



FINANSINSPEKTIONEN

FI's Use of Macroprudential Tools

8 June 2018



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Foreword

Finansinspektionen (FI) has long had at its disposal tools including the ability to impose capital and liquidity requirements on banks. In addition, the Swedish Government has relatively recently given us the opportunity to introduce amortisation requirements and other measures to counteract financial imbalances. It is desirable that this work be evaluated, in particular because our powers have been expanded. However, it is not obvious how this evaluation should be conducted.

In our Letter of Appropriation for 2018, we were tasked with developing and reporting methods for evaluating macroprudential policy. The final report on this assignment is to be submitted on 14 June 2019. This is an initial interim report describing the direction and priorities of this work.

Macroprudential measures can apply both to financial firms and to households and non-financial firms. However, the tangible problems we are currently facing and have faced in recent years have largely pertained to the volume of household debt. Consequently, we are using this interim report to describe the work of analysing and managing the risks associated with household debt. In the future, this account may be expanded to also include all the macroprudential measures FI has implemented. There are three key issues that each have a chapter devoted to them in this report:

- In what ways can household debt constitute a vulnerability and how substantial is this vulnerability?
- What measures has FI implemented in order to reduce the vulnerability associated with household debt and what has been the effect of these measures?
- Why did FI choose to introduce a stricter amortisation requirement instead of raising the capital requirements for the banks, reducing the mortgage cap or imposing a loan-to-income limit?

Much of the content in the report is a compilation of analyses and results we have published previously in other contexts. What is new is primarily the final chapter that compares the expected effects of the stricter amortisation requirement with the expected effects of alternative measures. Here we have restricted the analysis to only include those measures that are included in FI's toolbox.

We have chosen to report the results of the measures that have been developed to date. The process to develop further methods, which we are prioritising up until the final report in 2019, is described in more detail in each chapter.

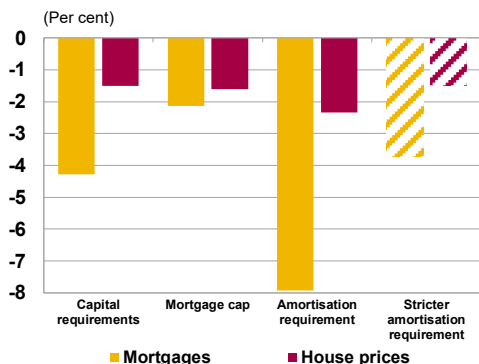
Stockholm, 8 June 2018

Erik Thedéen
Director General

Summary

The high level of household debt makes Swedish households vulnerable. If the economy takes a turn to the worse, many households may be forced to reduce their consumption. This could exacerbate a crisis and, by extension, threaten financial stability. FI has increased the resilience of banks by imposing high capital requirements. Thanks to the mortgage cap and amortisation requirements, households are also better equipped for an economic downturn.

Diagram 1. Effects of FI's measures on mortgages and house prices
(Per cent)



Source: Finansinspektionen

Note: The graph shows the extent to which the measures have suppressed household mortgage borrowing and house prices compared to a situation in which FI had not introduced each of these regulations. The bars for the mortgage cap show the effect on total household debt, the others apply to mortgage borrowing. The bars for the stricter amortisation requirement show the effect FI expects requirement to have.

HOUSEHOLDS ARE VULNERABLE TO MACROECONOMIC SHOCKS

The high and rising level of household debt may be associated with risks to financial and macroeconomic stability. If there are a large number of households that are unable to repay their loans in the event of an economic downturn, banks may make credit losses, which can threaten financial stability. FI's assessment is that these financial stability risks are limited. The assessment is based on FI's stress tests, which show that only a small proportion of those households that have recently taken out a mortgage would have problems continuing to repay their debt if interest rates rise rapidly or their income decreases.

However, a crisis may be exacerbated if a large number of households reduce their consumption at the same time in order to allow them to repay their loans or increase their saving. In this case, there may be credit losses through banks' lending to other sectors of the economy, which could, by extension, pose a threat to financial stability. FI makes the assessment that this macroeconomic risk associated with household debt is high. This assessment is based on the fact that a large number of households have loans that entail a high loan-to-value (LTV) ratio or high debt-to-income (DTI) ratio and that international experience suggest that such highly leveraged households are sensitive to altered conditions.

FI'S MEASURES HAVE INCREASED RESILIENCE

FI has implemented several measures aimed at reducing the vulnerability associated with household debt. The capital requirement is currently almost 25 per cent of the major banks' risk-weighted assets. This is significantly higher than the 10.5 per cent that is automatically implied by the capital adequacy regulations. The higher capital requirements have strengthened banks' resilience, enabling them to manage credit losses and continue to arrange loans in economic downturns. At the same time, the capital requirements have had moderate effects on household debt and house prices (see Diagram 1).

The mortgage cap of 85 per cent has broken the trend of rising LTV ratios in new mortgages. It has reduced the risk that households who are forced to sell their home in a declining market would end up with a residual debt. The mortgage cap has also suppressed household debt by just over 2 per cent and house prices by about 1.5 per cent (see Diagram 1).

The first amortisation requirement has encouraged households with high LTV ratios to buy less expensive homes, borrow less and amortise more. This makes the households less inclined to reduce their consumption heavily if economic development is seriously impaired. The overall effect of the amortisation requirement is that household mortgage borrowing has been suppressed by about 8 per cent and house prices by just over 2 per cent (see Diagram 1).

It consistently appears that the effect of FI's measures is greater on household debt than on house prices. This means that households have both bought cheaper homes and financed their homes using means other than mortgages to a larger extent. This can involve using existing savings, seeking financing from relatives or taking out unsecured loans. It also seems to have become more common for young people to have a co-signer within the household.

STRICTER AMORTISATION REQUIREMENT MAKES HOUSEHOLDS MORE RESILIENT

FI introduced a stricter amortisation requirement in order to break the trend towards more households taking out loans that entail a high loan-to-income (LTI) ratio. The stricter amortisation requirement is expected to reduce the proportion of new borrowers with an LTI ratio in excess of 450 percent of gross income from 15 to 7 per cent. In this scenario, new lending is suppressed by almost 4 per cent. It would have been possible to achieve an equally large suppression of new lending or reduction in the proportion of households with a high LTI ratio using other measures. However, a reduced mortgage cap would have hit the youngest households hard. It would also have risked further exacerbating the increase in unsecured borrowing.

An LTI limit can apply to a household's total borrowing or just its mortgage borrowing as a proportion of household income. A cap on total borrowing is based on there being a register that records all of the household's loans and is therefore difficult to implement in practice. A cap on mortgage borrowing as a proportion of income risks, as is the case for a reduced mortgage cap, further exacerbating the increase in unsecured borrowing.

An LTI limit may involve severe interference in individual households' finances as it sets a limit on how much an individual household is permitted to borrow. This could be justified if the risks were sufficiently serious. However, FI wanted to introduce a regulation that incentivises households not to have excessive levels of debt and that prevents the trend from moving in the wrong direction. An LTI limit would have needed to be designed with significant flexibility in order to achieve this aim. However, there is a risk that flexible LTI limits distort competition in the mortgage market.

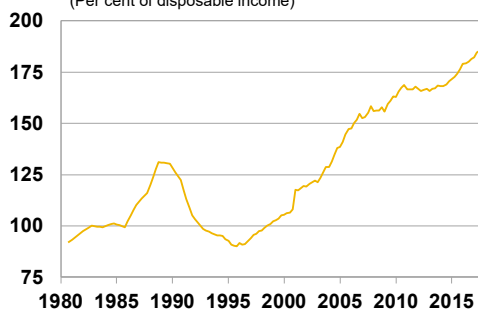
The stricter amortisation requirement achieves the same objective as a flexible LTI limit without distorting competition. Households that want to borrow more than 450 per cent of gross income still can, but are instead forced to amortise an additional 1 per cent of the loan. This slows down the trend of an increasing number of households taking out loans that entail a high LTI ratio. It also has characteristics that are similar to those of automatic stabilisers. As debt increases as a proportion of income, the more borrowers are forced to amortise, and vice versa.

Higher capital requirements would also have been a possibility. However, it would have been necessary to raise the requirements by an unreasonable amount in order to decrease the macroeconomic risks associated with household debt. For example, the risk weight floor would have needed to be raised from 25 to 50 per cent in order to suppress new lending by as much as is expected as a result of the stricter amortisation requirement. This supports the view that bank-based measures, such as capital and liquidity requirements, build resilience in the banks at the same time as they are not particularly effective means of reducing the macroeconomic risks associated with household debt.

Household Debt is a Vulnerability

The high and rising level of household debt makes households vulnerable to changes in conditions. If a large number of households are unable to afford to repay their loans, banks may make credit losses, which may pose a threat to financial stability. However, even if households were to manage to continue repaying their loans, they may be forced or wish to make adjustments to their finances. If a large number of households reduce their consumption sharply at the same time, a crisis may be exacerbated so that banks make credit losses on their lending to other sectors of the economy. FI's assessment is that household debt is primarily this type of macroeconomic risk.

Diagram 2. Household debt
(Per cent of disposable income)



Source: Statistics Sweden

HOUSEHOLD DEBT IS INCREASING FROM A HIGH LEVEL

Since 1995, household debt as a proportion of income has increased from 90 to approximately 185 per cent (see Diagram 2). There are several reasons why this development has taken place. Among these are the increase in the proportion of households that own their home, taxes on services for the home have decreased and interest rates have been on a downward trend ever since the Riksbank introduced the inflation target in 1993.¹ Regardless of whether the increase is primarily due to such fundamental factors, the high and rising level of household debt may still constitute a risk, not only to households and banks, but also to the Swedish economy as a whole. This relates both to direct financial stability risks and to macroeconomic risks, which may by extension pose a threat to financial stability.

Both of these risks are affected by households' cash flow and balance sheets. The cash flow is a combination of the household's incoming and outgoing payments. A household's balance sheet is a compilation of the household's assets and debt. The difference between the households' assets and its debt is the household's net wealth.

FINANCIAL STABILITY RISKS ASSOCIATED WITH HOUSEHOLD DEBT

The more debt a household has as a proportion of its income, the larger the share of its income is used to make interest and amortisation payments. If interest rates rise or the household's income decreases, the household's cash flow is impaired. The household may then be forced to reduce its consumption or the amount it saves. If the value of the household's assets falls, its net wealth decreases.

If a household's cash flow is severely impaired at the same time as its net wealth becomes negative, there is a risk that the household is not able to cope with its debt service payments. The bank that has lent to the household may then make a credit loss. This is especially the case if the value of the collateral the bank has taken also decreases. If a large number of households were to end up in such a situation at the same time, the credit losses may be so large that financial stability

¹ See Braconier, et al. (2014).

would be threatened. This is the direct financial stability risk associated with household debt.

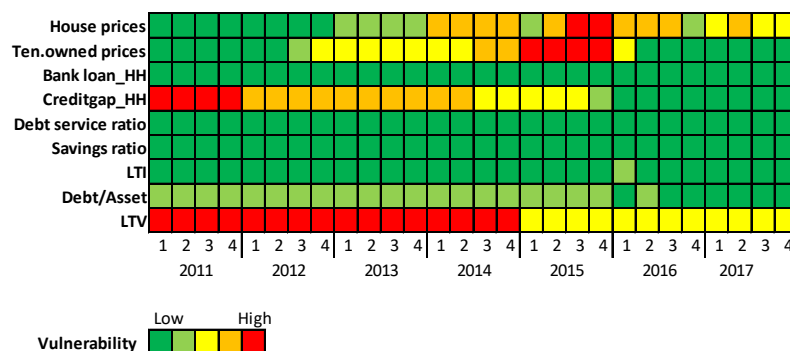
MACROECONOMIC RISKS ASSOCIATED WITH HOUSEHOLD DEBT

If its cash flow deteriorates sharply, the household may be forced to sell its home in order to move to less expensive housing. If a large number of households end up in this situation at the same time, it will put pressure on house prices. And even if the household was able to cope with its debt service payments, large adjustments may be needed. The household may need to sell assets in order to repay loans or to be able to continue paying its monthly outgoings.

Furthermore, the household may be forced to make major adjustments to its consumption. If a large number of households reduce their consumption at the same time, an economic downturn may be exacerbated. And when demand falls rapidly, there may be credit losses from the banks' lending to other parts of the economy, e.g. the commercial property sector which is sensitive to economic fluctuations. In this way, household debt may be associated with macroeconomic risks, which may by extension threaten financial stability.

THE FINANCIAL STABILITY RISKS ARE DEEMED TO BE LIMITED

Diagram 3. Vulnerability indicators for the household sector



Source: Finansinspektionen

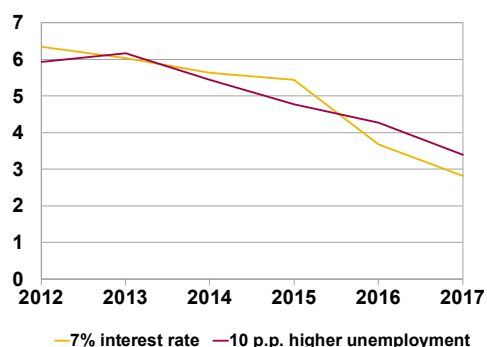
Note: The heat map shows how the vulnerability indicators have changed over time. See also Finansinspektionen (2015).

FI's assessment is that household debt is not primarily a threat to financial stability. This is very much consistent with what is signalled by the various vulnerability indicators (see Diagram 3). The indicators that show elevated vulnerabilities are connected to property prices having risen rapidly and households' loan-to-value (LTV) ratios being higher than the historical average since the 1980s.

Furthermore, FI's stress tests indicate that only a small proportion of those households that have recently taken out a mortgage would have problems continuing to repay their loans if interest rates rise sharply or unemployment increases (see Diagram 4). Households' resilience in the face of rising interest rates or unemployment has even increased in recent years, not least in conjunction with the introduction by FI of the first amortisation requirement.

Diagram 4. Proportion of households with deficit at an interest rate of 7 per cent and an increase in unemployment of 10 percentage points, respectively.

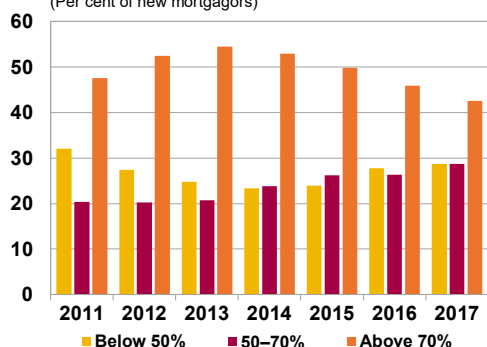
(Per cent of new mortgagors)



Source: Finansinspektionen (2018)

Diagram 5. Proportion of new mortgages distributed by LTV interval

(Per cent of new mortgagors)

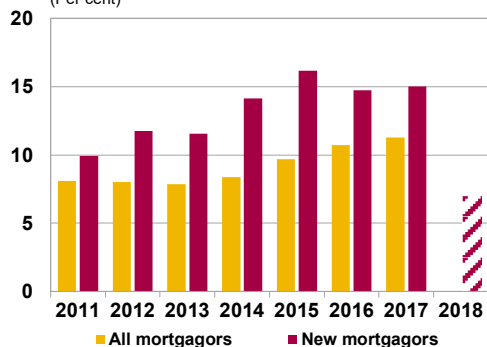


Source: Finansinspektionen (2018)

Note: The LTV ratio is the size of the mortgage as a proportion of the market value of the home.

Diagram 6. Percentage of households with a loan-to-income ratio of over 450 per cent of gross income

(Per cent)



Source: Finansinspektionen (2018) and the Riksbank

Note: 2018 refers to FI's forecast.

THE MACROECONOMIC RISKS ARE DEEMED TO BE HIGH

Even though households have margins that enable them to cope with their debt service payments should interest rates rise or incomes fall, FI's assessment is the macroeconomic risks associated with household debt are still high. More and more households are purchasing their home, and the majority of these have a mortgage. About seven in ten households that are granted new loans have a LTV ratio of more than 50 per cent (see Diagram 5). Consequently, many Swedish households are relatively highly leveraged and may react strongly in the event of shocks.

Analysis requirement: Indicators of financial imbalances

FI has developed vulnerability indicators for the household sector in order to enable the systematic monitoring of developments in a number of variables that can reflect the build-up of risks. These indicators are chosen in order to capture the risk of banks making credit losses than may threaten financial stability. In addition, they are coloured on the basis of how well the indicator managed to predict the banking crisis of the 1990s and the financial crisis of 2008–2009. FI therefore needs to develop vulnerability indicators that better capture the macroeconomic risks associated with household debt. These might pertain to how the proportion of households with high loan-to-income ratios is changing or the size and composition of households' balance sheets. The analysis must also take into account the fact that macroeconomic risks can be non-linear. For example, an isolated fall in house prices can lead to small effects on consumption if the economy otherwise continues to develop strongly. However, if house prices fall at the same time as the stock market falls and unemployment and interest rates rise, the effects on consumption may be significantly larger. FI intends to develop this sort of indicator of macroeconomic imbalances and to publish the results in an FI Analysis.

The proportion of households with loans that are large in proportion to their income has also increased (see Diagram 6). This development is largely due to the fact that house prices have risen much faster than household income in recent years. The proportion of households with new mortgages that entailed a high loan-to-income (LTI) ratio certainly decreased somewhat in conjunction with the introduction by FI of the amortisation requirement in 2016 but increased a little in the most recent mortgage survey. In the mortgage stock as a whole, the proportion of households that have a high LTI ratio has increased since 2013. Experience from other countries suggests that both households with a high LTV ratio and households with a high LTI ratio can react more strongly to shocks.²

Analysis requirement: Develop stress tests for households

As part of the annual mortgage survey, FI conducts stress tests for new mortgagors in order to investigate their resilience in the face of rising interest

² See for example Bunn and Rostom (2014).

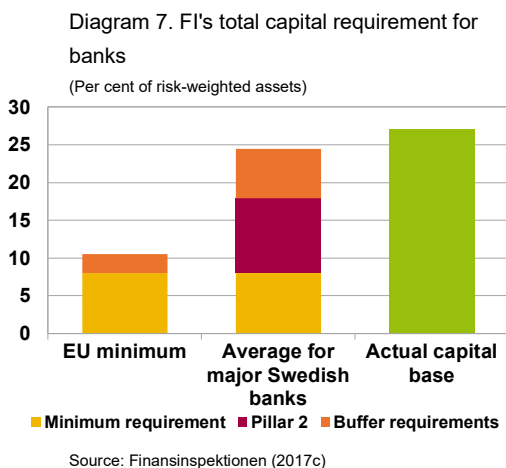
rates, increased unemployment or falling house prices. The primary aim of such stress tests is to assess the risk of household debt leading to large credit losses in the banking sector.

These stress tests show that households manage to repay their loans even in economic downturns. But even if households were to manage to continue repaying their loans, they may be forced, or choose voluntarily, to make large adjustments in the form of reduced consumption or to sell assets in order to cope with their payments or settle their loans. FI needs to develop methods that quantify these effects. FI intends to develop stress tests that are based on macroeconomic scenarios. These differ from the stress tests FI publishes in the mortgage survey in that the entire population is of interest (at the individual level, the mortgage survey sample only contains new mortgagors). They also differ in that it is not just households that have a deficit in their cash flow that are studied; households with a surplus can also make large adjustments if the conditions change. In addition, stress tests of this type are based on analysis of households' actual consumption (the mortgage survey only studies whether the household manages to repay its loans if it consumes in accordance with the banks' standardised costs).

Stress tests based on macroeconomic scenarios can show the extent to which household debt amplifies macroeconomic fluctuations. They can also be used to quantify how regulations such as amortisation requirements and mortgage caps affect households' resilience. FI intends to develop this type of stress test based on macroeconomic scenarios and to publish the results in an FI Analysis.

Effects of FI's Measures

FI has implemented several measures in order to make banks and households more resilient. FI's assessment is that measures targeting borrowers directly are the most effective means by which to reduce the macroeconomic risks associated with household debt. The mortgage cap increases households' resilience in the face of falling house prices. The amortisation requirement reduces the proportion of highly-indebted households, which makes households less inclined to reduce their consumption heavily if economic development is seriously impaired. It reduces the risk of a deep recession becoming a financial crisis. The capital requirements for Swedish banks are generally high and this is especially true for lending to households. This means that banks can deal with significant credit losses and continue arranging loans, even in economic downturns.



CAPITAL REQUIREMENTS INCREASE BANKS' RESILIENCE

When the Basel III agreement was incorporated into Swedish law through CRD4/CRR in 2014, FI introduced capital requirements that were high from an international perspective. Since then, FI has gradually increased these requirements in general, in particular for lending to households in the form of the risk weight floor for mortgages and, to some extent, the countercyclical capital buffer. Currently, the total capital requirements amount to nearly 25 per cent of the major banks' risk-weighted assets. In addition, the banks hold additional capital in the form of voluntary buffers of 2–3 percentage points (see Diagram 7).

Within the EEA, seven out of 31 countries have set the countercyclical capital buffer higher than 0 per cent. At 2 per cent, Sweden, along with Norway, has the highest buffer value. The systemic risk buffer is used by twelve countries. A further three countries are in the process of phasing in a systemic risk buffer. The potential to impose capital requirements on macroprudential grounds via Pillar 2 is being used by five countries.³

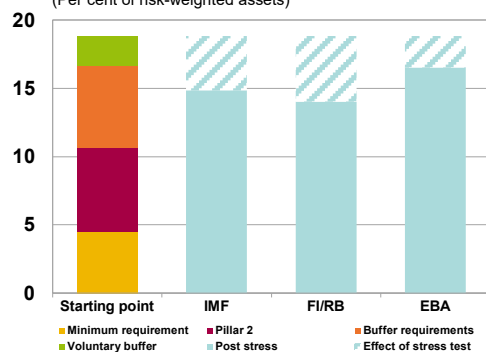
The aim of these high capital requirements is primarily to make banks more resilient and to contribute to reducing the impact of the systemic risks associated with factors such as household debt.⁴ The capital requirements FI has introduced in order to reduce the systemic risks of household debt, such as the increase in the risk weight floor for mortgages from 15 to 25 per cent and the use of the countercyclical capital buffer, are also primarily aimed at increasing banks' resilience. The fact that mortgage rates are increasing and household debt is suppressed have been seen as positive side effects, but FI deems these effects to be small.⁵

³ See ESRB (2018).

⁴ See Finansinspektionen (2014).

⁵ See, for example, Finansinspektionen (2013), which shows that an increase in the risk weight floor for mortgages from 15 to 25 per cent would tie up a further SEK 32bn in total capital in the major Swedish banks. FI's assessment was that this would lead to mortgage rates rising

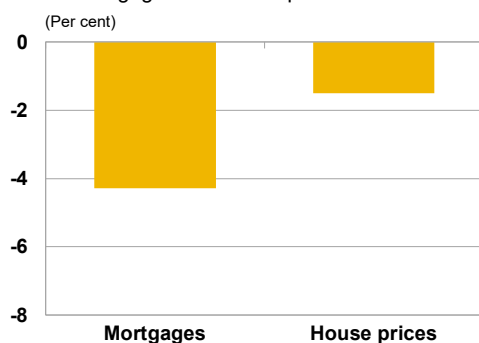
Diagram 8. Outcome of the 2016 stress tests
(Per cent of risk-weighted assets)



Source: Finansinspektionen (2016b)

Note: The left-hand bar shows the components of the banks' Common Equity Tier 1 capital ratios. The other three bars show the results of each stress test, with dashed lines illustrating the reduction in Common Equity Tier 1 capital ratios after three years in the respective stress test's severe scenario.

Diagram 9. Effect of the capital requirements on mortgages and house prices
(Per cent)



Source: Finansinspektionen

Note: The graph shows the extent to which FI's higher capital requirements have suppressed households' mortgage borrowing and house prices compared with a situation in which FI has imposed a capital requirement in line with the EU minimum.

Table 1. Capital effects for a mortgage of SEK 1m

Regulation	Risk weight	RWA	Requirement	Capital
EU minimum	5%	SEK 50 000	10.5%	SEK 5 250
FI	25%	SEK 250 000	17.5%	SEK 43 750

Source: Finansinspektionen

Note: RWA denotes risk-weighted assets. FI's 17.5 per cent only encompasses those parts of the capital requirements that are affected by mortgages, i.e. the EU minimum (10.5%), systemic risk (5%) and countercyclical capital buffer (2%).

The respective stress tests that the IMF, FI and the Riksbank, and EBA conducted in 2016 were based on scenarios in which the four major Swedish banks were estimated to suffer large credit losses, reduced earnings and higher risk weights. All in all, the Common Equity Tier 1 capital was reduced by up to five percentage points of the risk-weighted assets. However, the banks' capital buffers were sufficiently large to absorb these losses (see Diagram 8). Thanks to the high capital requirements, with large buffer elements, the major Swedish banks also have the resilience to withstand very severe financial shocks. Accordingly, they are deemed capable of continuing to arrange loans, even in significant economic downturns.

Capital requirements affect the banks' financing mix. Equity is more expensive than borrowed capital. This is why banks' financing costs rise when FI increases the capital requirements. FI's calculations indicate that mortgage rates have increased by 40–50 basis points as a result of the requirements FI imposes over and above the EU minimum (more detail can be found in Analysis requirement: What effect do the capital requirements have on the interest rates offered to the bank's customers?). The total effect on mortgage rates is moderate but underlying this is a large increase in the capital requirements. FI's calculations also indicate that the higher interest rates have in turn made households borrow around 4 per cent less and that they have suppressed house prices by around 1.5 per cent compared to a situation in which FI had imposed capital requirements at the level of the EU minimum (see Diagram 9).⁶

Analysis requirement: What effect do the capital requirements have on the interest rates offered to the bank's customers?

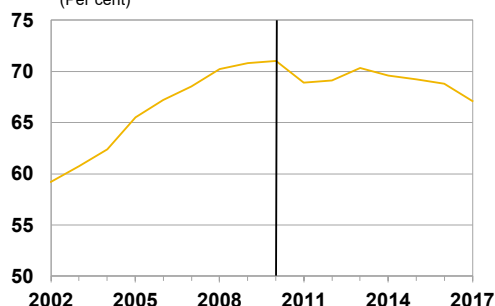
Higher capital requirements can increase a bank's financing costs as equity is more expensive than borrowed capital. FI's assessment of the effects on mortgage rates is based on a simple calculation. A mortgage of SEK 1m requires almost SEK 40 000 more in own funds under the requirements FI imposes (see Table 1). According to the yield requirements the banks specify themselves, own funds are 10–12 percentage points more expensive than borrowed capital. In which case, FI's higher requirements cost the bank SEK 4 000–5 000. In order to cover this cost, the bank must add 40–50 basis points to the mortgage rate.

However, this simple calculation ignores the fact that the bank's yield requirements on the equity may be affected by the bank having a smaller proportion of debt financing. It also ignores the fact that the effect on the final interest rates are dependent on how much of the higher financing costs the bank is able and wishes to pass on to its customers. These estimates are central to assessing whether even higher capital requirements are an

by up to 0.2 percentage points. The elasticity between capital requirements and mortgage rates is therefore low.

⁶ The calculation is based on the elasticity between debt service payments (interest and amortisation payments) and debt, see Finansinspektionen (2017b). The estimated elasticity means that if a household's debt service payments increase by one per cent, the household borrows 0.3 per cent less.

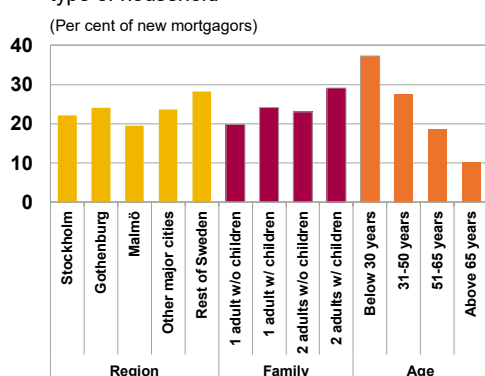
Diagram 10. Average volume-weighted LTV ratio, new loans
(Per cent)



Source: Finansinspektionen (2018)

Note: The vertical line indicates when FI introduced the mortgage cap.

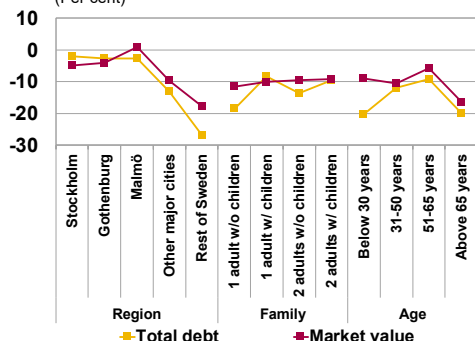
Diagram 11. Percentage of households affected by the mortgage cap, distributed by type of household
(Per cent of new mortgagors)



Source: Andersson, et al. (2018)

Note: The graph shows the proportion of households, divided into different categories, that took out loans with LTV ratios in excess of 85 per cent according to the mortgage data for 2009.

Diagram 12. The effects of the mortgage cap, distributed by type of household
(Per cent)



Source: Andersson, et al. (2018)

Note: The graph shows how much less was borrowed by various groups of new mortgagors affected by the mortgage cap and how much less expensive the homes they purchased were.

alternative to a stricter amortisation requirement. FI therefore intends to make more precise estimates and publish the results in an FI Analysis.

MORTGAGE CAP INCREASES HOUSEHOLD RESILIENCE TO FALLING HOUSE PRICES

On 1 October 2010, FI introduced a mortgage cap which means that new loans collateralised by a home should not exceed 85 per cent of the value of the home. Within the EEA, 19 of 31 countries have introduced a mortgage cap, which makes it the most used macroprudential tool for suppressing household demand for loans.⁷

The aim of the mortgage cap is to counteract unhealthy lending and to strengthen consumer protection. The average LTV ratio of new mortgages had been on an upward trend for a long time (see Diagram 10). There was therefore concern that banks and other credit institutions were using higher LTV ratios as a means of competition. An excessively large debt and LTV ratio makes borrowers vulnerable in a situation where house prices are falling as the borrower risks being left with a residual debt if their home must be sold. The mortgage cap results in households borrowing less and therefore makes them more resilient in the face of falling prices in the housing market. As households are borrowing less, it also reduces the risk of households cutting back sharply on their consumption in a deep recession.

Before FI introduced the mortgage cap, almost 25 per cent of new mortgagors borrowed more than 85 per cent of the value of their home. Households outside metropolitan areas, families with children and young households, in particular, borrowed a large amount in relation to the value of their home (see Diagram 11). When FI introduced the mortgage cap, this proportion decreased to 18 per cent.⁸ Andersson, et al. (2018) show that the households affected by the regulation borrowed an average of approximately 13 per cent less and purchased homes that were about 10 per cent less expensive than they would otherwise have purchased.

Of the households affected, it was primarily those outside of the metropolitan areas that bought less expensive homes and borrowed less (see Diagram 12). This is because LTV ratios were (and still are) higher outside of the metropolitan areas.

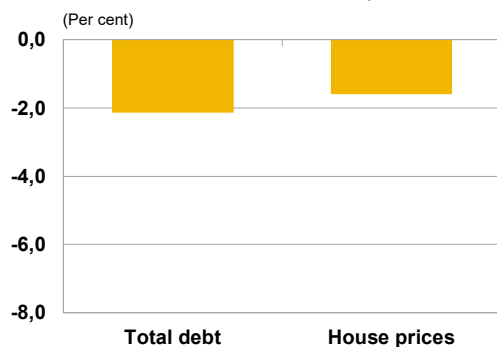
All family constellations affected by the mortgage cap bought homes that were approximately ten per cent less expensive. Families with children also borrowed approximately 10 per cent less, while families without children borrowed 15–20 per cent less (see Diagram 12).

The oldest mortgagors bought homes that were about 20 per cent less expensive. The other age groups bought homes that were about 10 per cent less expensive. Most age groups reduced the size of their mortgages in line with the reduction in the cost of the homes being purchased. The exception was the youngest households, which

⁷ See ESRB (2018)

⁸ The fact that households are borrowing more than 85 per cent of the value of the home does not mean that banks violated the mortgage cap but that households took out unsecured loans in conjunction with house purchases.

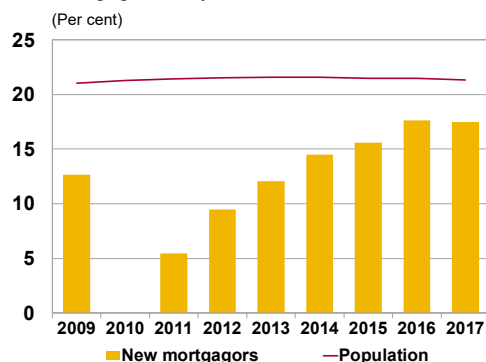
Diagram 13. Effects of the mortgage cap on total household debt and house prices



Source: Andersson, et al. (2018)

Note: The graph shows the extent to which the mortgage cap has suppressed households' mortgage borrowing and house prices compared to a situation in which FI had not introduced the mortgage cap.

Diagram 14. Proportion of young people in the mortgage survey



Source: Finansinspektionen (2018)

Note: The proportion of young people denotes households containing people aged between 18 and 30. No survey was conducted in 2010.

reduced their borrowing by significantly more than the reduction in the cost of the home being purchased (see Diagram 12).

The effect was smaller for new mortgagors as a whole. This is because the majority of households were already borrowing less than 85 per cent of the value of their home prior to FI introducing the mortgage cap. Overall, the mortgage cap resulted in new mortgagors buying homes that were an average of 1.6 per cent less expensive and borrowing an average of 2.1 per cent less (see Diagram 13).

The fact that the effect on house prices was often smaller than on borrowing, both in total and for many categories of household, is a sign that alternative financing (e.g. savings, loans from relatives or unsecured loans) became more important for highly leveraged households. This was particularly true for households outside of the metropolitan areas, families without children and the youngest borrowers. The youngest borrowers often have no savings they can use as a deposit.

Rising house prices and an increased need for deposits appear to have made young first-time buyers' entry into the housing market more difficult. In 2009, 13 per cent of new mortgagors in the survey were below the age of 30.⁹ This proportion decreased to 5 per cent in 2011 (see Diagram 14).

Since 2011, the proportion of young mortgagors has increased steadily. However, the proportion of young people in the population as a whole has remained stable over the same period. Accordingly, it is not because of demographic changes that an increasing number of young people have been taking out mortgages since 2011. In addition, the average size of loans taken out by young people has doubled since 2011. This is a faster increase than in any other age group.

According to the mortgage surveys, the proportion of young people with co-signers within the household has increased from 40 per cent in 2011 to 55 per cent in 2017. For older households, this proportion has not changed appreciably over the same period. This means that young people, to a greater extent than previously, are taking out a loan together with someone they live with when they purchase a home.

AMORTISATION REQUIREMENT AFFECTS HIGH-LTV-RATIO HOUSEHOLDS

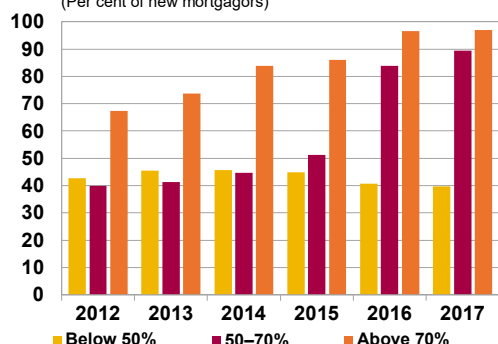
The first amortisation requirement, which FI introduced on 1 June 2016, entailed households with a mortgage larger than 50 per cent of the value of the home having to amortise at least 1 per cent of the loan every year. If the loan exceeds 70 per cent of the value of the home, the household must amortise at least 2 per cent per year. Within the EEA, four out of 31 countries have introduced amortisation requirements in order to reduce household demand for loans.¹⁰

The objective of the amortisation requirement is to counteract macroeconomic and financial stability risks associated with high levels of household debt. The amortisation requirement is expected to

⁹ See "Increasing number of young new mortgagors" in Finansinspektionen (2018).

¹⁰ See ESRB (2018). However, that number is somewhat misleading as many countries have amortisation requirements in legislation or in accordance with standard practice.

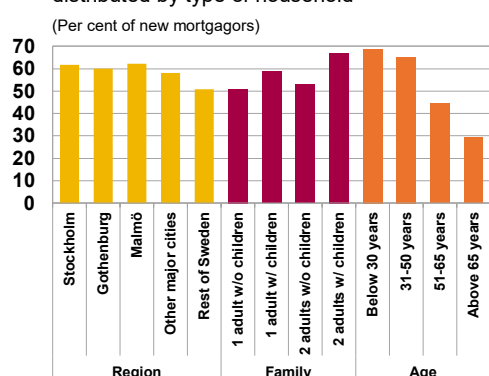
Diagram 15. Proportion of households that amortise, distributed by LTV interval
(Per cent of new mortgagors)



Source: Finansinspektionen (2018)

Note: The LTV ratio indicates the size of the mortgage as a proportion of the purchase price or market value.

Diagram 16. Proportion of households affected by the amortisation requirement, distributed by type of household
(Per cent of new mortgagors)



Source: Finansinspektionen (2017a)

Note: The graph shows the proportion of households, divided into different categories, that took out loans with LTV ratios that required amortisation payments, according to the mortgage data for 2016.

reduce the number of highly leveraged households in the long term. This makes households more resilient to shocks.

FI introduced the amortisation requirement for households with high LTV ratios instead of requiring that a bank's entire portfolio was amortised at a certain average rate. The reason was that experiences from Denmark, for example, indicated that households with a high LTV ratio tended to decrease their consumption more than households with a low LTV ratio when house prices fell.¹¹ An amortisation requirement targeting the banks' total mortgage portfolio certainly could have increased total amortisation payments as much as the amortisation requirement FI introduced. However, it is unlikely that the banks would have required the specific households that constitute the largest macroeconomic risks to amortise. On the contrary, there is a risk that the banks would have granted interest-only mortgages to the most profitable customers, which could be the customers who take out the largest loans. In which case, an amortisation requirement that entails a bank's entire mortgage portfolio having a certain average amortisation rate may lead to households with a low LTV ratio being forced to amortise, at the same time as households with a high LTV ratio are granted interest-only mortgages. Hence, it is not an effective way to reduce the macroeconomic risks associated with household debt.

The proportion of new mortgagors who are amortising increased from 67 per cent in 2015 to 78 per cent in 2016. Above all, it is those with LTV ratios in the 50–70 per cent interval that are now amortising in greater numbers, but those with LTV ratios greater than 70 per cent are also amortising to a somewhat greater extent than was the case previously (see Diagram 15).¹² The amortisation amounts have also increased since the requirement was introduced. The amortisation requirement has thus resulted in more mortgagors with high LTV ratios amortising, and they are amortising more.

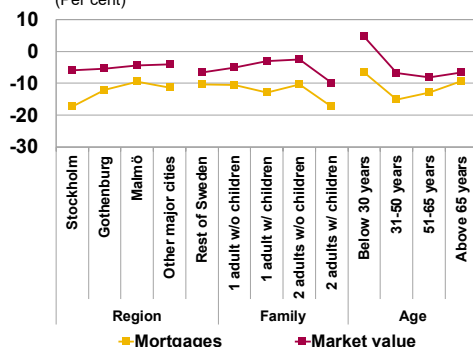
Before FI introduced the amortisation requirement, almost 60 per cent of new mortgagors did not amortise in accordance with the amortisation requirement's respective 1 and 2 per cent rates. It was primarily households in the metropolitan areas, families with children and households under the age of 50 that were affected by the amortisation requirement (see Diagram 16).

Finansinspektionen (2017a, 2018) shows that the amortisation requirement has resulted in households buying less expensive homes and borrowing less (see Diagram 17). The effect was greatest for new mortgagors in Stockholm and Gothenburg. This is probably due to house prices being highest in these cities and households there consequently taking out the largest loans. The more a household borrows, the greater the proportion of its disposable income must be used for amortisation payments each month. This reduces the household's potential to borrow via the banks' discretionary income calculations.

¹¹ See Andersen, et al. (2016).

¹² The reason why not all new mortgagors with LTV ratios of more than 50 per cent are amortising is that there are certain exceptions from the amortisation requirement, e.g. households that switch banks.

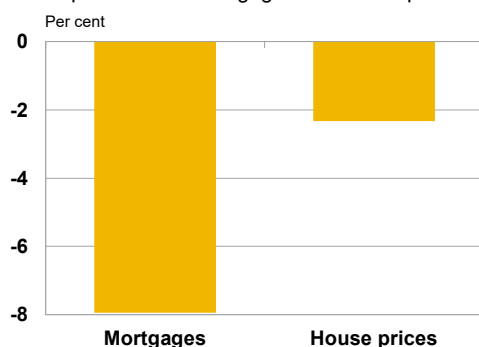
Diagram 17. Effects of the amortisation requirement, distributed by type of household (Per cent)



Källa: Source: Finansinspektionen (2017a)

Note: The graph shows how much less was borrowed by various groups of new mortgagors affected by the amortisation requirement and how much less expensive the homes they purchased were.

Diagram 18. Effects of the amortisation requirement on mortgages and house prices (Per cent)



Source: Finansinspektionen (2017a)

Note: The graph shows the extent to which the amortisation requirement has suppressed households' mortgage borrowing and house prices compared to a situation in which FI had not introduced the amortisation requirement

Before FI introduced the amortisation requirement, there was concern that younger first-time buyers would be hit especially hard. It is true that the amortisation requirement affected more younger households than older households, but it is above all households over the age of 30 that are borrowing less and buying less expensive homes following the introduction of the amortisation requirement. The youngest borrowers purchased homes that were roughly as expensive after the amortisation requirement was introduced but borrowed almost 10 per cent less (see Diagram 17).

For new mortgagors as a whole, the effect of the amortisation requirement was that households had to buy homes that were an average of just over 2 per cent less expensive compared to a situation in which FI had not introduced the amortisation requirement. At the same time, the requirement has suppressed households' mortgage borrowing by an average of about 8 per cent (see Diagram 18).

Analysis requirement: What explains the increase in consumption loans?

When FI introduced the mortgage cap in 2010, consumption loans started to increase rapidly. The same thing happened when FI introduced the first amortisation requirement in 2016. Van Santen (2017) argues that this could be due to households taking out unsecured loans in order to circumvent FI's macroprudential measures.

FI is currently collecting data from the market regarding consumption loans, and this data includes unsecured loans. The results are being presented in a report published in June 2018. As part of the work to survey the market for consumption loans, FI has collected both aggregate and detailed data. FI intends to continue analysing these data and to collect further data on consumption loans in order to analyse what explains the increase.

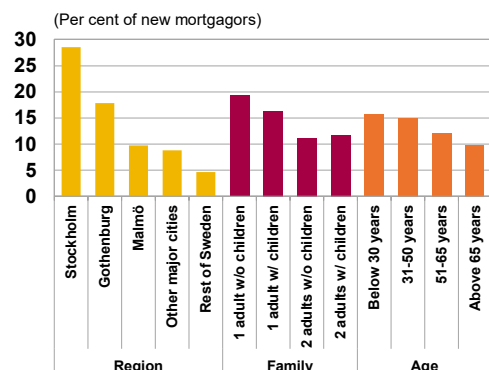
STRICTER AMORTISATION REQUIREMENT AFFECTS HIGH-LTI-RATIO HOUSEHOLDS

FI introduced the stricter amortisation requirement on 1 March 2018. The stricter requirement means that the households that take out mortgages in excess of 450 per cent of the household's gross income have to amortise 1 per cent each year, in addition to that which applies under the current amortisation requirement.

The purpose of the stricter amortisation requirement is to reduce the proportion of households taking out loans that are large in relation to their income. In turn, this reduces the risk of households being forced to sharply reduce their consumption in a financially stressed scenario.

FI has described the stricter amortisation requirement as an LTI brake. Within the EEA, five out of 31 countries have introduced some form of direct limitation of household LTI ratios, often in the form of LTI

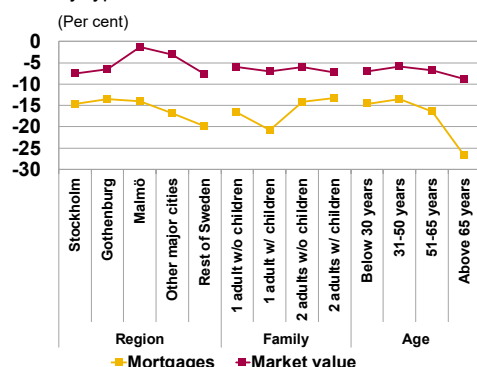
Diagram 19. Proportion of households that are expected to be affected by the stricter amortisation requirement, distributed by type of household



Source: Finansinspektionen (2017b)

Note: The graph shows the proportion of households, divided into different categories, that took out loans with a loan-to-income ratio in excess of 450 per cent, according to the mortgage data for 2016.

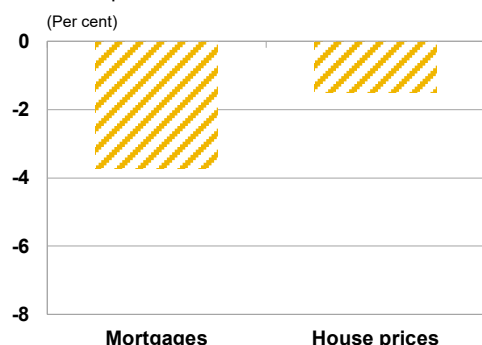
Diagram 20. The expected effects of the stricter amortisation requirement, distributed by type of household



Source: Finansinspektionen (2017b)

Note: The graph shows how much less various groups of new mortgagors affected by the mortgage cap are expected to borrow and how much less expensive the homes they are expected to buy are.

Diagram 21. Expected effects of the stricter amortisation requirement on mortgages and house prices



Source: Finansinspektionen (2017b)

limits.¹³ In addition, eight countries have introduced a cap on household debt service payments as a proportion of income.¹⁴

Analysis requirement: What effect did the stricter amortisation requirement have on household debt and house prices?

FI introduced the stricter amortisation requirement on 1 March 2018. FI intends to evaluate how much the stricter amortisation requirement suppressed household debt and house prices in conjunction with the mortgage report for 2019.

When FI decided to introduce the stricter amortisation requirement, just under 15 per cent of new mortgagors were expected to be encompassed by the requirement.¹⁵ According to the latest mortgage report, about 15 per cent of households still had an LTI ratio in excess of 450 per cent of disposable income (see Diagram 6).

Some households with high LTI ratios are already amortising in accordance with the stricter requirement. This is why FI expects that somewhat fewer households (approximately 14 per cent) will be affected and will need to borrow less or increase their amortisation payments as a result of the stricter amortisation requirement. The proportion of households being granted new loans with loan-to-income ratios of over 450 per cent of gross income is expected to decrease to 7 per cent (see Diagram 6). In particular, it is households in Stockholm and Gothenburg, single households and borrowers under the age of 50 that are expected to be affected by the stricter amortisation requirement (see Diagram 19). Households affected by the requirement are expected to borrow less and purchase less expensive homes, and the effect on those that are affected is expected to be greatest outside of the metropolitan areas, on single households and on the oldest borrowers (see Diagram 20).

All in all, the stricter amortisation requirement is expected to reduce households' mortgage borrowing by almost 4 per cent and lead to households purchasing homes that are an average of 1.5 per cent less expensive compared to a situation in which FI had not introduced the stricter amortisation requirement (see Diagram 21).

Analysis requirement: How does FI use its macroprudential measures in a crisis?

FI has implemented several measures in order to reduce the risks associated with household debt. But what does FI do with these

13 See ESRB (2018). Ireland, Norway and the UK have introduced loan-to-income limits, Sweden has introduced a loan-to-income brake through the stricter amortisation requirement. Denmark has introduced a stricter credit assessment for households with high loan-to-income ratios.

14 It is customary for a regulation pertaining to households' debt service ratios to be based on a fixed standardised interest rate. In such cases, this measure is comparable to a loan-to-income limit.

15 This statement is based on Finansinspektionen (2017b) and Finansinspektionen (2017d).

requirements if the risks materialise? And what indicators does FI have to monitor in order to assess when the risks are about to materialise?

The aim of the countercyclical capital buffer is to build up the banks' capital buffers so that they are able to withstand credit losses and continue arranging loans, even in economic downturns. When FI is deciding where to set the buffer value, it has to calculate a benchmark based on the growth in lending as a proportion of GDP. This indicator can show when risks are about to accumulate, but it is not useful for assessing whether FI has to reduce the countercyclical capital buffer. FI intends to develop such indicators.

The amortisation requirements contain a flexibility in that banks are able to grant borrowers a break in their amortisation payments for a limited period if there are specific grounds to do so. These may be situations in which the household's financial circumstances have deteriorated substantially, for example if someone in the household loses their job.

However, the macroeconomic risk associated with household debt pertains to households that are able to repay their loans. They are, nonetheless, forced or choose to cut back on other forms of consumption. If a large number of households act in this way, they can exacerbate an economic crisis so that it risks becoming a financial crisis. If such a scenario is about to materialise, it is doubtful whether the specified potential to take a break from amortisation is sufficient. FI may need to repeal the amortisation requirement so as to not exacerbate the recession. FI intends to develop indicators that show when such a macroeconomic risk is about to materialise and to clarify its view of the amortisation requirement in such a situation.

Alternatives to a stricter amortisation requirement

FI introduced the stricter amortisation requirement in order to further increase the resilience of the most highly leveraged households. It would have been possible to achieve an equally large suppression of new lending or reduction in the proportion of households with a high LTI ratio using other measures. A reduced mortgage cap would have hit the youngest households hard. It would probably also have contributed to an even more rapid increase in unsecured lending. An LTI limit could have distorted competition in the mortgage market and would also have risked a further increase in unsecured lending. The capital requirements would have needed to be raised to an unreasonable level in order to decrease the risks associated with household debt.

Table 2. Alternatives to a stricter amortisation requirement
(Per cent)

Regulation	Limit	Affected	LTI > 450
Stricter amortisation requirement	450	14.1	7
Reduced mortgage cap	75.4	38	13
DTI limit	557	4.6	14
LTI limit	492	9.4	14
Higher capital requirements			
-Risk weight floor for mortgages	50	100	13
-Countercyclical capital buffer	20	100	13

Source: Finansinspektionen

Note: The alternative regulations are calibrated so that new lending in autumn 2016 would have been suppressed by 3.72 per cent. The table shows the calibration of each regulation and the percentage of borrowers that would be affected. The last column shows the proportion of households that would take out loans in excess of 450 per cent of gross income if the regulation had been introduced in autumn 2016.

The purpose of the stricter amortisation requirement is to reduce the proportion of households taking out loans that are large in relation to their income. A measure is most effective and entails the lowest risk of distortions if it directly targets the problem, in this case household debt. This means that an LTI limit or stricter amortisation requirement for households with a high LTI ratio, for example, should be a more effective means of tackling high LTI ratios than, for example, a reduction in the mortgage cap.

The stricter amortisation requirement is expected to lead to new lending being suppressed by almost 4 per cent and to the proportion of households taking out loans with an LTI ratio in excess of 4.5 times their gross income decreasing from 15 to 7 per cent. The alternative measures studied here are calibrated so that they also suppress new lending by almost 4 per cent.

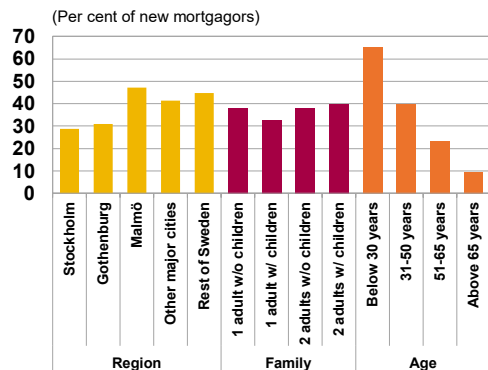
A REDUCED MORTGAGE CAP PRIMARILY AFFECTS YOUNG PEOPLE

In order to suppress new lending by 4 per cent, the mortgage cap would, according to FI's calculations, need to be reduced from 85 to approximately 75 per cent.¹⁶ That would affect 38 per cent of new mortgagors, which can be compared to the stricter amortisation requirement that is expected to affect about 15 per cent of new mortgagors. The proportion of households with an LTI ratio in excess of 4.5 times gross income decreases from 15 to 13 per cent (see Table 2).

The mortgage cap therefore needs to affect more households in order to achieve the same suppressant effect on new lending. In order to understand why, we can study a household that wants to borrow 85 per cent of the value of the home and has an LTI ratio of more than 450 per cent. If the mortgage cap is reduced, the household can instead take out an unsecured loan. This would increase the

¹⁶ The calculations are based on the elasticity in footnote 6.

Diagram 22. Proportion of households that are expected to be affected by a reduced mortgage cap, distributed by type of household



Source: Finansinspektionen

household's debt service payments (interest and amortisation) since the unsecured loan is associated with higher interest rates and larger amortisation payments. The household is therefore expected to borrow a little less if the mortgage cap is reduced. However, the increased amortisation payments and the higher interest rate only affects the smaller unsecured loan. With a stricter amortisation requirement, the household must increase its amortisation payments by 1 per cent of the entire mortgage. This has a major impact on the household's debt service payments. The mortgage cap therefore needs to affect more households in order to suppress new lending by as much as the stricter amortisation requirement is expected to.

A reduced mortgage cap would have primarily affected households outside of Stockholm and Gothenburg. This is because the LTV ratio is higher there. It would also have affected the youngest borrowers to a large extent; almost 70 per cent of the youngest borrowers would have been affected by a reduced mortgage cap (see Diagram 22). It would have risked making young people's entry into the housing market more difficult.

Since the mortgage cap only encompasses loans collateralised by the home, households that want to borrow more than the mortgage cap allows can take out unsecured loans. A reduction in the mortgage cap therefore risks leading to a further increase in unsecured lending.

Reducing the mortgage cap to 75 per cent would also not have decreased the proportion of households with a high LTI ratio to any particularly great extent. In order to reduce the proportion of households with a high LTI ratio by as much as the stricter amortisation requirement, the mortgage cap would need to have been reduced even more, but the effects of this on new lending, house prices and unsecured loans would also have been larger.

LOAN-TO-INCOME LIMITS ENTAIL SEVERE INTERVENTIONS FOR THOSE AFFECTED

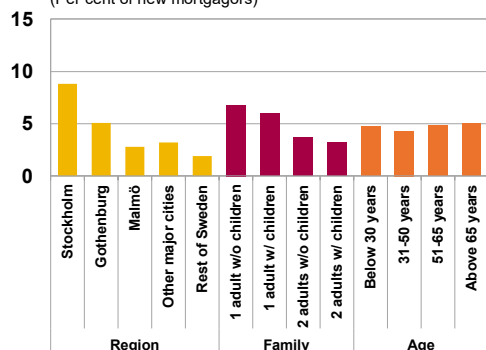
Loan-to-income limits – a limit on household debt as a proportion of income – can be structured in various ways. They can apply to total household debt (debt-to-income, DTI) or only to mortgages (loan-to-income, LTI). They can also be structured with or without the potential for banks to grant loans that exceed the limit. From an international perspective, LTI limits are the most common and they are often structured in a way that allows the bank to grant a certain proportion of new loans with a loan-to-income ratio in excess of the limit.¹⁷ One reason why LTI limits are more common than DTI limits is that a limit on total household debt requires there to be a loan register where all of households' loans are registered.

FI has previously analysed the macroeconomic effects of different loan-to-income limits.¹⁸ A DTI limit that allows banks to grant loans that exceed the limit affects Swedish banks differently, depending on the bank. Banks with a large proportion of customers in metropolitan areas, and thus also a large number of borrowers with high loan-to-

¹⁷ In the UK, for example, the LTI limit allows for a maximum of 15 per cent of new mortgages to have an LTI that is greater than 450 per cent of the household's gross income. Ireland has also introduced an LTI limit with potential exemptions such as this.

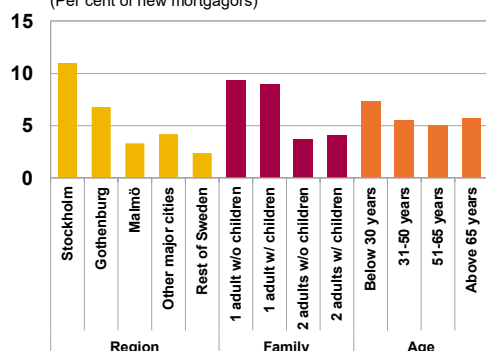
¹⁸ See Finansinspektionen (2016a).

Diagram 23. Proportion of households expected to be affected by a DTI limit of 550 per cent, distributed by type of household
(Per cent of new mortgagors)



Source: Finansinspektionen

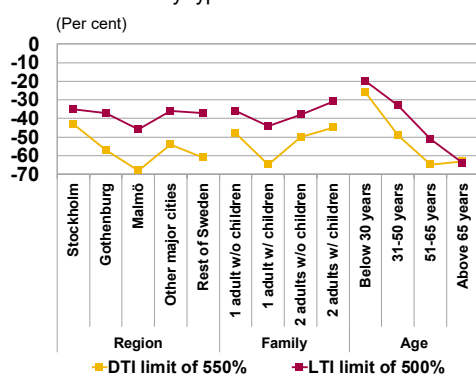
Diagram 24. Proportion of households expected to be affected by an LTI limit of 500 per cent, distributed by type of household
(Per cent of new mortgagors)



Source: Finansinspektionen

Note: The graph shows how much less various groups of new mortgagors affected by loan-to-income limits are expected to borrow.

Diagram 25. The loan-to-income limits' expected effects on household debt, distributed by type of household
(Per cent)



Source: Finansinspektionen

Note: The graph shows how much less various groups of new mortgagors affected by loan-to-income limits are expected to borrow.

income ratios, would be affected more than other banks. This could result in banks that have a large number of customers in metropolitan areas being forced to say no to certain customers because they had already reached the limit of the number of loans that can exceed the limit. These customers may then instead turn to banks with a more geographically diverse customer base, which still have exemptions to grant. Consequently, a flexible limit such as this for total household debt risks distorting competition between the banks.

We are therefore focusing here only on hard loan-to-income limits (DTI and LTI limits), i.e. regulations that do not allow banks to issue loans that result in a loan-to-income ratio in excess of the limit. As a household, regardless of lender, cannot borrow more than the hard loan-to-income limit, such regulations have no distorting effects on competition in the mortgage market.

The difference between the two regulations is that a DTI limit restricts households' total borrowing, while an LTI limit only limits households' mortgage borrowing. If the household wants to borrow in excess of the LTI limit, it can, as is the case with the mortgage cap, take out unsecured loans. The DTI limit is therefore a stricter regulation than the LTI limit. In order to suppress new lending by 4 per cent, the DTI limit needs to be set at approximately 550 per cent of gross income, while the LTI limit need to be set at approximately 500 per cent of gross income. The respective loan-to-income limits then affect approximately 5 and 9 per cent of new mortgagors. The proportion of households with loan-to-income ratios in excess of 4.5 times gross income is suppressed from 15 to 14 per cent (see Table 2).¹⁹

The loan-to-income limits affect more or less the same households as the stricter amortisation requirement. It is primarily households in Stockholm and Gothenburg that are affected (see Diagrams 23–24). However, the households affected by the regulation may need to reduce their borrowing greatly. For example, a DTI limit of 550 per cent of gross income would result in the 2–3 per cent of households in Malmö that are affected by the cap borrowing 70 per cent less on average (see Diagram 25).

An LTI limit only encompasses loans collateralised by a home. Households that want to borrow more than the loan-to-income limit can thus take out unsecured loans in the same way as with the mortgage cap. Consequently, an LTI limit also risks resulting in a further increase in unsecured lending.

All in all, FI could have achieved the same suppression in new lending by introducing a loan-to-income limit instead of a stricter amortisation requirement. However, the loan-to-income limit would have needed to be set fairly low in order to reduce the proportion of households with high loan-to-income ratios and would therefore be a more severe intervention into households' finances. Furthermore, loan-to-income limits have large effects on those households that are affected as it sets

¹⁹ The calculations here are based on households that want to borrow more than the DTI limit allows borrowing the maximum allowed under the limit. Those who want to borrow more than the LTI limit take out a mortgage that is the maximum allowed under the limit. The remainder is taken out in the form of unsecured loans at the same time as they reduce their total debt in accordance with the elasticity in footnote 5.

an absolute limit on how much the household is allowed to borrow. A stricter amortisation requirement is a milder form of regulation for suppressing the proportion of households with a high loan-to-income ratio; they are still allowed to borrow more than 450 per cent of gross income, but they must amortise 1 per cent more of the loan.

CAPITAL REQUIREMENTS INEFFECTIVE FOR REDUCING MACROECONOMIC RISKS

Higher capital requirements may also suppress new lending as mortgage rates rise along with the capital requirements. In order to suppress new lending by 4 per cent, i.e. the same result as is expected of the stricter amortisation requirement, mortgage rates would have needed to rise by about 50 basis points.²⁰ In which case, the proportion of households with a loan-to-income ratio in excess of 4.5 times gross income decreases from 15 to 13 per cent (see Table 2).

FI's calculations suggests that an increase in the risk weight floor for mortgages from 25 to approximately 50 per cent would have achieved just such an increase in the mortgage rate. But that option is not realistic. Risk weights for lending to non-financial firms are significantly lower. Consequently, an increase in the risk weight floor for mortgages to 50 per cent would have created an incentive for banks to reduce their relatively low-risk lending to households and instead lend more to higher risk businesses. Furthermore, an increase of this nature in the risk weight floor is the equivalent of a total of almost SEK 100bn for the four major Swedish banks. An increase in the capital requirement of that size could have resulted in significant effects on the banks' business models. For example, the banks could have been forced to completely stop granting mortgages or to move their operations abroad.

Another option for achieving an interest rate rise of 50 basis points would have been to increase the countercyclical capital buffer to about 20 per cent, which is the equivalent of just over SEK 350bn in additional capital.²¹ An increase in the capital requirement of that size would have had even more dramatic effects on the banks' business models. In addition, the rules for reciprocity²² of the countercyclical capital buffer only apply up to a level of 2.5 per cent. Raising the countercyclical capital buffer to 20 per cent would therefore also have potentially severely distorted competition in the mortgage market, to the advantage of foreign banks. It therefore appears to be an even less realistic alternative to the stricter amortisation requirement.

These calculations are approximate and depend on uncertain assumptions, but they do reinforce the view that high capital

20 This calculation is based on the elasticity in footnote 6.

21 The fact that the countercyclical capital buffer has a smaller effect on mortgage rates than the risk weight floor for mortgages is because the countercyclical capital buffer affects all of the bank's Swedish exposures. The costs of holding equity is assumed in FI's calculations to be divided between the exposures that draw capital. This means that an increase in the countercyclical capital buffer results in interest rates for both households and non-financial firms rising, while the risk weight floor for mortgages only affects the mortgage rate.

22 Reciprocity means that if FI introduces a countercyclical capital buffer of two per cent for Swedish banks, the foreign supervisory authorities need to ensure that foreign banks that operate in Sweden also hold a countercyclical capital buffer of two per cent for their Swedish operations.

requirements are not effective means of suppressing the macroeconomic risks associated with high levels of household debt. Instead, measures that more directly target households' demand for loans are more effective.²³

²³ See Braconier and Palmqvist (2017) for more on this.

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