage holders, the debt ratio is 315 per cent. The expansionary monetary policy stimulates inflation, but it is also contributing to expectations that housing prices and household indebtedness will continue to rise from their already high levels.

THE PRESENT LEVEL OF INDEBTEDNESS ENTAILS RISKS FOR THE SWEDISH ECONOMY¹⁸

In addition to information on households' debts, information on households' assets is also needed to gain a complete view of the vulnerabilities and risks inherent in the current level and rate of increase of household indebtedness (see chart 2:10). The risks should, in principle, be smaller if households have large assets and high incomes in relation to their debts.

However, assets can rapidly decline in value, while liabilities are nominally unchanged. In addition to the direct effect on household wealth, a fall in asset prices could also indirectly affect households' incentives and behaviour. A high level of indebtedness may therefore entail major risks, even if a household's net wealth (assets minus liabilities) is high at present.

Historical outcomes of the household interest ratio indicate that the level of indebtedness may become problematic

One way of assessing the risks inherent in aggregate household indebtedness is to use what is known as the interest ratio, which is to say households' interest expenditure in relation to their disposable incomes. The interest ratio gives an idea of the proportion of disposable income the household sector has left for consumption once interest expenses have been paid. In addition, experiences show that the interest ratio is a good indicator when it comes to identifying the risk of a financial crisis.

To get an indication of when the interest ratio is so high that there is a risk of a large fall in consumption in the event of a shock, the Swedish banking crisis in the beginning of the 1990s can be used

¹⁷ The way in which insurance companies can exacerbate a fall in share prices is discussed in the box "How life insurance companies can affect financial stability", *Financial Stability Report 2010:2*. Sveriges Riksbank.

¹⁸ Calculations and results are taken from Emanuelsson, R., Melander, O. and Molin, J. (2015), "Financial risks in the household sector". *Economic Commentaries*, no. 6, 2015. Sveriges Riksbank.

as a starting point. From 1989 to 1993, the aggregate interest ratio in the household sector increased sharply to an average of 10 per cent, while households' consumption developed weakly. An aggregate interest ratio at this level could therefore indicate an increased risk in the Swedish economy. International studies also suggest that this level indicates an increased risk of a financial crisis.¹⁹

The household interest ratio is low at present, about 3 per cent, as interest rates are at historically low levels, but it will eventually become much higher as interest rates rise to more normal levels. If stress should also arise on the financial markets, mortgage rates may rise further. If we assume that mortgage rates will rise to 8 per cent, which is conceivable in a stressed scenario, households would reach an average interest ratio of 10 per cent if they had an aggregate debt ratio of 180 per cent. An aggregate debt ratio of about 180 per cent could therefore indicate increased risks in the Swedish economy. Considering that structural changes have taken place in the Swedish economy in recent decades, adjusting the level to somewhere within the interval of 180–210 per cent is justifiable. One such change is the increasing number of households becoming indebted due to more of them owning their homes.²⁰ If the current development of household indebtedness continues, Swedish households' aggregate debts will very rapidly reach these critical levels (see chart 2:11).

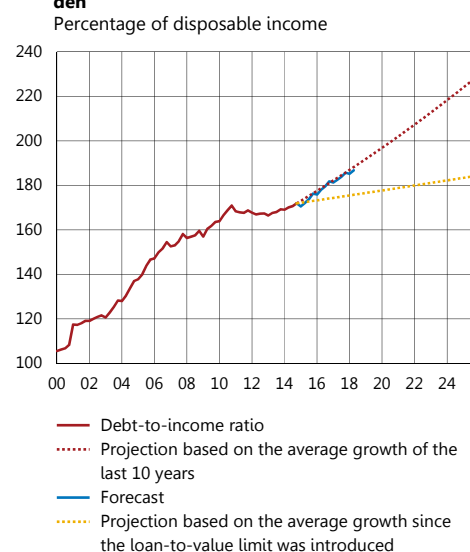
However, a deeper analysis of the risks would require the allocation of debt to be studied too. For example, data at the household level indicate that 40 per cent of all households with mortgages in Sweden have a debt ratio exceeding 300 per cent and just over 10 per cent have a debt ratio exceeding 600 per cent.

As many households choose a variable interest rate for their mortgages, interest rates will also have a rapid impact on household expenditure (see the article Interest-rate fixation periods for Swedish mortgages). The combination of high indebtedness and shorter fixed-rate periods has thus made households increasingly sensitive to interest rates.

The development of housing prices also indicates increased risks

Another indicator of the risks in the household sector is the development of housing prices.²¹ In Sweden, the rate of increase of housing prices has strongly accelerated recently. Prices for tenant-owned apartments and detached houses have risen by 20 per cent and 13

Chart 2:11 Household debt-to-income ratio in Sweden



Note. Riksbank's forecast in the *Monetary Policy Report*, April 2015. The projection means a mechanical calculation of the debt-to-income ratio if it continues to grow in line with historical averages.

Sources: Statistics Sweden and the Riksbank

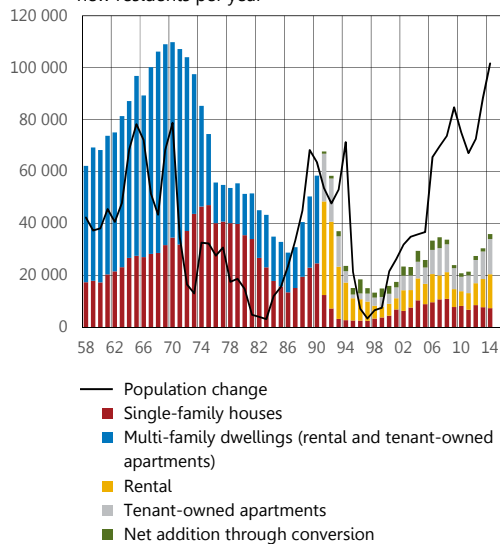
¹⁹ The level of the interest-to-income ratio is in line with the level of the debt-service-to-income ratio for households (11 per cent), which, according to a study from the ESRB, indicates a heightened risk that a crisis may be imminent. Drehman and Juselius (2012) also demonstrate how a high debt-service-to-income ratio indicates that a crisis may be imminent. See *ESRB Occasional Paper No. 5 (2014)* "Operationalising the countercyclical capital buffer: indicator selection, threshold identification and calibration options", ESRB. Drehman and Juselius (2012) also show that a high debt-service-to-income ratio indicates a heightened risk that a crisis may be imminent. See Drehman, M., and Juselius, M. (2012), "Do debt service costs affect macroeconomic and financial stability?", *BIS Quarterly Review*, BIS.

²⁰ There is no longer time series showing the proportion of Sweden's population that is indebted. However, according to Hansen (2013), the proportion of households with net interest expenditure increased from 48 per cent in 1994 to 55 per cent in 2008, which indicates an increase of 15 per cent. Englund et al. instead show that the proportion of the population owning their own homes increased from 59 per cent to 64 per cent between 1992 and 2012, which entails an increase of 8 per cent. The proportion of indebted households can thereby be assumed to have increased by about 8–15 per cent since the start of the 1990s. See Hansen (2013), *Council for Cooperation on Macroeconomic Policy's joint analysis groups' memorandum 1*, Finansinspektionen, and Englund, P., et al. (2015), *The Swedish Debt, Report from the SNS Economic Policy Council 2015*.

²¹ To gain a complete view of the risks in the household sector, other indicators also need to be considered. See Emanuelsson et al. (2015).

Chart 2:12 Housing construction and population change in Sweden

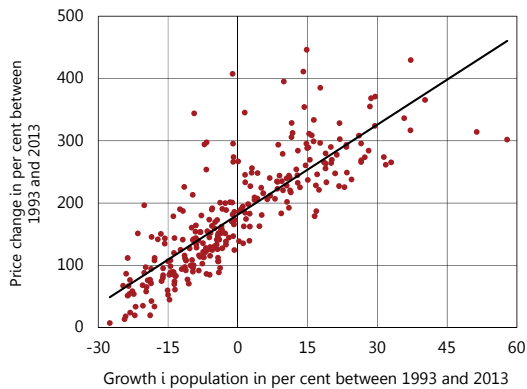
Number of completed dwellings and the number of new residents per year



Note. Before 1991, it is not possible to distinguish between tenure in apartment buildings.

Sources: Statistics Sweden and the Riksbank

Chart 2:13 Correlation between changes in single-family house prices and population of the municipalities in Sweden between 1993 and 2013



Note. Each point shows the percentage change in the price of nominal single-family houses and the number of inhabitants of the municipalities in Sweden between 1993 and 2013.

Sources: Statistics Sweden and the Riksbank

per cent respectively over the last year alone. At the same time, there are expectations of continued rising housing prices in the period ahead. For example, according to SEB's housing price indicator, the majority of households asked believe that housing prices will continue to rise over the coming year.²²

Rising housing prices is not a new phenomenon and there are explanations for the expansionary development of prices in recent decades. One important factor is that housing construction has been low at the same time as population growth has been relatively high (see chart 2:12). This has led to a shortage of housing in several parts of the country. The greater population growth a municipality has had, the greater the increase in housing prices has been (see chart 2:13). In addition, the rise in prices has also been driven by factors such as an ineffective rental market, the fact that an increasing number of households own their homes, tax deductions for interest payments and the lowering of the property tax. Another important explanation lies in increasing household incomes and the substantial fall in interest rates since the beginning of the 1990s. Although there are a number of factors that could explain the trend, the rise in price is deemed to be worrying. For a long time, housing prices have increased significantly faster than either household incomes or Sweden's GDP. This development is not sustainable in the long term. In addition, it is reasonable to expect that a number of the factors that could explain the rise in prices could reverse, which could thereby lead to falling prices. One factor that will change in the long run is interest rates, which are at historically low levels at present. It is therefore important for households to have a reasonable view of the future interest rate situation when buying homes.

It is also important for households to have a realistic view of future housing prices. If households believe that housing prices will continue to rise rapidly, there will be a risk that these expectations will be self-fulfilling and thereby contribute to further price increases. When, at some point in the future, the rise in prices halts and expectations are adjusted accordingly, the costs may be high and prolonged.

HOUSEHOLD INDEBTEDNESS CAN INFLUENCE MACROECONOMIC AND FINANCIAL STABILITY IN SEVERAL WAYS

If vulnerability is high in the household sector, this may lead to risks for both macroeconomic and financial stability. Shocks to the economy usually impact households' incomes, interest expenditure and the value of their homes. This, in turn, can affect household consumption and saving.²³

In countries in which housing prices fell in the recent crisis, consumption simultaneously decreased more than in other countries (see chart 2:14). In addition, there are indications that the effect on the

²² See *Swedish House Price Indicator*, May 2015. SEB.

²³ See, for example, Claussen, C., Jonsson, M., and Lagerwall, B. (2011), "A macroeconomic analysis of housing prices in Sweden", *The Riksbank's commission of inquiry into risks on the Swedish housing market*. Sveriges Riksbank, and "Makroekonomiska effekter av ett bostadsprisfall i Sverige" ("Macroeconomic effects of a fall in housing prices in Sweden"), 2014. National Institute of Economic Research.

economy gets greater as indebtedness increases. This pattern was clear during the global financial crisis. Chart 2:15 shows that consumption decreased more in countries with high levels of indebtedness than in those with low levels of indebtedness.

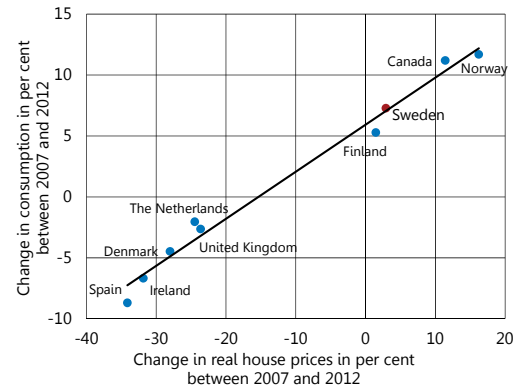
High indebtedness may lead to substantially reduced consumption

Studies on the individual and household levels also indicate that the decline in consumption among highly indebted households may have been an important explanatory factor behind the negative effects on consumption identified in several countries following the crisis. In both Denmark (see chart 2:16) and the United Kingdom, households with debt ratios above 300 per cent reduced their consumption more than other households did during the financial crisis.²⁴

In Sweden, over 590,000 households have debt ratios exceeding 300 per cent. This corresponds to 40 per cent of all households with mortgages. Among new mortgage holders, the corresponding proportion is almost 60 per cent. If households in Sweden with debt ratios of 300 per cent or more were to adjust their consumption like those in Denmark did during the financial crisis, the level of their consumption could decline by about 5 per cent, according to the Riksbank's calculations.

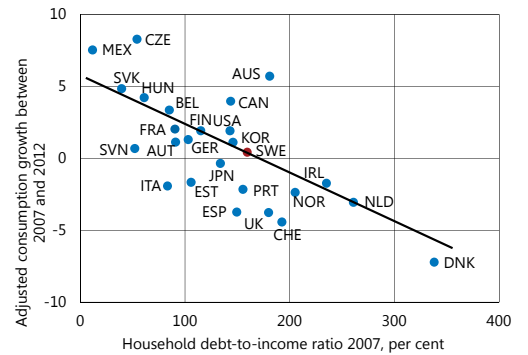
High indebtedness also means that individual households' scope for consumption decreases, for example, when interest rates increase. In 2014, about 170,000 households had a debt ratio of 600 per cent or more. This corresponds to just over 10 per cent of all households with mortgages. About 10 per cent of new mortgage holders also had a debt ratio exceeding 600 per cent. Under the current low interest rates, these households' interest payments, after tax, form about 8 per cent of their disposable incomes. When mortgage rates climb to more normal levels (6 per cent), their interest payments will increase to about 25 per cent of their disposable incomes. For a household with a debt ratio of 600 per cent, a loan of just over SEK 2 million and a disposable income of SEK 30,000 a month, this would entail an increase in interest expenditure after tax relief from SEK 2,500 to SEK 7,500 per month. Under a stressed mortgage rate (8 per cent), interest payments would amount to about 35 per cent of disposable income. This would mean interest expenditure after tax relief of about SEK 10,000 per month. These are simple calculations and do not consider other relevant circumstances, but they provide an illustration of how sensitive a household with a high level of indebtedness is. In addition, they provide an indication of the effects on consumption that could arise in Sweden in the event of a macroeconomic shock.

Chart 2:14 Correlation between consumption and housing prices between 2007 and 2012



Sources: Reuters EcoWin, Marcobond, The Teranet – National Bank House Price Index and the Riksbank

Chart 2:15 Correlation between debt-to-income ratio and consumption growth between 2007 and 2012

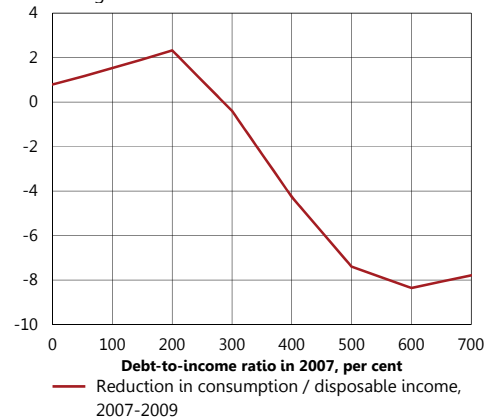


Note. Adjusted consumption growth has been calculated as actual consumption growth minus contributions from growth in debt ratio, current account and consumption. For further information, see Flodén, Martin, (2014), Did household debt matter in the great recession?

Sources: OECD and the Riksbank

Chart 2:16 Estimated change in consumption among Danish households at different debt ratios

Change in consumption from 2007 to 2009 as a percentage of income in 2007



The chart shows the development of consumption for Danish households with various levels of indebtedness between 2007-2009.

Source: Danmarks Nationalbank

²⁴ See Andersen, A. L., Duus, C. and Lærkholm Jensen, T., (2014), "Household debt and consumption during the financial crisis: Evidence from Danish micro data", Working Papers 89, Danmarks Nationalbank, and Bunn, P., and Rostom, M. (2014), "Household debt and spending", Quarterly Bulletin, 2014 Q3, Bank of England. In the same way, Danish households with loan-to-value ratios above 40 per cent reduced their consumption more than other households did. A partial explanation for the greater reduction of consumption by highly-indebted households in Denmark and the United Kingdom during the crisis is that they had negative saving before the crisis.

Macroeconomic instability can turn into financial instability

High indebtedness may not just risk macroeconomic stability. It may also threaten financial stability. If a large proportion of households reduce their consumption of goods manufactured in Sweden at the same time, the profitability of the corporate sector may decline. This may, in turn, entail both increasing bankruptcies and increasing loan losses on the banks' lending to companies. The banks may also be affected more directly if losses arise on their lending to households. Historically, however, such loan losses have been very small in Sweden. Finansinspektionen's stress tests of new mortgage holders, like the Riksbank's own analysis, also show that most households have sufficient margins to be able to cope with a worsened macroeconomic situation.²⁵ However, at present, indebtedness is historically high and it cannot be ruled out that the banks' loan losses to households may increase if housing prices fall, incomes decrease or interest rates rise.

Financial stability may also be directly affected in other ways. Weaker economic growth may lead to a decline in confidence in the Swedish banks. This, in turn, could negatively impact banks' access to wholesale funding. It may even be the case that mere concerns about an imminent fall in housing prices lead to banks facing impaired access to wholesale funding. The risk of this would probably increase with higher indebtedness.

In addition, a vicious circle may arise in which the development of the real economy and the financial system influence each other. A rise in the banks' funding costs may lead to higher mortgage rates. As Swedish households borrow at variable rates to such a large extent, an increase in interest rates would have a rapid impact on household expenditure. Borrowers' economic situations could thus worsen rapidly in an already-strained economic situation. This, in turn, could rebound on the banks' funding costs, which could then increase further.

²⁵ See *The Swedish Mortgage Market 2015*. Finansinspektionen. And the article "Interest rate fixation periods for Swedish mortgages" in this report.

■ 3. Recommendations

There are vulnerabilities in the banking system that increases its sensitivity to shocks. Continued high risk taking among investors and the households' high and growing indebtedness could initiate and reinforce such shocks. The Government and the Riksdag should therefore clarify the situation regarding Finansinspektionen's mandate and macroprudential-policy instruments as soon as possible so that necessary measures can be taken. In order to reduce vulnerabilities and risks in the household sector, measures are needed to address the underlying causes of increased indebtedness, such as reforms to increase the supply of housing and to reduce the willingness of households to take on debt. The Riksbank's assessment is that further measures are also needed. An amortisation requirement at least in line with Finansinspektionen's proposal should be introduced as soon as possible. Examples of other complementary measures include a debt-to-value limit and stricter requirements for the banks' credit assessments of individual households. Capital requirements should also be tightened to strengthen the resilience of the banks and the major banks should continue to reduce their liquidity risks.

The Riksbank's assessment is that the Swedish financial system is working well at present, but that there are vulnerabilities that increase sensitivity to various shocks. At the same time, high risk-taking on the financial markets and the Swedish households' high and growing indebtedness mean that the risks to financial and macroeconomic stability have increased since the end of last year. It is therefore important to take action to manage these risks. This is a matter of preventing crises from arising and of strengthening resilience to shocks. Meanwhile it has become evident that Finansinspektionen has neither a sufficiently clear mandate nor clearly defined tools to conduct effective macroprudential policy. It is therefore of the utmost importance that the Government and Riksdag ensure that Finansinspektionen gets the mandate and tools it needs to be able to counteract risks to macroeconomic and financial stability as intended.

Reforms that increase the supply of housing and reduce tax incentives to take on debt are needed to address the causes behind high indebtedness. However, it may take time to implement such measures and also take time for them to have an impact. It is therefore important that the pace of such reform work is accelerated. The Riksbank also considers that other measures are needed. The Government and the Riksdag should ensure that an amortisation requirement at least in line with Finansinspektionen's proposal can be introduced. However, an amortisation requirement is in itself not sufficient to manage the risks associated with high indebtedness.

Other measures are also needed in the near term. Measures that restrict the households' possibility to borrow, such as a debt-to-income limit, may be a good complement to the existing limit for the loan-to-value ratio to limit lending even during periods with rising housing prices. The requirements governing the banks' credit assessments should also be tightened to ensure, for example, that the banks use reasonable assumptions on living costs in their assessments of individual households.

As previously, the Riksbank considers that the banks need to hold more capital. This is in order to strengthen the banks' resilience to vulnerabilities in the Swedish financial system and to risks stemming, for example, from household indebtedness and the low interest-rate environment.

This chapter describes the recommendations that the Riksbank considers to be central at present (see table 3:1)²⁶. Previous recommendations that are still relevant are presented in brief. More detailed descriptions on those can be found in previous issues of the *Financial Stability Report*.²⁷ The chapter is followed by three articles. The first discusses measures that can be taken to reduce the risks relating to household indebtedness and the potential economic effects of such measures. The second discusses in more detail how a debt-to-income limit could dampen household indebtedness. The third article analyses why Swedish households choose variable interest rate mortgages to such a great extent and the risks this may entail.

Table 3:1 The Riksbank's current recommendations

Recommendation on mandate for macroprudential policy	Issued
The government and the Riksdag should promptly clarify Finansinspektionen's mandate and instruments for macroprudential policy.	Financial Stability Report 2015:1
Household indebtedness	
The Government and responsible authorities should take further measures as soon as possible to reduce the risks in the household sector.	Financial Stability Report 2015:1
The Government and the Riksdag should urgently work to make it possible to introduce an amortisation requirement for new mortgages.	Financial Stability Report 2015:1
Finansinspektionen should ensure that sound minimum levels are introduced for the standard values that the banks use in their discretionary income calculations.	Financial Stability Report 2014:1
The banks' capital levels	
Finansinspektionen should introduce a leverage ratio requirement for major Swedish banks at the group level of 4 per cent from January 2016 and 5 per cent from January 2018.	Financial Stability Report 2014:2
Finansinspektionen should set the countercyclical capital buffer rate at 2.5 per cent with the aim of increasing the banks' resilience.	Financial Stability Report 2014:1
The major banks' liquidity risks	
Finansinspektionen should extend requirements for the Liquidity Coverage Ratio (LCR) to also cover Swedish kronor. The requirement should be set at 60 per cent.	Financial Stability Report 2014:1
The major Swedish banks should continue to reduce their structural liquidity risks and meet the minimum level of 100 per cent in the Net Stable Funding Ratio (NSFR).	Financial Stability Report 2011:2
The major Swedish banks should report their LCR in Swedish kronor at least once a quarter.	Financial Stability Report 2013:2
The major Swedish banks should report their NSFR at least once a quarter.	Financial Stability Report 2013:1

²⁶ For recommendations that have been fulfilled, see table 3:4.

²⁷ See the references for the respective recommendations.

RECOMMENDATION ON MANDATE FOR MACROPRUDENTIAL POLICY

The government and the Riksdag should promptly clarify Finansinspektionen's mandate and instruments for macroprudential policy.

During the recent financial crisis, it became obvious that in both Sweden and other countries there was a lack of clear mandates to be able to introduce measures to counteract financial imbalances that could have serious negative consequences for the macroeconomy and, in worst-case scenarios, even put financial stability at risk. The International Monetary Fund and the European Systemic Risk Board, among others, have pointed to the importance of creating national bodies for macroprudential policy with a clear mandate.

In Sweden, the government has issued an ordinance giving Finansinspektionen the main responsibility for macroprudential policy. Finansinspektionen's new mandate came into force on 1 January 2014. It has become evident, however, that the regulations do not give Finansinspektionen a sufficiently clear assignment to take measures to counteract financial imbalances. This lack of clarity is delaying and obstructing the introduction of necessary measures to manage, among other things, the risks posed by household indebtedness. It is therefore of the utmost importance that Finansinspektionen's mandate and instruments for macroprudential policy are clarified and set out in law. The mandate should make it clear that Finansinspektionen can take measures to counteract financial imbalances even when there are no immediate risks to financial stability but rather risks to macroeconomic stability.

RECOMMENDATIONS ON MEASURES TO REDUCE RISKS LINKED TO HOUSEHOLD INDEBTEDNESS

The Government and responsible authorities should take further measures as soon as possible to reduce the risks in the household sector.

High and increasing indebtedness poses risks to individual households and to the economy as a whole. Other countries have taken a range of measures to manage the risks associated with rising housing prices and debts in the household sector. Common measures include abolishing or reducing tax deductions for interest payments, introducing loan-to-value and debt-to-income limits and raising risk weights for mortgages. Finansinspektionen has taken certain measures in Sweden. However, further measures are needed in several different policy areas.²⁸

Measures that address the underlying causes of increased indebtedness are needed. Measures that increase the supply of housing and reduce incentives to build up debt should therefore be given priority. Examples of important reforms include gradually reducing

²⁸ This view is shared by the European Commission and the IMF. See *Sweden – 2014 Article IV Staff Report*. IMF, and the European Commission's country-specific recommendations to Sweden, 2015.

tax deductions for interest payments, further reforms of the rent-setting system and improving competition in the construction and civil-engineering sectors. In connection with this it would also be desirable to conduct a broader review of property taxation, for example to reduce lock-in effects. However, it may take time to implement such measures and also take time for them to have an impact. It is therefore important that the pace of such reform work is accelerated.

However, other measures are also needed. An amortisation requirement at least in line with Finansinspektionen's proposal is a step in the right direction and should be introduced (see below). However, the Riksbank's assessment is that this is not enough. Measures that limit the households' possibility to borrow in relation to their incomes may be a good complement to other measures. The introduction of a debt-to-income limit and a tightening-up of the requirements for the banks' credit assessments of individual households (see below) are examples of such measures. These measures can limit the households' demand for loans in different ways. They can either limit the individual household's possibility to borrow or set limits in the banks' loan portfolios.

Measures are also needed to strengthen the resilience of the banks and the households to the risks posed by increasing indebtedness. Higher capital requirements can strengthen the banks' resilience even though they are not expected to have any significant effect on the supply of loans and thereby household indebtedness. It would also be reasonable for households with a low level of resilience to choose longer interest-rate fixation periods for their mortgages to a greater extent. This would reduce the households' sensitivity to changes in interest rates.

The Government and the Riksdag should urgently work to make it possible to introduce an amortisation requirement for new mortgages.

In the previous *Financial Stability Report*, the Riksbank recommended that Finansinspektionen should introduce an amortisation requirement for new mortgages. Like Finansinspektionen, the Riksbank considers that it is important that an amortisation requirement is put in place as quickly as possible. Finansinspektionen has now chosen to withdraw its proposal on an amortisation requirement due to uncertainties regarding the legal basis for the introduction of such a measure. It is therefore necessary for the Government and the Riksdag to ensure that an amortisation requirement can be introduced as soon as possible. Meanwhile, the banks should ensure that the households amortise their mortgages, at least in accordance with Finansinspektionen's proposed amortisation requirement.

Finansinspektionen should ensure that sound minimum levels are introduced for the standard values that the banks use in their discretionary income calculations.

The banks are obliged to conduct credit assessments to ensure that borrowers are able to meet their commitments. As part of this, the banks make discretionary income calculations. However, at present, there are significant differences between the standard values the banks use in these calculations, which means that different banks assess their borrowers' economic margins in different ways. Stipulating sound minimum levels for the standard values in the discretionary income calculations could ensure that the borrowers will at least be able to cope with certain levels of lending rates, amortisation rates and living costs, regardless of which bank issues the loan. This also helps to strengthen the resilience of the households by creating larger financial buffers and dampening loan growth.

RECOMMENDATIONS ON THE BANKS' CAPITAL LEVELS

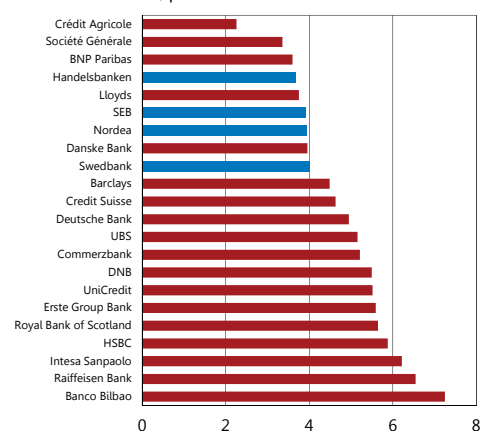
Finansinspektionen should introduce a leverage ratio requirement for major Swedish banks at the group level of 4 per cent from January 2016 and 5 per cent from January 2018.

The major Swedish banks have relatively low leverage ratios compared to many other European banks (see chart 3:1). The Riksbank therefore considers it justified to bring forward the introduction of a leverage ratio requirement in Sweden as a complement to the risk-based capital requirements. This will increase the resilience of the Swedish banks and also help to reduce uncertainty about to what extent the banks' risk weights actually reflect the real risks in their assets.

A number of countries, such as the United Kingdom, the Netherlands and the United States, have already introduced or are about to introduce leverage ratio requirements. A wider discussion is also underway internationally about the need for banks to have more loss-absorbing capital and to review their risk weights.²⁹

A Swedish leverage ratio requirement should be introduced gradually over a long period of time in order to give the banks time to meet the requirement. The requirement should be set at four per cent from 2016 and five per cent from 2018. All of the four major banks are already above four per cent (see chart 3:2). To meet a requirement of five per cent they will need to strengthen their balance sheets, for example by increasing their capital with retained profits. According to the Riksbank's calculations, the major banks will continue to be able to pay out half of their forecast profits in dividends and still have a leverage ratio of around or above 5 per cent at the beginning of 2018.³⁰

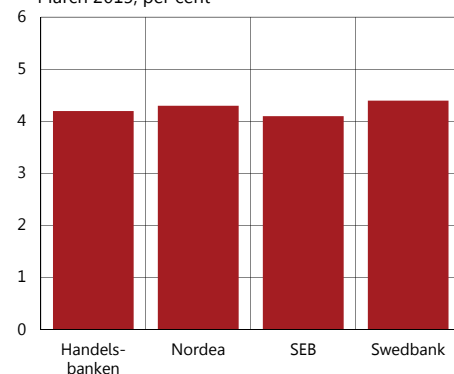
Chart 3:1 Leverage ratio
March 2015, per cent



Note. The metric is calculated by SNL as an approximation of the Leverage Ratio and refers to Tier 1 common capital as a per cent of total assets less derivatives. Data from some banks is from Q4 2014.

Sources: SNL Financial and the Riksbank

Chart 3:2 Reported Leverage ratio
March 2015, per cent

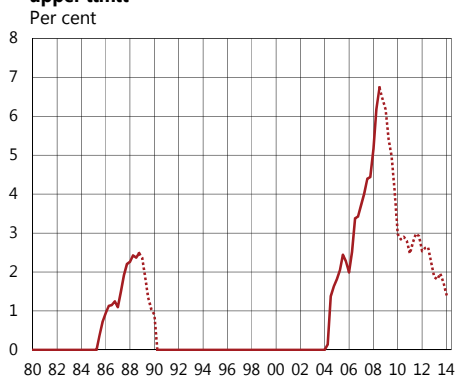


Source: Bank reports

²⁹ There is, for example, a proposal from the Financial Stability Board (FSB) that globally systemically-important banks should be subject to higher requirements for loss-absorbing capital; this proposal is designated TLAC, or Total Loss Absorbing Capital. The Basel Committee is currently reviewing the floor regulations and the standard method for risk-weighted assets.

³⁰ For a more detailed discussion of a Swedish leverage ratio requirement and the calculations, see the article "A Swedish leverage ratio requirement", *Financial Stability Report 2014:2*, Sveriges Riksbank.

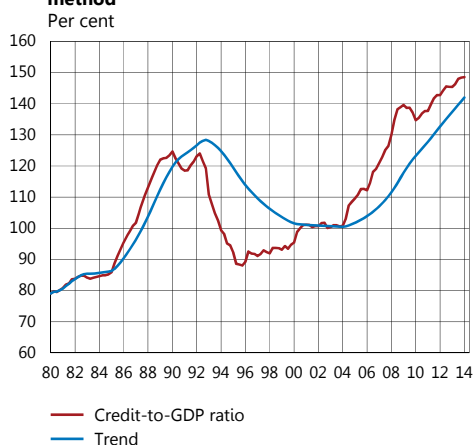
Chart 3:3 The countercyclical buffer rate according to the Basel Committee's standard method with no upper limit



Note. The countercyclical buffer rate for exposures in Sweden is based on a mechanical application of the credit gap according to the BIS standard method with no upper limit for the buffer rate. The credit gap shows how much the credit-to-GDP ratio deviates from its statistical trend. The reduction of the buffer value according to the standard method is represented by a dotted line in the chart.

Source: The Riksbank

Chart 3:4 The credit-to-GDP ratio and statistical trend according to the Basel Committee's standard method



Note. Credit is defined as monetary financial institutions' lending to the private non-financial sector and the outstanding stock of commercial paper and bonds issued by the Swedish private non-financial sector. GDP is in nominal terms and is defined as the sum of GDP for the four most recent quarters. The statistical trend is calculated using a one-sided HP filter with the smoothing parameter equal to 400,000.

Source: The Riksbank

Finansinspektionen should set the countercyclical capital buffer rate at 2.5 per cent with the aim of increasing the banks' resilience.

Raising the countercyclical buffer rate will help to strengthen the Swedish banks' resilience to risks stemming from, for example, Swedish household indebtedness and the low interest-rate environment. At present, the countercyclical buffer rate indicates that the Swedish countercyclical capital buffer should be 1.5 per cent (see chart 3:3).³¹ This is linked to the fact that lending has increased rapidly over a long period of time (see chart 3:4). However, in addition to this one should also take into account that there are other indicators that suggest significant systemic risks have built up in recent years. The countercyclical buffer rate should therefore be raised to 2.5 per cent.³²

It should be mentioned that a Swedish countercyclical capital buffer has a limited effect on the major Swedish banks' capital requirements in relation to their total assets at group level. This is because their risk weights are low and they have substantial operations abroad. The Riksbank's calculations show that the major banks' capital requirements at the group level would only increase by a few tenths of a percentage point in relation to total assets if the countercyclical capital buffer was set at 2.5 per cent.

RECOMMENDATIONS REGARDING THE MAJOR BANKS' LIQUIDITY RISKS

Finansinspektionen should extend requirements for the Liquidity Coverage Ratio (LCR) to also cover Swedish kronor. The requirement should be set at 60 per cent.

In the two latest *Financial Stability Reports*, the Riksbank has recommended Finansinspektionen to extend the current LCR requirements so that they also include a requirement in Swedish kronor. The background to this recommendation is that the major Swedish banks' LCRs in Swedish kronor have been low, and sometimes extremely low. This indicates that the buffers the banks have to be able to meet unexpected cash outflows in kronor are too small.

Since the Riksbank issued this recommendation, the major banks' LCRs in kronor have indeed improved and over the last six months have on average been above the recommended minimum level of 60 per cent. It is important, however, that the LCRs in kronor, as for the other currencies for which there are requirements at present, are met at every point in time, that is daily.³³ Today, the major banks' LCRs in kronor vary over time. The lowest levels indicate that some banks' buffers would not even last a week under stressed conditions (see chart 3:5).

³¹ Finansinspektionen has proposed that the countercyclical capital buffer for Sweden should be set at 1.5 per cent from 27 June 2016. See <http://www.fi.se/Folder-EN/Startpage/Supervision/Miscellaneous/Listan/Proposal-to-amend-the-regulations-on-the-countercyclical-capital-buffer/>.

³² For a more detailed discussion of the level of the countercyclical buffer rate and the calculations, see the article "The countercyclical capital buffer", *Financial Stability Report 2014:1*, Sveriges Riksbank.

³³ See Finansinspektionen's regulations on liquidity coverage ratios (FFS:2012:6).

The Riksbank therefore considers that there are still reasons for Finansinspektionen to extend the current LCR requirements to also include a requirement in Swedish kronor. The recent general improvement in LCRs in kronor also indicates that there are no significant obstacles on the financial markets to introducing a requirement of at least 60 per cent.³⁴

The major Swedish banks should report their Liquidity Coverage Ratios (LCR) in Swedish kronor at least once a quarter.

The major Swedish banks already report the LCR of all currencies together and separately in euros and US dollars. Supplementing the present reporting with a separate report of the LCR in Swedish kronor would provide a better picture of their liquidity risks in different currencies. At present, Swedbank is the only bank that reports its LCR in Swedish kronor every quarter (see table 3:2).

The major Swedish banks should continue to reduce their structural liquidity risks and meet the minimum level of 100 per cent in the Net Stable Funding Ratio (NSFR).

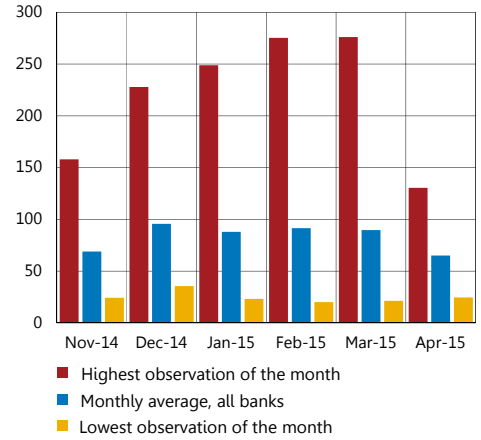
The NSFR is an internationally-accepted measure that makes it possible to monitor the development of structural liquidity risks over time and between banks. For the four major banks, the structural liquidity risks are relatively high in an international perspective. During the period October 2014 to April 2015, the major Swedish banks had an average NSFR of 96 per cent. The lowest and highest observations during the period were 90 per cent and 102 per cent respectively (see chart 3:6).

According to the Basel Committee's timetable, European banks will have to meet a minimum NSFR level of 100 per cent from 2018. However, many banks in Europe are already above a level of 100 per cent and the Swedish banks stand out with their relatively low levels. The potential for the major banks to improve their NSFRs is favourable at present as they can get low-cost funding at long maturities. The major banks should therefore continue to reduce their structural liquidity risks and reach the minimum NSFR level of 100 per cent as soon as possible.³⁵

The major Swedish banks should report their Net Stable Funding Ratios (NSFR) at least once a quarter.

At present, Swedbank is the only one of the four major banks that publishes its NSFR (see table 3:3). If the major banks deem that other measures better illuminate the structural liquidity risks they are taking, the Riksbank urges the banks to report these measures together with the NSFR.

Chart 3:5 The major Swedish banks' LCR in kronor
Per cent



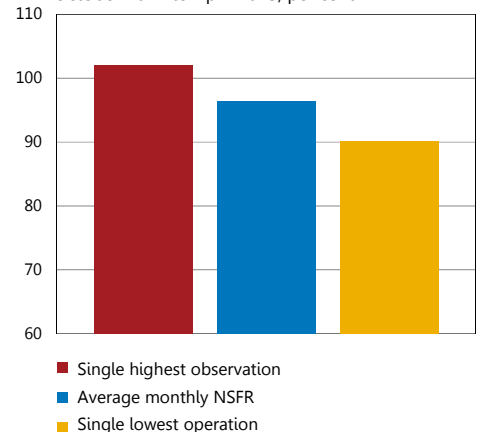
Note. The major banks' average daily LCR in SEK per month, and the highest and lowest individual observation each month.
Source: The Riksbank

Table 3:2 Public reporting of the LCR in SEK

Handelsbanken	Nordea	SEB	Swedbank
Does not report	Does not report	Does not report	Reports

Note. This statement says nothing about how the LCR has fluctuated during the quarter. It only states the value that applied on the last day of the quarter.

Chart 3:6 The major Swedish banks' lowest, average and highest monthly NSFR
October 2014 to April 2015, per cent



Note. Every month since November 2014, the Riksbank has collected the major banks' NSFRs in accordance with the Basel Committee's final definition. The chart shows the average since then for all of the banks, as well as the highest and lowest observations for a single month.
Source: The Riksbank

³⁴ For a more detailed discussion of an LCR requirement in Swedish kronor, see *Financial Stability Report 2014:1*. Sveriges Riksbank.
³⁵ For a more detailed discussion of the structural liquidity risks in the major Swedish banks, see *Financial Stability Report 2011:2*. Sveriges Riksbank.

Table 3:3 Public reporting of NSFR

Handelsbanken	Nordea	SEB	Swedbank
Does not report	Does not report	Does not report	Reports

Table 3:4 Recommendations that have been fulfilled

Recommendations	Issued	Observed
The major Swedish banks should report their leverage ratios at least once a quarter.	Financial Stability Report 2013:2	Financial Stability Report 2015:1
The risk weight floor for Swedish mortgages should be raised.	Financial Stability Report 2013:2	Financial Stability Report 2014:2
The major Swedish banks should ensure that they have a CET 1 capital ratio of at least 12 per cent on 1 January 2015.	Financial Stability Report 2012:1	Financial Stability Report 2013:2
The framework for the reference rate Stibor should be reformed through the establishment of clear responsibility, clear governance and control, better transparency, the possibility of verification and an obligation for the banks to conduct transactions at their stated bids on request.	Financial Stability Report 2012:2	Financial Stability Report 2013:2
The major Swedish banks should improve the transparency of their public reporting as regards information on asset encumbrance.	Financial Stability Report 2012:2	Financial stability 2013:1
The major Swedish banks should report comparable key ratios in the form of the subcomponents of the Liquidity Coverage Ratio (LCR).	Financial Stability Report 2011:2	Financial Stability Report 2013:1
The major Swedish banks' Liquidity Coverage Ratios (LCR) should amount to at least 100 per cent.	Financial Stability Report 2011:2	Financial stability 2012:2
The major Swedish banks' Liquidity Coverage Ratios (LCR) should amount to at least 100 per cent in euro and US dollars respectively.	Financial stability 2011:2	Financial stability 2012:2
The major Swedish banks should report their Liquidity Coverage Ratio (LCR) at least once a quarter beginning no later than the interim reports published after 1 July 2012.	Financial stability 2011:1	Financial stability 2012:2
The major Swedish banks should improve the transparency of their public reporting by reporting maturity information per asset and liability type, broken down per currency.	Financial Stability Report 2011:1	Financial Stability Report 2012:2

Measures to manage financial risks in the household sector

Housing prices and household indebtedness have been increasing in Sweden for many years. However, household incomes have not increased at the same rate. This poses growing risks to the Swedish economy. In order to manage these risks, measures that address the underlying causes of these developments are needed. The necessary measures are those that improve the functioning of the housing market and that reduce the willingness of households to take on debt, for example a gradual reduction of interest deductions. However, the Riksbank considers that other measures should also be taken in the near future. This article discusses a number of different measures and their potential economic effects.

Household indebtedness entails ever-greater risks

Housing prices and household indebtedness have been increasing dramatically for many years in Sweden. Indebtedness is high in both a historical and an international perspective and is expected to continue to rise going forward (see chart 2:11). This development poses ever-greater risks to macroeconomic and financial stability and indicates that there is a need for measures that can tackle the risks and reduce indebtedness (see chapter 2).

However, it is also important to consider that measures that limit the scope of households to borrow can have both benefits and drawbacks. The benefit for the economy is that such measures can reduce the likelihood of a financial crisis and mitigate the consequences if one nevertheless occurs. Such measures can also increase the resilience of the macroeconomy to shocks on the housing and credit markets. However, some households will not be able to borrow and consume as they did before. This is desirable if the increase in lending is unsustainable, but it may also be a disadvantage if ineffective measures are taken. Then it would also have a negative effect on growth. Measures may also have distributional effects; in other words some households will win while others will lose. For example, measures that limit the possibility to borrow would mainly affect households that do not have a foothold in the housing market. At the same time, these households could benefit if the introduction of measures lead to lower housing prices. Households that are already homeowners could be disadvantaged if housing prices fall as a result of measures taken or expectations of future measures. Although they could be hit even harder if housing prices were to fall dramatically in a future crisis.

In practice, it is difficult to assess the benefits and drawbacks of different measures. There may therefore be a risk of ineffective measures being taken. On the other hand, refraining from taking measures can also pose a risk. It may later turn out to have serious

consequences for the economy. For decision-makers it is a question of weighing the various risks against each other.

Further measures should be taken

Finansinspektionen has taken a number of measures to manage the risks associated with household indebtedness. The aim of these measures has been to strengthen the resilience of the banks to shocks by increasing capital requirements and to strengthen the resilience of households by reducing their demand for loans by using more targeted measures such as a loan-to-value limit. The Riksbank considers that these regulations are steps in the right direction but that they are nevertheless inadequate to deal with the risks in the household sector. Further measures should therefore be taken within several different policy areas.

Reform of the housing market is necessary

Measures that address the underlying causes of the build-up of risks should be given priority. One area in which measures are needed is the housing market. An inefficient rental market and a low level of housing construction coupled with a strong demand for housing have contributed to rapidly rising housing prices (see chapter 2). From a stability point of view it is therefore important to improve the functioning of the housing market, partly by making more efficient use of the existing housing stock and partly by building more housing where demand is high. This could also help to improve the functioning of the labour market and to stimulate growth by making it easier for people to move to where the jobs are. In the long run, public finances will also benefit when more people find work and fewer need social security benefits.

An increased supply of housing can thus dampen the increase in housing prices, which would help to limit household indebtedness. Furthermore, the building of more rental homes could increase housing supply without the need for more households to incur debt. At the same time, it is possible that aggregate household indebtedness would increase if more households bought a home. However, at the aggregate level this does not necessarily mean that risks will increase as the total debt will be distributed among more households. On the other hand, risks could increase to a certain extent if some of the new homeowners become excessively indebted. This suggests that limits on loan-to-value ratios and debt-to-income ratios are needed for new mortgage holders (see the description of such measures below).

Tax regulations should be reviewed

Favourable tax regulations for homeowners, for example interest deductions and property tax cuts, have also provided incentives to the build-up of debt. Tax regulations should therefore also be reviewed. A gradual reduction of interest deductions would help to dampen household demand for loans and thus indebtedness. Several countries have abolished interest deductions following the financial crisis

(Ireland and Spain) while others have begun to gradually reduce deductions (Denmark, Finland and the Netherlands).³⁶

Such a measure would reduce the incentive for all households to build up debt. It would also lead to a strengthening of public finances. However, reducing interest deductions may have a negative impact on the resilience of households in the short term as they would need to devote a larger part of their incomes to interest expenditure. This suggests that it is best to gradually reduce the deductions and/or to reduce them in combination with other measures that increase households' scope for consumption without providing an incentive for greater indebtedness. In connection with this it would also be desirable to conduct a broader review of housing taxation, for example to reduce lock-in effects.

It may take time to implement measures that address the underlying causes of household indebtedness and also take some time before they have any tangible effect. Accelerating this reform is therefore a matter of the utmost urgency.

Other measures – a catalogue

There are several other measures that can be used to manage the risks in the household sector.^{37 38}

There are, for example, measures that affect the demand for loans and have a direct impact on indebtedness as they change the loan conditions for households and thus their demand for credit. Such measures can either be aimed directly at individual households or at the banks' portfolios. Several countries have recently introduced measures aimed at the banks' portfolios (United Kingdom, Ireland and Estonia).

Other measures instead affect the supply of loans and work by increasing the banks' lending costs, for example by raising the capital requirements for mortgage lending. The primary aim of such measures is to increase the banks' resilience, but if the banks reduce their lending or raise their lending rates then higher capital requirements may to a certain extent help to dampen indebtedness. A range of measures and their potential effects are presented briefly below.

Amortisation requirement

An amortisation requirement would require households to pay off all or part of their mortgages within a certain predetermined period of time. Several countries have introduced amortisation requirements to dampen household indebtedness (for example Norway, the Netherlands and Canada). There are many different ways of designing an amortisation requirement. The effects on household indebtedness vary depending on how the requirement is designed.³⁹

³⁶ *IMF Multi-Country Report: Housing Recoveries: Cluster Report on Denmark, Ireland, the Netherlands, and Spain* (2015). IMF.

³⁷ This catalogue does, of course, not include all the measures that can affect the housing market.

³⁸ For a review of different measures, see for example the *IMF Staff Guidance Note on Macroprudential Instruments – Detailed Guidance on Instruments* (2015) and the *ESRB Handbook on Operationalising Macroprudential Policy in the Banking Sector* (2014).

³⁹ See "Amortisation requirements – a step towards a more sustainable debt situation", *Report to the Financial Stability Council*, November 2014. Sveriges Riksbank

Finansinspektionen's proposal for an amortisation requirement for new mortgages is a step in the right direction. It is therefore important to clarify Finansinspektionen's mandate as a matter of urgency so that an amortisation requirement can be introduced as soon as possible. However, an amortisation requirement is expected to have only a limited effect on total indebtedness in Sweden even if highly indebted households gradually reducing their indebtedness would be a positive development. Moreover, it will take a long time before the effects are realised.⁴⁰ More complementary measures are therefore needed to limit household indebtedness.

Loan-to-value limit

A loan-to-value limit reduces the scope of households to borrow using their home as collateral. It sets an upper limit for the size of the borrower's loan in relation to the value of the home. A loan-to-value limit can thus help to reduce the vulnerability of households to a fall in housing prices. Loan-to-value limits are the most common macroprudential measure internationally and several countries have introduced, or plan to introduce one (for example Denmark, Estonia, Finland, Ireland, Canada, Korea, Latvia, Lithuania, the Netherlands, New Zealand, Norway and the United Kingdom).

In 2010, Finansinspektionen introduced a loan-to-value limit of 85 per cent of the value of the housing. According to the IMF, a loan-to-value limit of 85 per cent is high in comparison to the levels of around 75 per cent that apply in many other countries.⁴¹ Tightening the loan-to-value limit may be a way of curbing household indebtedness. It would also be a relatively simple measure to implement as the loan-to-value limit is already in place. At the same time, too low a loan-to-value limit can restrict the opportunities of those who lack capital but have high incomes, or high expected incomes in the future, such as many young households. However, as the loan-to-value limit only restricts the scope of households to borrow in relation to the value of the home, their credit limits will continue to increase if housing prices rise. It may therefore be beneficial to supplement a loan-to-value limit with other measures that subdue lending even when housing prices rise.

Measures linked to household incomes

Three different measures that limit the scope of households to borrow in relation to their incomes are described below - a debt-to-income limit, a debt-service-to-income limit and stricter credit assessments in the banks' discretionary income calculations.

Debt-to-income limit⁴²

A debt-to-income limit restricts the size of a household's debt in relation to its income. The aim is to strengthen the resilience of households to changes in cash flow. As the debt-to-income limit is linked

⁴⁰ See the Riksbank's comments on "Proposal on new regulations on amortisation requirements for new mortgages". Sveriges Riksbank.

⁴¹ Sweden—2014 Article IV Staff Report. IMF.

⁴² See the article "Debt-to-income limit as a policy measure" in this report for a more detailed discussion.

to income, the household's scope for credit is limited even when housing prices rise. An upward spiral, in which higher housing prices lead to larger loans which in turn enable even higher housing prices, can thus be avoided. A debt-to-income limit can therefore be a good complement to a loan-to-value limit.

In several countries with dramatically rising housing prices and a highly-indebted household sector, it has become increasingly common to use a debt-to-income limit as a complement to a loan-to-value limit. In the United Kingdom and Ireland, for example, a debt-to-income limit has recently been introduced as a cap on the banks' loan portfolios instead of as a limit on individual households.⁴³

Debt-service-to-income limit

A debt-service-to-income limit restricts the size of the loan based on the borrower's ability to make interest and amortisation payments. This measure entails limiting the household's loan-related payments (interest and amortisation) in relation to the borrower's income. If a debt-service-to-income limit is based on standard interest and amortisation levels, its effect will be similar to that of a debt-to-income limit. On the other hand, the effect will be weaker if it is based on today's low interest and amortisation levels. A number of EU countries have introduced limits on the debt-service-to-income limit (Estonia, Greece, Cyprus and Lithuania).

Discretionary income calculations

Discretionary income calculations form part of the banks' credit assessments. The calculations are used to estimate how much of a household's income is left after taxes, interest expenditure, operating and maintenance costs for their home and living costs have been paid. These calculations are largely based on the standard figures that the banks themselves decide on, which means that they may take different forms. Consequently, the banks' assessments of one and the same borrower's financial margins may differ. In several countries (Norway, Finland and the United Kingdom), the authorities have recently tightened the requirements governing the stress rates that the banks may use in their credit assessments to test the debt-servicing ability of borrowers.⁴⁴ In Finland the authorities have also recommended that the banks use a specific amortisation period in their discretionary income calculations.

The introduction of minimum levels in the discretionary income calculations may be one way of curbing household indebtedness and of increasing the resilience of households to shocks.⁴⁵ Such a measure might have a similar effect as a debt-to-income limit or a debt-service-to-income limit since all measures restrict in different ways the scope of households to take on too much debt in relation to their income. However, it is uncertain how great the effect of minimum levels in discretionary income calculations on lending will actually be

⁴³ See, for example, *Record of the Financial Policy Committee Meetings held on 17 and 25 June, 2014*, Bank of England.

⁴⁴ *The Financial Policy Committee's powers over housing tools*, February 2015, Bank of England.

⁴⁵ See the recommendation in *Financial Stability Report 2014:1*. Sveriges Riksbank.

as the results of the calculations are not necessarily decisive in the banks' credit assessments. The banks may choose to grant loans even to households that, according to the calculations, do not have any financial margins after necessary living costs have been paid.

The discretionary income calculations would provide a better basis for decisions if the banks in their calculations used not only the actual mortgage rate and a stressed mortgage rate, as they do today, but also a normal long-term mortgage rate.⁴⁶ If a household has unrealistic expectations with regard to the long-term normal mortgage rate, such a measure may contribute to more well-founded decisions on indebtedness.

Interest-rate fixation periods⁴⁷

A regulation of interest rate fixation periods for mortgages aims in the first instance to make households less sensitive to interest-rate changes by requiring the borrower to have a fixed rate for all or part of the mortgage for a specified period of time. In addition to posing a risk for individual households, a large proportion of loans at floating rates may also entail stability risks. This is because having a high proportion of the mortgage at a floating rate, in combination with high indebtedness, increases the sensitivity of households to interest rates. Two countries that have introduced such regulations are Belgium and Israel.

Interest rate fixation periods can be regulated in different ways. The regulations may cover all borrowers or only new borrowers. They may apply to all or part of the loan sum and they may, for example, be linked to the borrower's loan-to-value ratio.

Capital requirements

Three different measures that increase the banks' capital requirements are described below – general capital requirements, the countercyclical capital buffer and sectoral capital requirements such as higher risk weights for mortgages.

General capital requirements

Higher capital requirements aim to increase resilience in the financial system. This is done by the banks building up capital to cover losses that may arise in less prosperous times. Higher capital requirements may also lead to the banks reducing their lending or raising their lending rates to compensate for the costs of acquiring new capital. However, higher general capital requirements are not an effective tool for reducing household indebtedness.⁴⁸

Finansinspektionen has raised the risk-based capital adequacy requirements for Swedish banks, particularly for the systemically important major banks. At the same time, the major Swedish banks still

⁴⁶ A normal mortgage rate in the long term could be 6 per cent. This is based on an assumption of a normal repo rate of 4 per cent with a supplement of 2 per cent.

⁴⁷ See the article "Interest rate fixation periods for Swedish mortgages" in this report for a more detailed discussion.

⁴⁸ See the article "Stricter capital requirements for Swedish banks – effects on the macroeconomy", *Monetary Policy Report* July 2014. Sveriges Riksbank.

have relatively low leverage ratios compared to many other European banks (see chapter 2).⁴⁹

The countercyclical capital buffer

The countercyclical buffer is aimed at strengthening the banks' resilience by binding capital in the banking sector during periods in which systemic risks are accumulating. During periods when the risks are realised, the buffer can then be used to manage losses and thereby prevent or mitigate credit tightening. However, the countercyclical capital buffer is not an effective tool for reducing household indebtedness. The aim is rather to strengthen resilience in the financial system as a whole. Moreover, the buffer is a blunt tool that affects all lending, not just lending to households.⁵⁰

Finansinspektionen activated the countercyclical capital buffer in September 2014. The buffer rate is currently set at 1 per cent and shall be applied from 1 September 2015.⁵¹

Sectoral capital requirements

Sectoral capital requirements can be introduced for a segment of the banks' loans, for example for mortgages. They can take the form of higher risk weights or of extra capital requirements for such loans and the aim is to increase the resilience of the banks. Several countries have increased risk weights for mortgages in order to subdue lending to the mortgage sector (Belgium, Estonia, Ireland, Norway and Switzerland).

Finansinspektionen has raised the risk weight floor for mortgages to 25 per cent. A further increase would strengthen the banks' resilience and would also help to reduce debt growth to some extent. An increase to 35 per cent would, for example, increase the requirement for the major banks' CET 1 capital for mortgages to the level that applied prior to 2007.⁵² A risk weight floor of 35 per cent would also correspond to what already applies for banks that use the standard method. At the same time, it is not probable that such a measure would have any significant impact on household indebtedness.⁵³ A further increase in the risk weight floor would therefore only be a complement to other measures aimed at the demand for mortgages.

Economic effects of different measures

As discussed earlier, lower indebtedness can reduce the probability of a financial crisis and mitigate the consequences if a crisis never-

⁴⁹ See the article "A Swedish leverage-ratio requirement", *Financial Stability Report 2014:2*. Sveriges Riksbank.

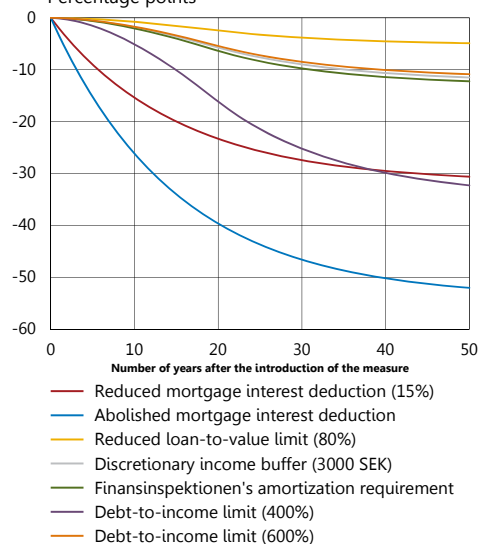
⁵⁰ See the article "The countercyclical capital buffer", *Financial Stability Report 2014:1*. Sveriges Riksbank.

⁵¹ Finansinspektionen has proposed that the countercyclical capital buffer for Sweden should be set at 1.5 per cent from 27 June 2016. See <http://www.fi.se/Folder-EN/Startpage/Supervision/Miscellaneous/Listan/Proposal-to-amend-the-regulations-on-the-countercyclical-capital-buffer/>. The Riksbank instead recommends a buffer rate of 2.5 per cent (see Chapter 3).

⁵² See the article "Minimum requirement for the banks' capital if risk weights for Swedish mortgage are raised" *Financial Stability Report 2013:2*. Sveriges Riksbank.

⁵³ See the article "Stricter capital requirements for Swedish banks – effects on the macroeconomy", *Monetary Policy Report July 2014*. Sveriges Riksbank. Other studies also demonstrate that higher capital requirements for mortgages have not succeeded in preventing dramatic credit growth. See Crowe, C., et al. (2013), How to deal with real estate booms: Lessons from country experiences. *Journal of Financial Stability* 9 (3), pp. 300–319.

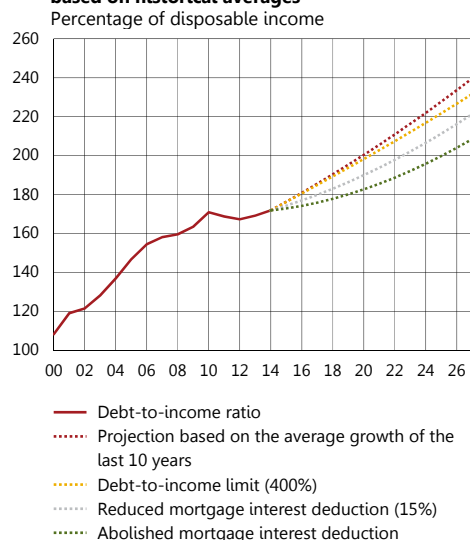
Chart A3:1 Various measures effect on the aggregate debt-to-income ratio compared to a basic scenario for the debt-to-income ratio
Percentage points



Note. The calculations are based on the current distribution of debt-to-income ratios among new and existing borrowers. This means that the aggregate debt-to-income ratio in the baseline scenario is constant. If one would change the assumption that the debt-to-income ratio in the baseline scenario increases, the effects could be greater.

Source: The Riksbank

Chart A3:2 Effect on the aggregate debt-to-income ratio of reduced or abolished interest deductibility and debt-to-income limit compared to projections based on historical averages
Percentage of disposable income



Note. The calculations are based on the current distribution of debt-to-income ratios among new and existing borrowers. This means that the aggregate debt-to-income ratio in the baseline scenario is constant. In the chart, the debt-to-income ratio increases in the baseline scenario and therefore the impact could be greater than what is shown in this chart.

Source: Statistics Sweden and the Riksbank

theless occurs. At the same time, it could lead to costs in the short term in the form of lower consumption and growth.⁵⁴

An analysis of the effects on the aggregated debt-to-income ratio, growth and consumption is presented below along with some calculations to illustrate the effects on individual households. The examples focus only on the negative effects on growth and consumption and do not take into account the positive effects of measures with regard to reducing the likelihood of a financial crisis and mitigating the consequences of a crisis if it nevertheless occurs.

Calculations are presented for the following measures:

- reduced interest deductions from 30 to 15 per cent and abolished interest deductions,⁵⁵
- lowered loan-to-value limit from 85 to 80 per cent,
- requirement for households to have a minimum level in the banks' discretionary income calculations of SEK 3,000,⁵⁶
- debt-to-income limit of 400 and 600 per cent respectively.

Macroeconomic effects

The calculations show that reduced interest deductions and a debt-to-income limit are the two measures with the greatest effect on the aggregate debt-to-income ratio, both in the short term and in a slightly longer perspective (see table A3:1). However, it is difficult to compare the effects of different measures as this depends on how the measures are designed. Reducing interest deductions is the measure that has the most rapid effect on the debt-to-income ratio as it comprises all households with loans and not just new borrowers. If interest deductions are reduced to 15 per cent, the debt-to-income ratio would fall 15 percentage points after 10 years. It is worth noting that if the debt-to-income ratio continues to increase at the same rate as over the last 10 years then no individual measure will be enough to reverse the upward trend (see table A3:2).

Loan limits may dampen consumption and GDP growth...

Limiting the possibility to borrow gives rise to both short-term and long-term macroeconomic effects. In the short term, loan limits may dampen consumption and hence growth. They may also push down housing prices by reducing the demand for housing. In the long term, the effects on the macro economy will be significantly weaker, because interest costs decrease when indebtedness falls, which give borrowing households scope to increase their consumption.

⁵⁴ For calculations of how effective macroprudential policy measures have been in various countries, see, for example, Kuttner, K., and Shim, I., (2013), Can non-interest rate policies stabilize housing markets? Empirical evidence from a panel of 57 countries, NBER Working paper no. 19723, and Lim et al. (2011), Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences, *WP/11/238*, IMF.

⁵⁵ The calculations are based on a reduction to the various levels being implemented immediately and on households adapting gradually. In practice, a reduction of interest deductions would probably take place gradually and the effects would therefore also occur over an even longer period of time.

⁵⁶ In the calculations it is assumed that borrowers with less to live on than the minimum level will borrow a smaller sum in order to reduce their interest costs and thus meet the new requirement.

...but the effects are relatively minor

The Riksbank has previously analysed the macroeconomic effects of amortisation requirements.⁵⁷ The debt-to-income limit, the loan-to-value limit, amortisation requirements and stricter discretionary income calculations by the banks are all different types of loan restrictions and their macroeconomic effects can therefore be analysed in a similar way.⁵⁸ Such an analysis indicates that the short-term costs in terms of reduced consumption and growth are relatively minor for a debt-to-income limit of 600 per cent and a discretionary income buffer of SEK 3,000. The effects are approximately the same as for Finansinspektionen's proposal for amortisation requirements. The assessment is that consumption could at most fall by about 1 percent while GDP could at most fall by just over 0.5 per cent. The Riksbank's calculations therefore indicate that annual GDP growth will on average fall by only a few tenths of a percentage point over the course of a few years. This can be related to the fact that GDP growth over long periods is approximately 2 per cent per year. A debt-to-income limit of 400 per cent would have a greater effect; reducing consumption at most by about 2.5 per cent. The level of GDP would decrease by at most 2 per cent, which means that average growth would fall by 0.5 to 1 percentage points per year over the course of a few years. On the other hand, reducing the loan-to-value limit to 80 per cent would have marginal effects on both household indebtedness and the macro economy.⁵⁹ However, it must be emphasised that these estimates are highly uncertain, for example with regard to the development of housing prices.⁶⁰

Reduced interest deductions do not entail any significant macroeconomic costs either

The effects of reduced interest deductibility look slightly different as this is a tool that affects households' interest after tax rather than imposing a direct limit on loans. The effect on indebtedness depends on the assumptions made about the behaviour of households, and is therefore uncertain. A substantial reduction or abolition of interest deductions would probably dampen household indebtedness relatively significantly, and the macroeconomic effects would thereby be somewhat greater than the effects of most loan-limiting measures.

If we disregard the fact that government tax revenue increases and can be used to increase expenditure or to cut taxation, an abolition of the tax deduction could mean that household consumption declines by at most around 4 per cent and GDP at most by just over 3 per cent a few years ahead. In terms of GDP growth, this corresponds to an average decline of around 1 percentage point a year during the same period.

⁵⁷ For a more detailed description of the various effects and how they are calculated, see for example *Financial Stability Report 2014:2*. Sveriges Riksbank. "Amortisation requirements – a step towards a more sustainable debt situation", *Report to the Financial Stability Council*, November 2014. Sveriges Riksbank

⁵⁸ See Guibourg, G. and Lagerwall, B. (2015), "How is the economy affected by macroprudential policy measures?", *Economic Commentaries*, no. 9, 2015. Sveriges Riksbank.

⁵⁹ Reducing the loan-to-value limit to 75 per cent would have approximately the same effects as Finansinspektionen's proposal for amortisation requirements.

⁶⁰ See Appendices to the memorandum "Amortisation requirements – a step towards a more sustainable debt situation", *Report to the Financial Stability Council*, November 2014. Sveriges Riksbank.

In practice, interest deductions would probably be reduced gradually and the effects would therefore also stretch over a longer period of time. We must also bear in mind that tax revenues increase when interest deductions decrease.⁶¹ If these revenues are used to increase expenditure or reduce taxation, the total macroeconomic effects of reduced interest deductions will be weaker.

Higher capital requirements strengthen the banks' resilience

Measures that target the supply of loans, such as capital requirements, strengthen the resilience of the banks. The more risks increase, the more urgent it is that the banks have more capital. General capital requirements can also affect lending to both households and companies, while sectoral capital requirements can affect lending to households more specifically. However, the assessment is that such measures will not reduce household indebtedness to any significant extent.⁶²

Effects for individual households

The measures can have different effects for the individual household depending on the size of the household's loans and incomes. In the case of changes in interest deductions, the effects also depend on the interest rate environment. The differences can be illustrated by investigating how the different measures affect three different households among new mortgage holders. It is assumed that all three households initially have a loan-to-value ratio of 85 per cent.

- The first household is assumed to have a disposable annual income of SEK 250,000 and a mortgage of SEK 1 million.
- The second household is assumed to have a disposable annual income of SEK 400,000 and a mortgage of SEK 2.6 million.
- The third household is assumed to have a disposable annual income of SEK 600,000 and a mortgage of SEK 5 million.

Table A3:1 shows how these three households are affected by the introduction of a debt-to-income limit of 600 per cent of disposable income and a lowering of the loan-to-value limit to 80 per cent. The table shows how much less the households would be able to borrow under these regulations compared to how much they can borrow today.

The first household would not be affected by a debt-to-income limit of 600 per cent as its initial debt-to-income ratio is 400 per cent. On the other hand, the household would be able to borrow just over SEK 50,000 less if the loan-to-value limit was lowered to 80 per cent compared to what they could borrow under the current limit of 85 per cent.

The second household would be affected by both measures. A debt-to-income limit of 600 per cent would mean that the household

⁶¹ The households' interest deductions amounted to SEK29 billion in 2013. This was equivalent to 0.8 per cent of GDP. This can be seen as an indication of how much central government revenues could increase if the deductions were abolished.

⁶² See the article "Stricter capital requirements for Swedish banks – effects on the macroeconomy", *Monetary Policy Report* July 2014. Sveriges Riksbank.

would be able to borrow SEK 200 000 less while a lowered loan-to-value limit would mean being able to borrow over SEK 150,000 less.

The third household would be significantly affected by a debt-to-income limit of 600 per cent. The household would be able to borrow SEK 1.4 million less, while a lowered loan-to-value limit would mean being able to borrow almost SEK 300,000 less.

Table A3:1 Effects of different measures on the indebtedness of new mortgage holders

SEK	Household 1	Household 2	Household 3
Disposable annual income	250,000	400,000	600,000
Liability	1,000,000	2,600,000	5,000,000
Debt-to-income limit	0	200,000	1,400,000
Reduced loan-to-value limit	50,000	150,000	300,000

Note. The measures in the table refer to the introduction of a debt-to-income limit of 600 per cent of disposable income and a lowering of the loan-to-value limit from 85 to 80 per cent. The table shows how much less households would be able to borrow under these regulations compared to how much they can borrow today.

Source: The Riksbank

Another possible measure is to require households to retain a certain minimum level of their monthly incomes in the banks' discretionary income calculations. Such a requirement would mean that new mortgage holders with a lower discretionary income than the minimum level would be forced to borrow a lower sum in order to reduce their costs and thus meet the requirement. If a household initially has no discretionary income buffer at all, a minimum level of SEK 3,000 means the household would be allowed to borrow just over SEK 500,000 less than it would otherwise be able to.⁶³

Another measure that has been discussed is reducing interest deductions. If interest deductions are reduced from 30 to 15 per cent, a household with a debt of SEK 1 million would incur increased interest costs after tax of SEK 375 per month (see table A3:2).

Table A3:2 Effects of reduced or abolished interest deductions

SEK	Household 1	Household 2	Household 3
Liability	1,000,000	2,600,000	5,000,000
15% interest deduction	375	975	1,875
Abolished tax deduction	750	1,950	3,750

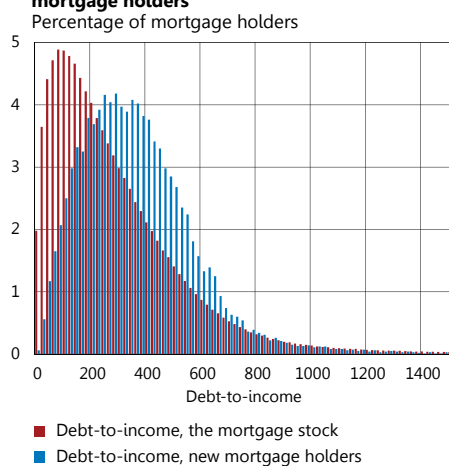
Source: The Riksbank

For the household with debts of SEK 2.6 million, monthly costs would increase by SEK 975, and for the household with debts of SEK 5 million, they would increase by SEK 1,875. If the deductions were completely abolished, the increases in interest costs would be twice as high for the respective households. These calculations assume a mortgage rate of 3 per cent, but with a more normal interest rate of, for example, 6 per cent, the effects would be twice as great.

⁶³ The calculation is based on a stressed interest rate of 7 per cent and a continuous amortisation period of 50 years.

Debt-to-income limit as a policy measure

Chart A3:3 Distribution of debt-to-income for mortgage holders in the mortgage stock and new mortgage holders



Sources: Finansinspektionen and the Riksbank

A debt-to-income limit restricts how much a household may borrow in relation to its income. A debt-to-income limit is one of several conceivable measures that could help to reduce the financial risks in the household sector. This article describes the advantages and disadvantages of introducing a debt-to-income limit. The article also presents two alternative debt-to-income limits and how these could affect different income and age groups, as well as regions and banks. In addition, the article discusses how these limits can dampen household indebtedness and the potential effects on the macroeconomy.

Both advantages and disadvantages of debt-to-income limits

The development of household debt and housing prices entails risks to the economy (see chapter 2). The Riksbank's assessment is that measures are required to reduce these risks, for example measures that limit how much households may borrow (see chapter 3).

In Sweden there is, for instance, a loan-to-value limit that limits the size of a household's mortgage in relation to the value of the property. However, the loan-to-value limit means that as housing prices increase households can increase their debts as long as this is permitted by the banks' credit assessments. If the debts of Swedish households continue to grow faster than their incomes, their debt-to-income ratios will increase. Chart A3:3 shows that the distribution of debt-to-income ratios among new mortgage holders (the blue bars) is higher than for mortgage holders in the loan stock (the red bars), which is also natural. However, from a stability perspective it is not desirable for mortgage holders to have increasingly large debts in relation to their incomes and, furthermore, for them to amortise their mortgages at a slow rate; implying a rightward shift of the distribution of debt-to-income ratios for the stock of mortgage holders.

Several countries, including the United Kingdom and Ireland, that have had sharply rising housing prices and a highly-indebted household sector have introduced a debt-to-income limit as a complement to a loan-to-value limit. One reason for this is that a debt-to-income limit restricts lending even during periods with rising housing prices, and thus dampens the propensity of lending to increase cyclical fluctuations.

However, a debt-to-income limit also means that certain households are forced to borrow less than what may be considered desirable from the individual household's point of view. This imposes a limit on the household's ability to smooth its consumption over the life cycle. As in the case of all other forms of regulation, a debt-to-income limit thus has both advantages and disadvantages that must be taken into account.

Who will be affected by a debt-to-income limit if it is targeted at individual households?

Here we analyse the effects of a requirement targeted at individual households.⁶⁴ We calculate how a requirement would affect all new mortgage holders together and also analyse how different income and age groups and regions and banks would be affected. Two examples of a debt-to-income limit are illustrated here. In the first example new mortgage holders are not permitted to borrow more than 600 per cent of their disposable incomes, and in the second example not more than 400 per cent.⁶⁵ The mortgage survey conducted by Finansinspektionen in 2015 reveals that 39 per cent of new mortgage holders have a debt-to income ratio of 400 per cent or more of their disposable incomes, while 12 per cent have a debt-to-income ratio of 600 per cent or more. A large proportion of new mortgage holders would thus be affected by a debt-to-income limit of 400 per cent.

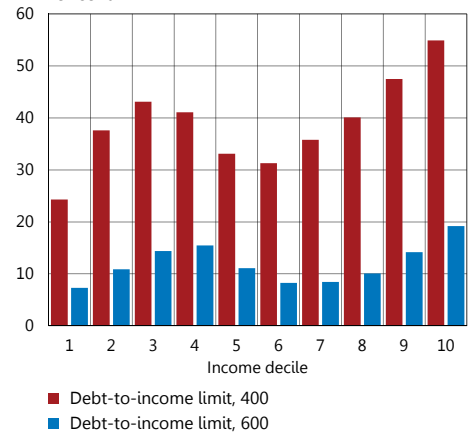
Chart A3:4 shows that at least 23 per cent of the households in each income decile would have had to borrow less than they actually did if a debt-to-income limit of 400 per cent had been introduced before the households in Finansinspektionen's mortgage survey took out their new mortgages. The largest proportion of affected households is to be found among those who have disposable incomes just below SEK 30,000 or more than SEK 60,000 per month.⁶⁶ Chart A3:5 shows how much less households affected by the debt-to-income limit would be permitted to borrow. With a debt-to-income limit of 400 per cent, households in all of the income deciles would have to borrow at least 24 per cent less compared to the actual amounts.

Chart A3:6 shows that it is primarily households in the age group 30 to 40 that would be affected by a debt-to-income limit of 400 per cent. They would have to borrow approximately 25 per cent less. The geographical analysis shows that the percentage of households that would be affected is highest in the metropolitan areas (see chart A3:7). There are also relatively large differences depending on the bank at which the household is a customer (see chart A3:8). At three of the banks, for example, more than 50 per cent of the new mortgage holders would have had to borrow less if a debt-to-income limit of 400 per cent had been introduced.

Effects on aggregate indebtedness and on the macroeconomy

Chart A3:9 shows how the aggregate debt-to-income ratio would be affected if a debt-to-income limit that is targeted at individual households is introduced. The effects would be small in the short term. This is mainly because only new mortgage holders are affected. On the other hand, the effects would become more evident in the

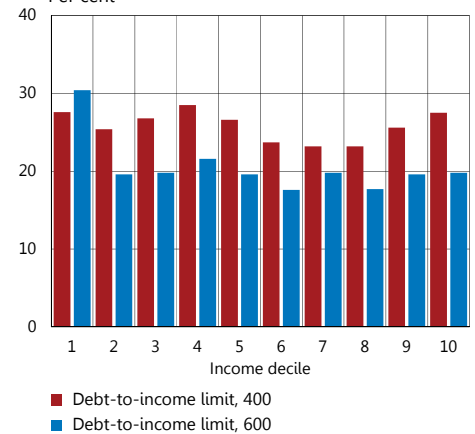
Chart A3:4 Percentage of borrowers per income group affected by a debt-to-income limit
Per cent



Note. The average disposable income in the respective income deciles is; 1: SEK 17 507, 2: SEK 22 570, 3: SEK 26 683, 4: SEK 31 666, 5: SEK 36 927, 6: SEK 41 369, 7: SEK 45 861, 8: SEK 51 003, 9: SEK 58 426, and 10: SEK 81 947.

Sources: Finansinspektionen and the Riksbank

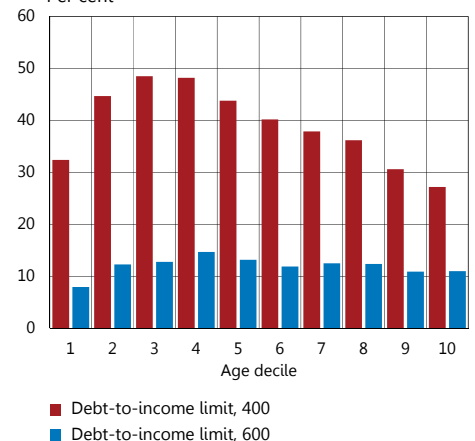
Chart A3:5 Reduction in debt for households affected by the debt-to-income limit per income group
Per cent



Note. The average disposable income in the respective income deciles is; 1: SEK 17 507, 2: SEK 22 570, 3: SEK 26 683, 4: SEK 31 666, 5: SEK 36 927, 6: SEK 41 369, 7: SEK 45 861, 8: SEK 51 003, 9: SEK 58 426, and 10: SEK 81 947.

Sources: Finansinspektionen and the Riksbank

Chart A3:6 Percentage of age group affected by a debt-to-income limit
Per cent



Note. The average age in the respective age deciles is; 1: 24, 2: 29, 3: 32, 4: 37, 5: 41, 6: 45, 7: 49, 8: 54, 9: 61, and 10: 71.

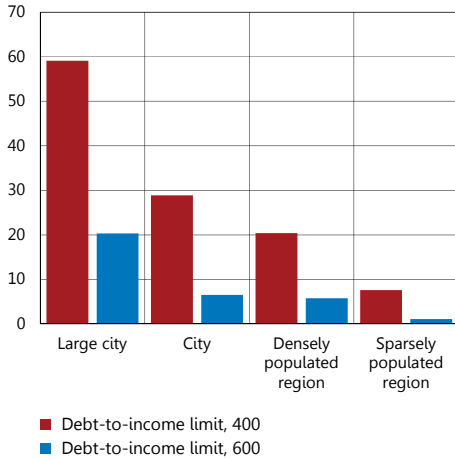
Sources: Finansinspektionen and the Riksbank

⁶⁴ For a discussion of a debt-to-income limit targeted at the banks' loan portfolios see Alfelt, G., Lagerwall, B. and Ölcer, D. (2015) "An analysis of the debt-to-income limit as a policy measure", *Economic commentaries*, no. 8, 2015. Sveriges Riksbank.

⁶⁵ This relates to mortgage holders' total debts and not just mortgages.

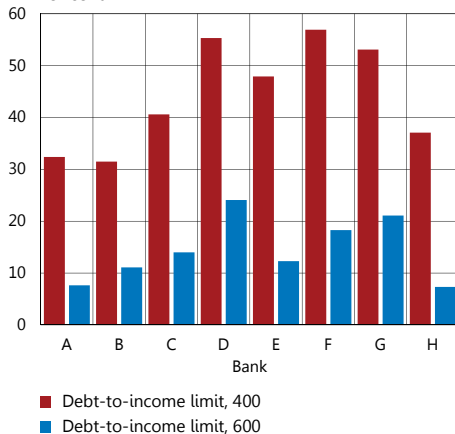
⁶⁶ Income relates to the household's total disposable income. A household may consist of one or more individuals.

Chart A3:7 Percentage of the region's new mortgage holders affected by the debt-to-income limit
Per cent



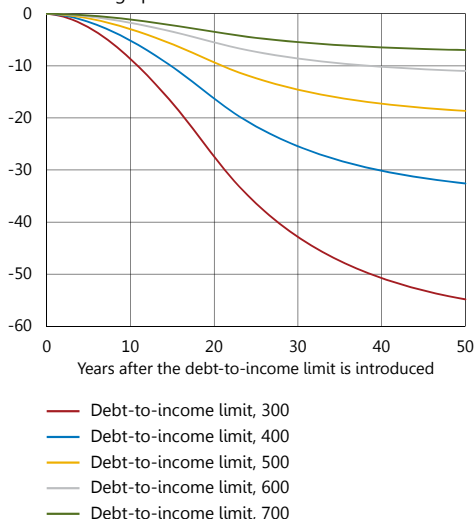
Sources: Finansinspektionen and the Riksbank

Chart A3:8 Percentage of banks' new mortgage holders affected by the debt-to-income limit
Per cent



Sources: Finansinspektionen and the Riksbank

Chart A3:9 Change in the aggregate debt-to-income ratio compared to base scenario at different debt-to-income limits
Percentage points



Source: The Riksbank

long term.⁶⁷ A debt-to-income limit of 400 per cent for new mortgage holders would reduce the aggregate debt-to-income ratio for the entire household sector by approximately 30 percentage points in the long term compared with a base scenario.⁶⁸ A debt-to-income limit of 600 per cent would reduce the aggregate debt-to-income ratio by approximately 10 percentage points in the long term. Other levels for a debt-to-income limit have been included in chart A3:9 as examples.

The analysis of the effects on the macroeconomy show that GDP may fall by between 0.1 and 2 per cent compared with a base scenario, and consumption by between 0.1 and 2.5 per cent. These calculations indicate that annual GDP growth will on average fall by only a few tenths of a percentage point over the course of several years. As GDP growth over long periods is approximately 2 per cent per year, this is a relatively small effect.⁶⁹

Debt-to-income limits targeted at the banks' mortgage portfolios are becoming increasingly common internationally

The examples above illustrate potential effects of a debt-to-income limit targeted at individual households. Debt-to-income limits can also be targeted at the banks' mortgage portfolios. In the United Kingdom, the Bank of England has recommended that the percentage of new mortgages granted by credit institutions to customers with a debt-to-income ratio above 450 per cent of gross income should be limited to a maximum of 15 per cent. Similarly, in January 2015 the Central Bank of Ireland introduced a debt-to-income limit stipulating that no more than 20 per cent of all new mortgage holders may have a debt-to-income ratio above 350 percent of gross income. The Bank of England chose to make its requirement non-binding for the credit institutions at present. The requirement instead aims to prevent the percentage of borrowers with a high debt-to-income ratio increasing in the future. The reason for this choice was that the Bank of England does not consider that household debt is too high at present, but that it wants to prevent the percentage of households with high debt-to-income ratios from increasing in the period ahead.

Summary

A debt-to-income limit would help to reduce the risk of households taking on too high debts in relation to their incomes. Such a measure would thus strengthen the households' resilience to shocks. As far as

⁶⁷ The paths for these limits are based on partial analyses. It is also important to remember that the forecast becomes more uncertain the further ahead one looks. The paths for these debt-to-income ratios should therefore be interpreted with caution.

⁶⁸ The calculations are based on the current distribution of debt-to-income ratios among new and existing borrowers. This means that the aggregate debt-to-income ratio in the base scenario is constant. If we change the assumption so that the debt-to-income ratio in the base scenario increases, the effects could be greater. For a discussion of the macro effects of a debt-to-income limit see Alfelt, G., Lagerwall, B. and Ölcer, D. (2015) "An analysis of the debt-to-income limit as a policy measure", *Economic Commentaries*, no. 8, 2015. Sveriges Riksbank as well as Guibourg, G., and Lagerwall, B. (2015). How is the economy affected by macroprudential policy measures?, *Economic Commentaries*, no. 9, 2015, Sveriges Riksbank.

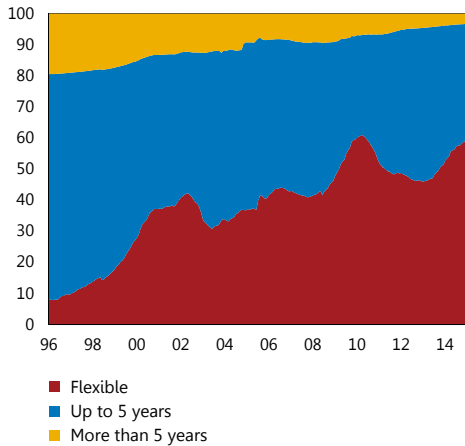
⁶⁹ For a broader discussion of the effects see also the article "Measures to manage financial risks in the household sector" in this report.

Sweden is concerned, a debt-to-income limit may be a good complement to the loan-to-value limit if one wishes to reduce the ability of lending to increase cyclical fluctuations. The analysis shows that some households would be affected much more than others. This applies, for example, to households in the age group 30 to 40 and those in metropolitan areas.

The effects on the aggregate debt-to-income ratio are expected to come gradually if the debt-to-income limit, as in the examples here, only applies to new mortgage holders. The macroeconomic effects are expected to be relatively small.

Interest-rate fixation periods for mortgages in Sweden

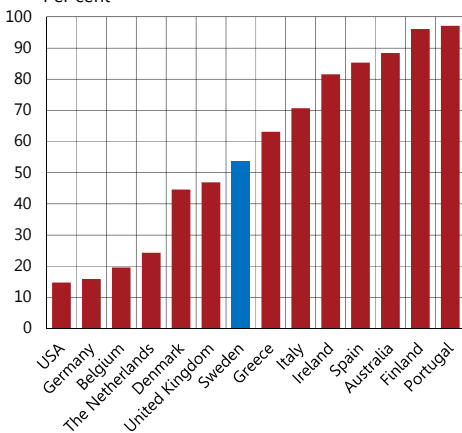
Chart A3:10 Mortgage loans at various interest rate fixation periods in Sweden
Per cent



Note. Based on the mortgage institutions' lending. The breakdown into fixed rate mortgages of up to five years and over five years is an estimate based on statistics for MFLs' lending to households.

Sources: Statistics Sweden and the Riksbank

Chart A3:11 Historical average proportion of new loans granted at variable rates in a sample of countries
Per cent



Note. The chart is based on the historical average of all new mortgages with a fixation period of less than one year.

Sources: Badarınza et al. (2014) and the Riksbank

It has become increasingly common for Swedish households to choose mortgages with short interest-rate fixation periods. This has made them more sensitive to interest-rate fluctuations. In combination with households' high levels of indebtedness this could lead to problems for macroeconomic and financial stability if interest rates were to rise. This article investigates why households borrow at variable interest rates. It shows that important factors in the choice of interest-rate fixation period include both the country's institutional settings and households' economic conditions, as well as the difference between variable and fixed interest rates. Other important factors are household interest-rate expectations and the expected variation in inflation. The article also discusses the risks entailed by households' choice of interest-rate fixation period, both for individual households and for macroeconomic and financial stability.

The proportion of mortgages at short interest-rate fixation periods has increased

Since the end of the 1990s, it has become increasingly common for Swedish households to choose mortgages with short interest-rate fixation periods. At present, about 76 per cent of all new mortgages have a variable interest rate while only about 6 per cent have a fixed period of five years or more.⁷⁰ Since 1996, the proportion of mortgages with variable interest rates in the stock of Swedish mortgage loans has risen from just under 8 per cent to almost 60 per cent (see chart A3:10).⁷¹

Mortgages at variable interest rates have also become more common internationally.⁷² However, there is great variation from country to country. For example, in Portugal and Finland, it is not unusual for over 90 per cent of new mortgages to be at variable interest rates, at the same time as mortgage borrowers in Germany and the United States tend to prefer mortgages with fixed interest rates (see chart A3:11). In many countries, borrowers' preferences have varied over time. For example, up to 60 per cent of new mortgages in the United States were at variable interest rates in the 1980s, in contrast to the current situation, with fewer than 20 per cent of US mortgage loans being at variable interest rates.⁷³

⁷⁰ The figures are average proportions of new mortgages raised from March 2014 up to and including March 2015.

⁷¹ In this context, a variable interest rate refers to a loan with a three-month interest-rate fixation period.

⁷² In international comparisons, a variable interest rate is defined as a loan with an interest-rate fixation period of less than one year.

⁷³ Badarınza, C., Campbell, J.Y. and Ramadorai, T. (2014), "What Calls to ARMs? International Evidence on Interest Rates and the Choice of Adjustable-Rate Mortgages", *Working Paper*.

The choice of interest-rate fixation period entails risks

If households have a high percentage of mortgages at variable interest rates, they will be exposed to an interest-rate risk. Households can protect themselves against this risk by choosing to fix the interest rate on their mortgages or by choosing mortgages at a variable interest rate with an interest-rate ceiling.⁷⁴ On the other hand, households with a large percentage of loans at a variable interest rate can be expected to face lower interest-rate payments during economic downturns if interest rates fall. Having a mortgage at a variable interest rate can thus be seen as insurance against a deteriorating economic situation.

The degree of vulnerability of households with a large percentage of mortgages at variable interest rates largely depends on how large their debts are in relation to their disposable incomes. When interest rates change, a household with a high debt-to-income ratio must make greater adjustments to its consumption or saving than a household with smaller debts would have to make. Highly-indebted households are thus most sensitive to interest-rate fluctuations.

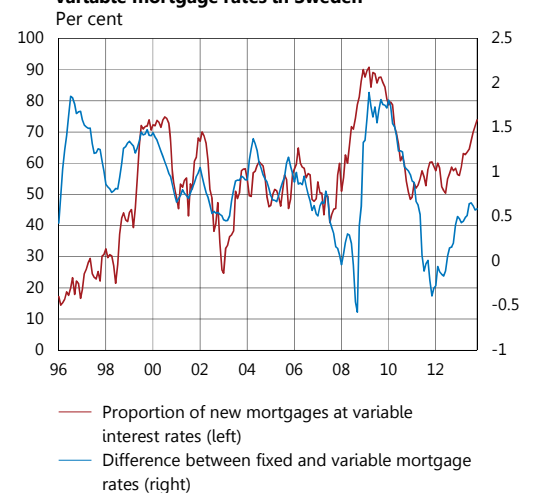
Households' interest-rate sensitivity can also affect macroeconomic stability. If the interest rate rises faster and more sharply than households have planned for, their interest-rate sensitivity may lead them to cut back substantially on their consumption. In addition, research indicates that households' increased interest-rate sensitivity also leads to housing prices being affected more by changes in the interest rate.⁷⁵ All in all, this risks, in turn, having repercussions on companies' profitability, with greater loan losses and higher funding costs for the banks as a consequence. Ultimately, therefore, financial stability may also be impacted.⁷⁶

Households' choices depend on many factors

The fact that households in certain countries have mortgages at variable interest rates is partly due to the institutional settings. One important aspect is the costs associated with the early redemption of mortgages.⁷⁷ In addition, certain countries have chosen to regulate the percentage of new loans at variable interest rates, with the aim of reducing households' interest-rate sensitivity.⁷⁸

However, factors other than these country-specific conditions also have an effect. Theoretical studies have shown that highly-indebted households with uncertain and varying incomes may prefer mortgages at fixed interest rates, while households with smaller loans, more stable incomes and higher propensities to move may

Chart A3:12 Proportion of new mortgages at variable interest rates and difference between fixed and variable mortgage rates in Sweden



Note. Variable rate loans are defined as loans with a fixation period of less than one year. The difference between mortgages at fixed and variable rates is based on calculated volume-weighted mortgage rates.

Sources: Badarınza et al. (2014) and the Riksbank

⁷⁴ A variable-interest rate mortgage with an interest-rate ceiling means that the household pays a variable interest rate that includes an insurance premium but that may not exceed a predetermined highest level.

⁷⁵ See for example Calza, A., Monacelli, T. and Stracca, L. (2013), "Housing finance and monetary policy", *Journal of the European Economic Association* vol. 11 (1).

⁷⁶ For a more detailed discussion on how interest-rate fixation periods affect the macroeconomy, see Holmberg, U., Janzén, H., Oscarsson, L., van Santen, P. and Spector, E. (2015), "An analysis of the interest-rate fixation period for Swedish mortgages", *Economic Commentaries*, no. 7, 2015. Sveriges Riksbank.

⁷⁷ In many countries (such as the Netherlands, Switzerland, Spain, Sweden and others), the cost of early redemption is formulated as an interest-rate differential. Other countries have a low or non-existent cost for the early redemption of mortgages (Japan and the United States, for example).

⁷⁸ Belgium and Israel, among others, have regulations intended to reduce the proportion of new loans at variable interest rates with the aim of reducing households' interest-rate sensitivity.

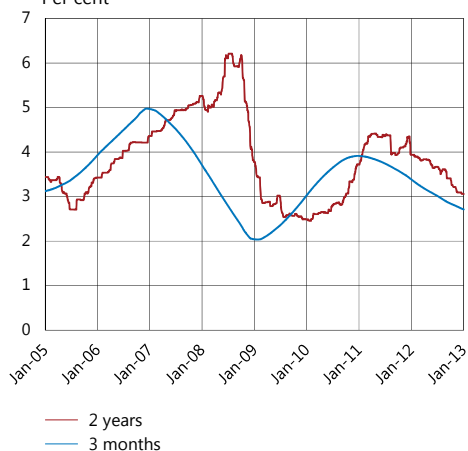
Chart A3:13 Interest rate for a mortgage with 5-year fixed-rate period compared to the average interest rate for a mortgage with 3-month fixed-rate period over an equivalent 5-year period
Per cent



Note. On each given date, the 5-year rate is compared with what the interest rate would have been if a rate with a 3-month fixed period been chosen over the corresponding period. The interest rates are an average of the listed rates published by the major Swedish banks.

Source: The Riksbank

Chart A3:14 Interest rate for a mortgage with 2-year fixed-rate period compared to the average interest rate for a mortgage with 3-month fixed-rate period over an equivalent 2-year period
Per cent



Note. On each given date, the 2-year rate is compared with what the interest rate would have been if a rate with a 3-month fixed period been chosen over the corresponding period. The interest rates are an average of the listed rates published by the major Swedish banks.

Source: The Riksbank

prefer loans at variable interest rates.⁷⁹ Empirical studies have also shown that households consider both the anticipated future level of interest rates and the present differences in interest costs when choosing between variable and fixed mortgage rates.⁸⁰ There are also studies showing that households in countries in which inflation has historically been volatile tend to prefer mortgages at variable interest rates to a greater extent.⁸¹

Part of the explanation for why it has become increasingly common for Swedish households to choose mortgages at variable interest rates could thus be that the gap between fixed and variable interest rates has been wide for a longer period of time (see chart A3:12). At the same time, the institutional settings have entailed potentially high costs for the early redemption of mortgages.⁸²

Another possible explanation is that, in Sweden, it has historically paid to choose mortgages at a variable interest rate instead of mortgages with slightly longer interest-rate fixation periods (see chart A3:13)⁸³, even if it has periodically paid to choose mortgages with two-year interest-rate fixation periods (see chart A3:14)⁸⁴. In addition, it is possible that households, given the recent period of low interest rates, have low⁸⁵ expectations of the future development of mortgage rates, leading many to choose short interest-rate fixation periods.⁸⁶

Households' economic conditions are important for their choice of interest-rate fixation period

The Riksbank has analysed microdata on new mortgage holders from Finansinspektionen's mortgage surveys to identify which households tend to choose variable-rate mortgages. The Riksbank's analysis confirms, to a degree, the results of previous studies and, at the same time, partly supports the theoretical results discussed earlier in this article.

The analysis shows that all income groups⁸⁷ have over 70 per cent of their mortgages at variable interest rates (see chart A3:15). Furthermore, it shows that households with high disposable incomes and high discretionary income calculations (see table A3:3) have a higher proportion of mortgages at variable interest rates. The proportion of mortgages at variable interest rates decreases in all income groups when households take larger loans or have higher loan-to-value ratios.

⁷⁹ See Campbell, J.Y. and Cocco, J. (2003), "Household Risk Management and Optimal Mortgage Choice", *The Quarterly Journal of Economics*, vol. 118 (4).

⁸⁰ See Badarinar, C., Campbell, J.Y. and Ramadorai, T. (2014), "What Calls to ARM? International Evidence on Interest Rates and the Choice of Adjustable-Rate Mortgages", *Working Paper*.

⁸¹ See Campbell, J.Y. (2013), Mortgage Market Design, *Review of Finance*, vol. 17 (1).

⁸² See the Riksbank's consultation response to the ministry memorandum "Ränteskillnadsersättning m.m. vid bolån" (Ds 2013:38) (Interest rate differential compensation etc. in connection with mortgages), August 2013.

⁸³ The historical profitability in choosing mortgages at a variable rate instead of mortgages at a fixed rate is also true of countries with a large proportion of mortgages at fixed rates, such as the United States. This primarily suggests that other factors influence households' choice of interest-rate fixation period.

⁸⁴ It should be pointed out that a three-month rate is significantly more volatile than a five-year rate.

However, the volatility of the three-month rate is not captured in Charts R3:13 and R3:14, as each observation is an average over five and two years respectively.

⁸⁵ See the report on households' interest-rate expectations from SKOP, 17 March 2015.

⁸⁶ See for example Kahneman, Slovic and Tversky (1982), "Judgment under Uncertainty: Heuristics and Biases", *New York and Cambridge: Cambridge University Press*.

⁸⁷ The income groups have been determined by ranking households into ten, equally large groups, i.e. income deciles. Each income decile thus includes 10 per cent of all new mortgage holders in the sample.

Table A3:3 Summary of variables affecting the choice of fixed-rate period

Variables <u>increasing</u> the proportion of variable-rate mortgages	Variables <u>decreasing</u> the proportion of variable-rate mortgages
Higher disposable income	Greater loan volume
Higher discretionary income calculation	The household has a secondary mortgage
Wider gap between variable and fixed rates	Higher loan-to-value ratio
Rising age if main applicant is younger than 43	Greater number of joint applicants

Note. The effects have been calculated using a linear regression model with bank-specific effects. The reported variables are those variables significantly affecting the proportion of variable mortgages on the household level. The results should be interpreted as marginal effects of changes to individual variables. When correlations between variables are considered, the gap between households with high and low debt/equity ratios becomes small. See Holmberg, U., Janzén, H., Oscarius, L., van Santen, P. and Spector, E. (2015), "An analysis of the interest-rate fixation period for Swedish mortgages", *Economic Commentaries*, no. 7, 2015. Sveriges Riksbank.

Few new mortgage holders have high interest-to-income ratios

Table A3:4 shows the proportion of new borrowers in Finansinspektionen's mortgage survey from 2015 that have variable interest rates and how high the average borrower's interest-to-income ratio is. The interest-to-income ratio gives households' interest expenditure in relation to their disposable incomes and can give an idea of the proportion of disposable income a household has left for consumption once interest expenses have been paid. Experiences show that interest-to-income ratios are a good indicator for the identification of stability risks.

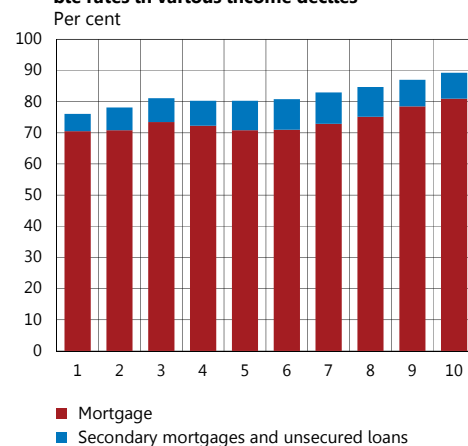
Table A3:4 shows that the majority of new mortgage holders currently have a relative low interest-to-income ratio. For example, about 82 per cent have an interest-to-income ratio of less than 10 per cent while only just under 4 per cent have a ratio of over 20 per cent when they take out the mortgage.⁸⁸ There is no major difference in interest-to-income ratios between the 66 per cent who only have variable rates and those who have a certain proportion of fixed rates.

The debt-servicing ability of new mortgage holders with variable interest rates is then investigated using a stress test in which the interest rate for all variable-rate loans rises from about 2.7 per cent to 8 per cent over an assumed one-year period, during which incomes are assumed to be unchanged.⁸⁹ This can provide a certain indication of the vulnerability of these borrowers. The test shows that households with a large proportion of loans at variable interest rates get a significantly heightened interest-to-income ratio. The proportion of new mortgage holders with an interest-to-income ratio of less than 10 per cent falls to about 27 per cent and about 38 per cent of mortgage holders in the random sample get an interest-to-income ratio of over 20 per cent under the assumed interest-rate stress (see table A3:5).⁹⁰

⁸⁸ 82 per cent is the total of 37.60 and 44.37, while 4 per cent is the total of 2.58, 0.73, 0.23 and 0.21.

⁸⁹ The assumption that the interest rate will rise to 8 per cent over one year means that households with an interest-rate fixation period of more than one year will not be subject to the interest-rate stress. As not all loans in the sample are at variable interest rates, this means that the average interest rate for new mortgage holders will be about 6.9 per cent.

⁹⁰ 27 per cent is the total of 17.8 and 9.51, while 38 per cent is the total of 23.89, 9.46, 2.8 and 2.01.

Chart A3:15 Proportion of new mortgages at variable rates in various income deciles

Note. The percentage of new loans in the various income deciles is the mean value for the various income groups based on random-sample data on new loans raised in the periods 27 August–3 September 2014 and 25 September–2 October 2014. For details, see Finansinspektionen's report "The Swedish mortgage market 2015".

Sources: Finansinspektionen and the Riksbank

Table A3:4 Percentage of households by proportion of loans at variable interest rates and interest-to-income ratio

Interest-to-income ratio	Percentage variable rate							Total
	0	1-20	20-40	40-60	60-80	80-99	100	
<5	3.45	1.57	1.32	2.26	1.77	2.03	25.2	37.6
5-10	2.13	1.81	2.29	3.24	2.4	3.83	28.67	44.37
10-15	0.19	0.24	0.46	0.69	0.77	1.05	7.29	10.69
15-20	0.01	0.02	0.13	0.24	0.38	0.36	2.46	3.59
20-30	0.01	0.01	0.05	0.14	0.32	0.3	1.77	2.58
30-40	0	0.01	0	0.04	0.09	0.1	0.49	0.73
40-50	0	0	0	0.01	0.02	0.02	0.18	0.23
>50	0	0	0	0.01	0.02	0.05	0.14	0.21
Total	5.78	3.66	4.25	6.61	5.77	7.74	66.19	100

Note: The calculations are based on households' total debts according to random-sample data on new loans raised in the periods 27 August–3 September 2014 and 25 September–2 October 2014. For details, see Finansinspektionen's report "The Swedish mortgage market 2015".

Sources: Finansinspektionen and the Riksbank's calculations

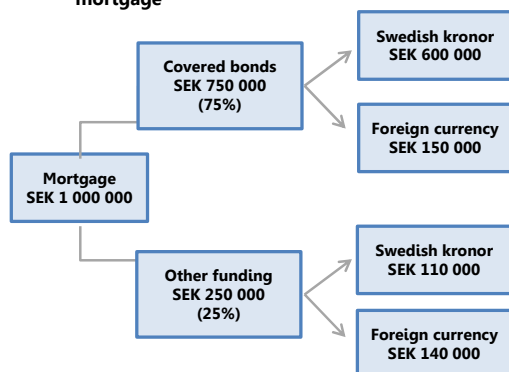
Table A3:5 Percentage of households by proportion of loans at variable interest rates and interest-to-income ratio if the interest rate for loans with a fixed-rate period of less than one year rises to 8 per cent

Interest-to-income ratio	Percentage variable rate							Total
	0	1-20	20-40	40-60	60-80	80-99	100	
<5	3.61	1.39	0.64	0.43	0.25	0.11	3.08	9.51
5-10	2	1.66	1.5	1.76	1.23	0.9	8.75	17.8
10-15	0.15	0.55	1.37	2.01	1.31	1.62	11.22	18.24
15-20	0.01	0.04	0.53	1.37	1.14	1.64	11.57	16.29
20-30	0.01	0.01	0.19	0.84	1.23	2.35	19.25	23.89
30-40	0	0	0.02	0.13	0.34	0.68	8.28	9.46
40-50	0	0	0	0.05	0.16	0.19	2.4	2.8
>50	0	0	0	0.02	0.11	0.24	1.64	2.01
Total	5.78	3.66	4.25	6.61	5.77	7.74	66.19	100

Note. The calculations are based on total household debt according to random sample data on new loans taken in the periods 27 August to 3 September 2014 and 25 September to 2 October 2014. For details see Finansinspektionen's report "The Swedish Mortgage Market 2015". The stressed interest-to-income ratio is calculated on the basis of a lending rate of 8 per cent for the proportion of variable-rate mortgages.

Sources: Finansinspektionen and the Riksbank's calculations

Chart A3:16 Example of how a Swedish bank funds a mortgage

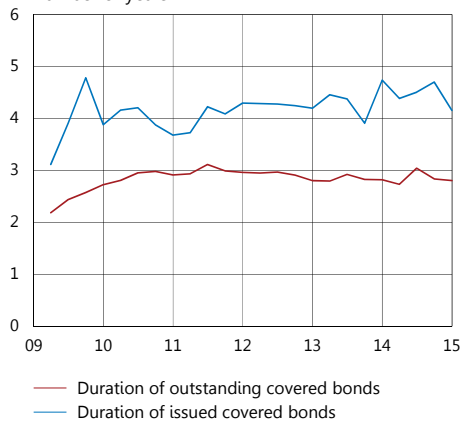


Note. Other funding consists of senior unsecured funding and deposits from the public.

Source: The Riksbank

Chart A3:17 Duration of outstanding and issued covered bonds

Number of years



Note. The chart covers seven of the eight issuers active on the Swedish covered bond market. They are Handelsbanken/Stadshypotek, Landshypotek, Länsförsäkringar Hypotek, Nordea/Nordea Hypotek, SBAB, SEB, Swedbank/Swedbank Hypotek. Skandiabanken has also been issuing on the Swedish market since May 2014.

Source: Association of Swedish Covered Bond Issuers

Even if the stress test indicates that the majority of the new borrowers in the sample have the capacity to withstand heavy interest-rate stress for a year, highly indebted households with a high proportion of mortgages at variable interest rates can be expected to reduce their consumption to deal with the higher interest expenditure. Calculations show that mortgage holders in the sample may have to reduce their consumption by up to 11.5 percentage points⁹¹ in relation to their disposable incomes if they are to adjust to these higher interest rate payments solely by reducing their consumption.⁹²

Interest-rate fixation periods on mortgages do not affect the banks' funding

It is also interesting to study whether households' choice of interest-rate fixation period influences the way the banks fund mortgages. Swedish banks primarily fund mortgages by issuing covered bonds in both Swedish kronor and foreign currencies (see chart A3:16). As most mortgages today have relatively short interest-rate fixation periods, in most cases less than five years, the banks normally assume that their customers will retain their mortgages in the bank for about the same length of time regardless of interest-rate fixation period. Consequently, the maturity of the banks' covered bonds is typically the same regardless of the interest-rate fixation periods chosen by customers.⁹³

At present, the maturity of the banks' newly-issued covered bonds corresponds to about four years (see chart A3:17) which is significantly shorter than the contractual maturity of a mortgage, which corresponds to between 30 and 50 years.⁹⁴ The banks are thereby exposed to a refinancing risk, which makes it desirable for the maturity of the banks' funding to become longer. If, on the other hand, customers were to start to demand mortgages with longer fixed-rate periods than is the case today, allowing the banks to assume that their customers would retain their mortgages in the bank for a longer period, this would create an incentive for the banks to extend the maturities of their bonds. This could, in turn, reduce the banks' refinancing risks, which would be positive from the point of view of financial stability. It would also thereby create a link between long fixed-rate periods and covered bonds with long maturities.

⁹¹ Based on the proportionally-weighted average increase of the interest-to-income ratio for households in Finansinspektionen's mortgage survey 2014.

⁹² The calculations thus assume that households will not use saved funds to deal with a substantial increase in lending rates.

⁹³ However, the banks use interest rate swaps to match the incoming interest payments they receive from their customers to the outgoing interest payments to investors. This is to neutralise the interest rate risk that otherwise would arise.

⁹⁴ *The Swedish Mortgage Market 2013*. Finansinspektionen. In contrast, the fixed-rate period of a mortgage can vary from three months to five years.

Summary

The high percentage of mortgages at variable interest rates in Sweden could entail a stability risk, both for the macroeconomy and for financial stability, if households were to cut down their consumption substantially in the event of an unexpected rise in interest rates.

At the same time, there is data to indicate that new mortgage holders with a high proportion of mortgages at variable interest rates have relatively low monthly interest payments in relation to disposable income. At the same time, there are palpable risks in certain groups. Those households that are highly indebted and, at the same time, have a high proportion of mortgages at variable interest rates risk facing substantially increased interest payments if lending rates increase, which could have repercussions on the economy as a whole.

The Riksbank's overall assessment is that it would be desirable for households with low resilience, such as highly-indebted households with low incomes and modest savings, to reduce their vulnerability to higher interest costs. The interest rate risk could be reduced if these households signed mortgages with longer interest-rate fixation periods to a greater extent. Moreover, longer interest-rate fixation periods for mortgages create incentives for the banks to extend the maturities of their bonds. This could reduce the banks' refinancing risks, which would be positive from the point of view of financial stability.

Glossary

Basel II: International regulatory framework for financial institutions that mainly regulates banks' capital adequacy, i.e. how much capital a bank must hold in relation to the risk it takes. The regulations also stipulate requirements concerning the banks' risk management and the disclosure of public information. Basel II was implemented in Sweden in 2007.

Basel III: International regulations for financial institutions that replace the Basel II regulations on the bank's capital adequacy. Compared to Basel II, Basel III entails increased capital requirements and regulations on capital buffers. Basel III also regulates the bank's liquidity management. The Basel III Accord will be progressively phased in by 2019.

CDS, Credit Default Swap: A contract between agents on the credit market aimed at transferring the credit risk of an asset, such as a bond, from one agent to another. The buyer of a CDS contract buys credit protection from the seller of the CDS contract by paying a premium over the contract's duration or until a credit event occurs. If a credit event occurs, the buyer transfers the insured asset to the seller in exchange for the nominal value of the asset.

CDS premium: Annual cost in basis points for buying a CDS contract.

Core Tier 1 capital: Tier 1 capital with a deduction for capital contributions and reserves that may be included in the capital base as Tier 1 capital in accordance with chapter 3, section 4 of the Capital Adequacy and Large Exposures Act (2006:1371).

Core Tier 1 capital ratio: Core Tier 1 capital in relation to risk-weighted assets.

Covered bond: A bond whose holder has a special benefit right in the event of a bankruptcy. Covered bonds normally entail a lower credit risk than unsecured bonds, which means that the borrowing costs are lower.

Credit gap: The deviation from the trend in lending by monetary financial institutions to companies and households in relation to GDP.

Credit risk: The risk of a borrower failing to meet commitments.

Credit terms: The terms and conditions laid down in a loan agreement covering, for example, the interest rate and the repayment schedule. Credit terms can also include the maximum loan-to-value ratio allowed for a mortgage.

CRR/CRDIV, Capital Requirements Regulation/Capital Requirements Directive IV: Proposed EU regulation with directives that implement the Basel III Accord. The regulations include stipulations on the banks' capital adequacy, leverage and liquidity.

Currency swap: An agreement to buy or sell a currency at the daily rate and then sell or buy back the same currency on a later day.

Debt-service-to-income-ratio: The household's loan-related payments (interest and amortisation) in relation to disposable income.

Debt-to-income ratio: Total household debt in relation to disposable income.

Disposable income: The total of a person's or a household's incomes less taxes and charges.

ESRB, European Systemic Risk Board: The European Systemic Risk Board is responsible for the macroprudential policy of the financial system within the EU.

Interbank rate: The interest rate on unsecured loans that the banks offer other banks. Stibor (Stockholm Interbank Offered Rate) is usually used to measure the Swedish interbank rate. Stibor is used as a reference for rate setting or pricing of derivative contracts.

Interest rate swap: A bilateral agreement to exchange a specific interest rate in return for another interest rate for a predetermined period according to specific conditions.

Interest-to-income ratio: Household interest expenditure in relation to disposable income.

Key policy rate: Interest rate that a central bank sets for monetary policy purposes. In Sweden, they are the repo rate and the deposit and lending rates to the banking system. The repo rate is the Riksbank's most important policy rate.

LCR, Liquidity Coverage Ratio: Liquidity measurement defined by the Basel Committee that measures a bank's ability to deal with a stressed net outflow of liquidity for 30 days. In simple terms, an LCR of 100 per cent means that a bank's liquidity reserves are adequate to enable the bank to manage an unexpected liquidity outflow for 30 days.

Liquidity: Measure of the ability of a company or organisation to meet its payment obligations in the short term. Can also describe how quickly it is possible to convert an asset into money without the price varying to any greater extent.

Liquidity buffer: Funds an institution holds to ensure its short-term debt-servicing ability.

Liquidity risk: The risk of not being able to meet payment commitments due to a lack of liquidity. Liquidity risk in a financial instrument means that an investment cannot be immediately liquidated at all or without falling sharply in value.

Loan-to-value limit/mortgage cap: Limits the size of a borrower's mortgage in relation to the value of the home.

Loan-to-value ratio: A borrower's debt in relation to the market value of the collateral for the loan. For example, a household's loan-to-value ratio for its home corresponds to the household's debt collateralised by the home divided by the market value of the home.

Market liquidity: Market liquidity refers to the possibility to sell a financial instrument immediately or without any significant movements in the market price.

NSFR, Net Stable Funding Ratio or the structural liquidity ratio: Liquidity measurement defined by the Basel Committee. The measurement puts a bank's stable funding in relation to its illiquid assets in a stress scenario that covers a period of one year.

Risk premium: The additional return an investor requires as compensation for an additional risk.

Risk weight: In simplified terms, to calculate a bank's risk-weighted assets, the amount lent is multiplied by a risk weight. The risk weights are determined on the basis of how likely it is that the borrower will be unable to fulfil its loan commitment and thus varies from borrower to borrower – a high risk weight implies a greater risk than a low risk weight.

Risk-weighted assets: Assets recorded in the balance sheet and off-balance sheet commitments valued by credit, market and operational risk in accordance with the capital adequacy regulations (see Basel II and Basel III).

Stibor: See Interbank rate.

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