ARTICLE – Household indebtedness and interest rate sensitivity

Household indebtedness is high and has been rising for a long time. As most loans are taken out at a variable rate, households' interest expenditure would increase rapidly if interest rates started to increase. This article shows that highly indebted households are more sensitive to rising interest rates than other households. It also examines by how much interest expenditure is calculated to rise if interest rates increase. The analysis shows that interest expenditure will remain on a low level for most households if rates increase by 1 percentage point. Sharper increases, on the other hand, could lead to major consequences for financial and macroeconomic stability. If household indebtedness continues to increase more rapidly than incomes, households will become increasingly sensitive to economic downturns as well as disruptions in their private finances. It is therefore important to increase households' resilience.

High household indebtedness creates vulnerabilities

Over the last ten years, households' nominal debts have doubled and currently amount to almost SEK 4,000 billion. 260,000 households have an indebtedness that exceeds 600 per cent of their disposable income. A high and rising level of household indebtedness constitutes a risk to financial and macroeconomic stability in Sweden. Rising indebtedness among households also increases the likelihood of economic downturns and financial crises, and amplifies their length and intensity.[56]

When interest rates rise, households with higher debt-to-income ratios cut down on their consumption more than households with lower debt.[57] Since Swedish households are more indebted than ever before, the risk that household consumption will decrease when interest rates increase is also greater than ever.

Several factors driving the build-up of debt

A number of factors have contributed to the increase in household indebtedness over time. As the household debt is mainly made up of mortgages, it is closely connected to how housing prices have developed. Over the last 20 years, single-family house prices have tripled. Prices of tenant-owned apartments have increased at an even faster rate. These price rises are due to a high demand for housing, which in turn is a consequence of an increase in both the population and incomes, while structural factors have contributed to limiting supply (see Chapters 2 and 3). Tax relief on interest expenditure, the abolition of property tax and the increased proportion of the population now owning their own homes are other factors that could explain why private indebtedness has increased.[58]

Interest rates are low now ...

Another important reason why indebtedness has increased and continues to do so is the low level of interest rates. Nominal and real interest rates have fallen worldwide over the last 20 years and household mortgage rates are very low from a historical perspective.[59]Currently, about 2.5 per cent of disposable household income goes to interest expenses. This share has been falling since 2012, despite debt increasing faster than incomes.

An obvious risk associated with low interest rates is that households might not take into account that interest rates might be much higher in the future. If households expect low rates to last for a very long time, they may end up borrowing too much in relation to their income. This may lead to a reduction in consumption if expenditure for mortgages rises sharply in relation to incomes.

The National Institute of Economic Research's survey shows that households expect mortgage rates to rise in the years ahead.[60] The extent to which households consider these expectations when they decide to borrow is uncertain, however. Interest rate expectations also seem to be backward-looking. During 2010, when rates rose, households' expectations of the future mortgage rate were lower than the actual average mortgage rate (see Chart B1).

[56] Schularick, M. and Taylor, A.M. (2009), Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870–2008. *American Economic Review* 102(2), and Mian, A., Sufi, A. and Verner, E. (2017), Household debt and business cycles worldwide. *Quarterly Journal of Economics*.

[57] Flodén, M., Kilström, M., Sigurdsson, J., och Vestman, R. (2017), Household debt and monetary policy: revealing the cash-flow channel. *Riksbank Working Paper* No. 342, september 2017. Sveriges Riksbank.

[58] Hansen, S. (2013), Explanations of the development of household indebtedness since the mid-1990s, *PM 1*. Finansinspektionen.

[59] See The long-term repo rate. Article in *Monetary Policy Report*, February 2017. Sveriges Riksbank.

[60] Hjalmarsson, E. and Österholm, P. (2017), Households' mortgage rate expectations – more realistic than at first glance? *Economic Review*, November 2017, Sveriges Riksbank, and Österholm, P. (2017), Are household expectations of future mortgage rates realistic?, *Ekonomisk Debatt* 45, no. 5.

Chart B1. Household expectations of the mortgage rate
Per cent

Note. The average mortgage rate refers to the realised mortgage rate one year after the question was asked.

Sources: The National Institute of Economic Research and Statistics Sweden

... but are expected to rise

In the Riksbank's main scenario in the latest Monetary Policy Report, the repo rate is expected to rise by about 1 percentage point up until 2020. Increased rates are quickly passed on to borrowers as almost 70 per cent of all loans are variable-rate.

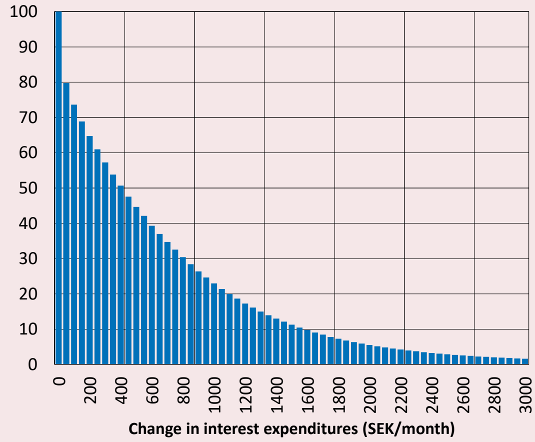
However, household interest rates can increase much more, or much quicker, than in the main scenario. If shocks occur on the financial markets, or if investor confidence in Swedish banks is undermined, in the event of a sharp fall in housing prices for example, this may lead to banks' funding and ultimately household borrowing becoming much more expensive.

With this in mind, the analysis in this article assumes not only a rate increase of 1 percentage point but also a greater rate rise of 5 percentage points. Such an increase would bring the rate into parity with interest rates from 2008.

Households' interest expenses when rates rise

Based on household debt level data,[61] it can be shown how much interest expenses would increase if rates go up, all other factors being equal. Chart B2 shows the share of indebted households that would have unchanged or up to SEK 3,000 higher interest expenses if rates increased by one percentage point. The chart shows that if the rate increases by 1 percentage point, interest expenses rise by at least SEK 400 per month for 50 per cent of indebted households. But there are major differences: for 11 per cent of the households (about 300,000 households) included in this data, interest expenses would increase by at least SEK 1,500.

Chart B2. Additional interest expenses, when the interest rate increases by 1 percentage point.
Percentage of indebted households



Note. The amounts have been adjusted for tax relief on interest payments. The chart is designed so that it possible to see the share of indebted households that would see their interest expenses increase by at least the figure given on the x-axis. This data does not included the interest rate level or interest-rate fixation period chosen by the household. For simplicity's sake, it is assumed that the interest rate for all households increases by 1 percentage point.

Source: The Riksbank.

Table B1 shows the debt service (interest and amortisation) payments for three household categories: households with a median debt of around SEK 700,000, households with a debt level of around SEK 1.6 million (75th percentile) and highly indebted households with a debt of SEK 3.5 million (95th percentile).

When calculating debt service payments, it is assumed that the actual interest rate is 2 per cent and that the household pays off its loans over 40 years.[62] Based on these assumptions, the three household categories currently pay SEK 2,275, SEK 5,200 and SEK 11,375 per month. If the debt is held constant, a 1 percentage point increase in the interest rate leads to a 50-per cent rise in households' interest expenses. This would mean that debt service payments in total would amount to between SEK 2,683 and SEK 13,417 per month. In the alternative scenario where the interest rate rises by 5 percentage points, debt service almost doubles.

[61] This data is from the eight largest banks in Sweden. See Blom, K. and van Santen, P (2017), Household indebtedness in Sweden – update for 2017, *Economic Commentaries* No. 6. Sveriges Riksbank.

[62] The median number of years until mortgage is repaid is about 40 years.

Table B1. Mortgage payments for three household categories
SEK per month

Debt level	50th percentile (median)	75th percentile	95th percentile
Debt	700,000	1,600,000	3,500,000
Interest payments	817	1,867	4,083
Amortisation	1,458	3,333	7,292
Mortgage payment	2,275	5,200	11,375
Scenario			
Mortgage payment (+1%)	2,683	6,133	13,417
Mortgage payment (+5 %)	4,317	9,867	21,583

Note. The interest rate is assumed to be 2 per cent. Remaining amortisation period set at 40 years. All amounts given in Swedish kronor per month and adjusted for tax relief on interest payments.

Source: The Riksbank

The rise in household debt in recent years has made households more sensitive to interest-rate changes. Table B2 shows interest payments for a typical housing purchase in 2004 and 2016. Households who, during this period, bought an averagely priced home financed by means of a mortgage with an average loan-to-value ratio at the average current interest rate have approximately the same interest expenses. This is true for both the Stockholm region as well as for the country as a whole. This is explained by the fact that the interest rate has fallen during this period. However, those who bought a home in 2016 are significantly more sensitive to rising rates than those who bought in 2004. If the rate is increased by 1 percentage point, monthly payments rise by about SEK 1,100 on average for those who bought a home in 2016 in Sweden, and by SEK 2,200 if the home was bought in Stockholm. This amounts to more than a doubling compared with the increase for those who bought a home in 2004, when the average indebtedness was much lower. The increased sensitivity is obviously even clearer in the alternative scenario, where interest payments rise by 5 percentage points (see Table B2).

Table B2. Interest payments for a typical housing purchase
SEK per month

Region	Sweden		Greater Stockholm	
Year	2004	2016	2004	2016
Housing price (SEK million)	1.34	2.77	2.58	5.58
Loan-to-value ratio (%)	62	69	62	69
Debt (SEK million)	0.83	1.91	1.60	3.85
Interest rate (%)	3.7	1.6	3.7	1.6
Interest payments	1,793	1,784	3,452	3,594
Scenario				
Interest payments (+1 %)	2,278	2,899	4,386	5,839
Interest payments (+5 %)	4,216	7,359	8,118	14,823

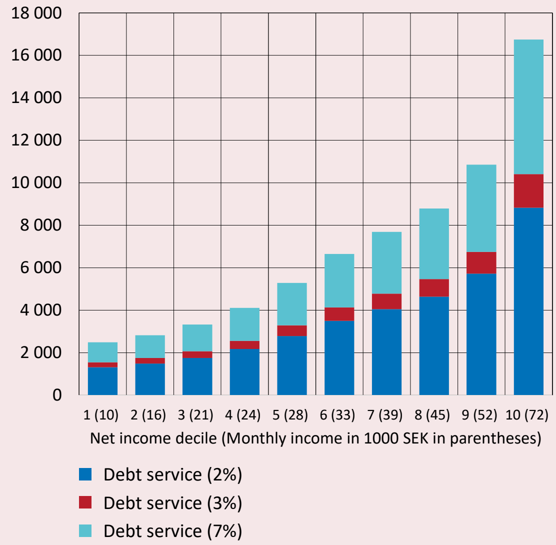
Note. The amounts have been adjusted for tax relief on interest payments. The table does not include amortisation payments.

Sources: Finansinspektionen, Statistics Sweden and the Riksbank

With rising interest rates, debt service increases the most for high-income households

To be able to assess the consequences of rising interest rates, household income must also be considered in the analysis. Chart B3 shows debt service amounts at different interest rate levels for different income groups.[63] The debt service payment for the highest income group amounts to just over SEK 16,000 per month when the interest rate is 7 per cent. This means that debt service payments would comprise about 20 per cent of disposable income for the highest income group. For those with the lowest incomes, the proportion of disposable income going to mortgage payments will be about the same as for those with the highest incomes. The corresponding figure for other groups is between 15 and 20 per cent.

Chart B3. Mortgage payments in different income decile groups
SEK per month



Note. Mortgage payments are calculated with an interest rate of 2, 3 and 7 per cent. Amortisation period set at 40 years. Interest expenses adjusted for tax relief.

Source: The Riksbank.

In addition to debt service payments, households also have other housing-related expenses, including insurance and maintenance costs and housing association fees. As housing associations are also indebted, annual fees may need to be increased if interest rates rise (see Chapter 2).

Consumption can decrease when interest rates rise

As described above, rising interest rates will lead to an increase in households' debt servicing expenditure. This is particularly true when interest rates are at a low level

[63] The result for income group 1 should be interpreted with a certain amount of caution as this group includes households with highly varying incomes. Neither can this analysis take account of tax-free sources of income such as child or housing allowances, which form important sources of income for households in income group 1.

(when even small changes in interest rate levels imply a high growth rate of for interest expenditure) and debt-to-income ratios are high.[64] The combination of low interest rates and rising indebtedness therefore makes Swedish households sensitive to changes in the interest rate.

It is primarily highly indebted households who are exposed to greater risks when interest expense rises rapidly and who consequently may need to reduce their consumption. The increased debt servicing expenditures in the main scenario are, however, relatively small for most households. In the event of larger interest rate increases, however, debt service payments may rise sharply for all groups, with potentially severe consequences for macroeconomic and financial stability.

The effect of rising interest rates on consumption also depends on how housing prices develop. The forecast in the Riksbank's latest Monetary Policy Report is that the growth rate in housing prices will slowdown.[65] A situation in which housing prices fall more than in this scenario, at the same time as interest rates increase, could lead to a reduction of consumption. Consumption could also decline even if there is no direct decrease in housing prices, and even if interest rates would not increase faster than in the Riksbank's main scenario, especially if expectations of future housing prices and interest rates change.

Several factors can dampen the effects on consumption

There are also factors that can counteract the effects of interest rate increases on consumption. Certain households will, for example, be able to compensate for rising debt servicing payments by reducing their saving. Household savings are currently on an historically high level. These high savings could serve as a cushion for adverse changes in the households' economic situation, such as higher interest expenditure or unemployment. There is no information on how assets and savings are distributed among households, however, and it is therefore not clear how much savings the most indebted households have. There are indications, however, that households with high debts in relation to their incomes have relatively small liquid assets in relation to their incomes. These households will probably have to reduce their consumption if interest expenses increase heavily.[66]

Household indebtedness will have consequences for economic decision-making

Higher indebtedness has made households sensitive to rising interest rates. If indebtedness continues to increase more rapidly than incomes, households will become increasingly sensitive to economic downturns as well as disruptions in their private finances. It is therefore important to increase resilience in the household sector.

Furthermore, the increased interest-rate sensitivity of households may have consequences for economic policy in several areas. With increased indebtedness and interest-rate sensitivity, it follows that a change to the Riksbank's policy rate would have a greater effect on households' debt service payments and thereby on their scope for consumption. This implies a strengthening of the effects of monetary policy on inflation.[67] Household interest rate sensitivity also means that conditions for conducting fiscal policy may change, influencing the impact and effectiveness of fiscal policy.

[64] In a low-interest rate environment, the growth rate of interest expenses will be high, even when only small changes in the rate level occur. When the interest rate rises from, for example, 2 to 3 per cent, it means a 50-per cent increase in interest expenses. If incomes don't rise by 50 per cent as well, the debt service ratio will increase. The income growth needed to keep the debt service ratio constant is much lower if interest rates were to rise from 5 to 6 per cent that is a 20-per cent increase in interest expenses.

[65] Is activity in the Swedish economy too high? Article in *Monetary Policy Report* October 2017. Sveriges Riksbank.

[66] Se Flodén, M., Kilström, M., Sigurdsson, J., och Vestman, R. (2017), Household debt and monetary policy: revealing the cash-flow channel. *Riksbank Working Paper* No. 342, September 2017. Sveriges Riksbank.

[67] Finocchiaro, D., Jonsson, M., Nilsson, C. and Strid, I. (2016), Socioeconomic effects of reducing household indebtedness. *Economic Review*, 2016:2. Sveriges Riksbank.