ARTICLE – How are households affected by rising interest rates?

The fact that households' debt has increased and that their loans, to a greater extent, have short interest-rate fixation periods means that the effects of monetary policy on household consumption are greater than before. One reason for this is that households' borrowing costs are affected by interest rate adjustments to a greater extent. The direct effect on households' interest expenditure and interest income of the Riksbank increasing the repo rate over the next three years in line with the forecast, i.e. by 1.25 percentage points, will reduce disposable household income by just over 1 per cent. This is expected, in itself, to have relatively limited effects on total household consumption over the next three years. But highly indebted households can be affected significantly more than other households. In the event higher interest rates subdue housing prices, households' loan-to-value ratios can also rise, which may make it more difficult to consume with the help of extended mortgages. The higher interest rate sensitivity among households indicates in itself that the repo rate should be raised at a slow pace. However, the speed at which it is appropriate to increase the repo rate going forward is determined by economic prospects in general and the forecast for inflation and not just by households' interest rate sensitivity.

Households' rising indebtedness, combined with an increasing proportion of mortgages with short interest-rate fixation periods, has raised the question of how households will be affected by rising interest rates. One argument that is sometimes made is that indebted households' interest payments would rise sharply, with major repercussions on demand in the economy. This could impede the Riksbank's scope for raising the repo rate, even if this would be justifiable on the basis of inflation and economic prospects.

This article aims to investigate how disposable household income would be affected by rising interest rates and the effects this could have on their consumption.[15] Interest rates are assumed to rise in line with the Riksbank's forecast, meaning that the repo rate will be raised from −0.5 per cent to 0.75 per cent by the end of 2020.

Why have households become more interest-rate sensitive?

According to economic theory, changes in the real interest rate affect consumption by changing the balance between household consumption today and household consumption in the future. Monetary policy determines the level of the short-term nominal interest rate and affects the real interest rate for a limited period, as prices are sluggish.

But the interest rate can affect household consumption via other channels as well. For example, more recent research has studied how indebtedness among households can influence the effects. One common feature of this research is that borrowers and savers behave differently, for example because borrowers have limited access to credit. Household consumption is thus affected to a greater degree by housing prices and current disposable income.

The effect of monetary policy on consumption can be amplified when indebtedness is high

As the repo rate affects housing prices, it can also affect the scope of households for taking loans with housing as collateral. The borrowing constraints faced by households may become more binding if housing prices fall, impairing their possibilities for consumption. This effect is usually called the **housing collateral effect**.[16] If households are highly indebted, this effect will be greater.[17]

One further reason why monetary policy affects household consumption is that adjustments to the policy rate have an impact on households' interest payments and disposable income. This is usually called monetary policy's **cashflow channel**. This channel is also amplified if households are highly indebted and have short interest-rate fixation periods on their mortgages.

One objection in principle to the cashflow channel is that lenders' interest income should increase just as much as borrowers' interest expenditure when the policy rate is raised. But if borrowers' propensity to consume differs from that of lenders, this transfer of income may have aggregate effects on consumption. More recent research has attempted

[15] For a more detailed description, see P. Gustafsson, M. Hesselman, and B. Lagerwall. "How are household cashflows and consumption affected by higher interest rates?", *Staff Memo*, Sveriges Riksbank, 2017. For a description of how various household groups' interest payments are affected by rising interest rates, see the article "Household indebtedness and interest-rate sensitivity" in the Financial Stability Report 2017:2, Sveriges Riksbank.

[16] See Walentin, K. (2014), "Housing Collateral and the Monetary Transmission Mechanism," Scandinavian Journal of Economics, pp. 635-668, 2016.

[17] See D. Finocchiaro, M. Jonsson, C. Nilsson and I. Strid, "Socioeconomic effects of reducing household indebtedness", Economic Review 2016:2, Sveriges Riksbank.

to map such differences between different households' consumption decisions when the interest rate is adjusted, to highlight the significance of the cashflow channel. One result is that, regarding their consumption, highly indebted households with variable-rate mortgages react relatively more to interest rate adjustments than other households do, which can be interpreted as support for the significance of the cashflow channel.[18] There are two feasible explanations for why the cashflow effect can be greater for highly indebted households with variable-rate mortgages. Firstly, the effect on disposable income of a given interest rate adjustment will be greater. Secondly, highly indebted households react more to changes in income than less indebted households. An explanation for this might be that highly indebted households have, or run the risk of having, limited access to credit.[19]

Cashflow effects subdue household income

Disposable household income can be defined in simple terms as follows:

Disposable income ≈ wages + transfer payments + ***interest income*** *+ other capital income* ***– interest expenditure*** *– taxes*

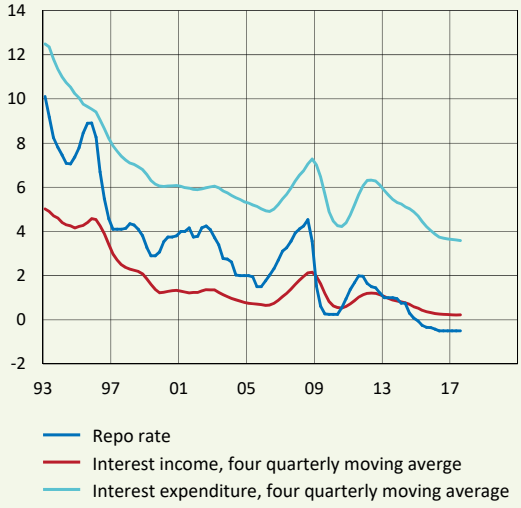
The Riksbank's repo rate path indicates that the rate will rise by 1.25 percentage points over the next three years. This will entail increased interest expenditure and reduced disposable income for borrowers. In a corresponding manner, the rate rise will entail increased interest income and increased disposable income for lenders.

We discuss here the effects on disposable household income in terms of direct effects on interest income and interest expenditure. The effects of rising interest rates on other household income, for example wages and other capital income, are disregarded.

Historically, interest income and interest expenditure have covaried with changes in the repo rate, but households' interest expenditure is higher than their interest income (see Figure 1.14). This is partly because households' debts are greater than their bank deposits, and partly because lending rates are higher than deposit rates. If the rise in deposit and lending rates is the same, interest expenditure can be expected to rise more than interest income – and total disposable income can be expected to fall.[20] Over the next few years, this effect is expected be amplified by deposit rates rising more slowly than the repo rate.[21] This is because household deposit rates have not followed the repo rate below zero (see Figure 2:8). Consequently, the deposit rate is not expected to rise as long as the repo rate is negative or just over zero.

Figure 1:14. The repo rate, household's interest expenditure and interest income

Per cent and percentage of disposable income respectively



Note. Interest income and expenditures are calculated before taxes and are not corrected for FISIM.

Sources: Statistics Sweden and the Riksbank

One way of calculating the direct effects on disposable household income is to use data from the Financial Accounts. The advantage is that it is possible to calculate both interest income and interest expenditure after tax. Such a calculation shows that the increase of households' interest expenditure, when the repo rate rises by 1.25 percentage points, will reduce disposable income by 1.6 per cent, while increased interest income will raise it by 0.3 per cent. All in all, the cashflow effect means that, all other factors being equal, disposable household income will be reduced by around 1.2 per cent.

A corresponding calculation using data from the mid-1990s, when household indebtedness was about half its current level, indicates that the effect at that time was much less. In this sense, households' interest-rate sensitivity via the cashflow effect has therefore increased over time.[22]

An alternative approach is to use the Riksbank's data on individual households' debts.[23] This data material lacks

[18] See, for instance, M. Flodén, M. Kilström, J. Sigurdsson and R. Vestman, "Household Debt and Monetary Policy: Revealing the Cash-Flow Channel", Working Paper no. 342, 2017, Sveriges Riksbank, 2017, J. Cloyne, C. Ferreira, and P. Surico, "Monetary Policy When Households Have Debt: New Evidence on the Transmission Mechanism", Bank of England Staff Working Paper No. 589, 2016, G. La Clava, H. Hughson, and G. Kaplan, "The Household cashflow Channel of Monetary Policy", Reserve Bank of Australia Research Discussion Paper 2016-12, 2016, and M. Di Maggio, A. Kermani, B.J. Keys, T. Piskorski, R. Ramcharan, A. Seru and V. Yao, "Interest Rate Pass-Through: Mortgage Rates, Household Consumption, and Voluntary Deleveraging", *American Economic Review* 107(11), pp. 3550–3588, 2017.

[19] See, for instance, S. R Baker, "Debt and the Response to Household Income Shocks: Validation and Application of Linked Financial Account Data", under publication in *Journal of Political Economy*, 2017.

[20] See article in Konjunkturläget, October 2017, pp. 27–28, National Institute of Economic Research.

[21] However, the difference between the lending rates and the repo rate is assumed to be constant, regardless of interest fixation period.

[22] See P. Gustafsson, M. Hesselman, and B. Lagerwall, "How household cashflows and consumption are affected by higher interest rates?", *Staff Memo*, Sveriges Riksbank, 2017.

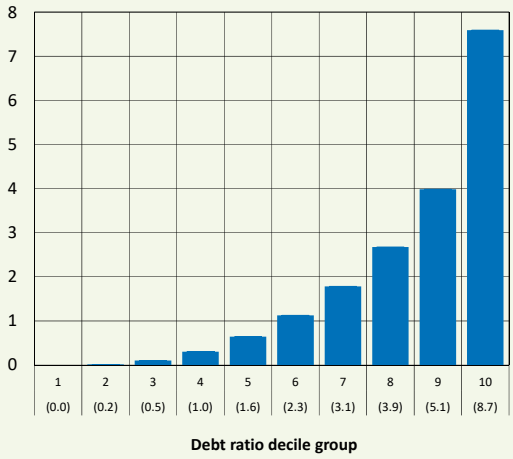
[23] This data comes from the eight largest banks in Sweden and covers about 75 per cent of total household debt according to the Financial Accounts. See van K. Blom and P. van Santen (2017), "Household indebtedness in Sweden – update for 2017", *Economic Commentaries* No. 6. Sveriges Riksbank.

information on households' assets, and hence their interest income, but does provide information on how households with varying levels of indebtedness are affected by rising interest rates.

There are major differences in cashflows between households. Figure 1:15 shows that, for households with debt-to-income ratios over 300 per cent, i.e. deciles 8-10, this may be a question of effects of between just below 3 and just over 7 per cent of disposable income.

Figure 1:15. Cashflow effect for groups of households with different debt-to-income ratios when the rate rises by 1.25 percentage points

Percentage change in d income after tax in per cent



Note: The cashflow effect refers to the average for the respective decile group. The average debt-to-income ratio is stated in brackets.

Source: The Riksbank

Differences among households in propensity to consume

The effect a change in disposable income has on consumption depends on what assumptions are made about propensity to consume, i.e. how much consumption changes in the event of a given change in income. The effect also depends on the varying effect on household consumption of increased interest income and interest expenditure. The maximum effect arises if increased interest income is completely saved, while increased interest expenditure results in an equally large decrease in consumption. In this case, household consumption will be subdued by 1.7 per cent.[24] Variations in propensity to consume among indebted households can also affect the aggregate effects, as the most heavily indebted households are responsible for a large part of the variation in cashflow.[25]

Rising wages and high savings will promote consumption

The effect of rising interest rates on household cashflows must also be placed in a wider context. In the Riksbank's forecast, disposable household income is expected to grow at a relatively good rate, even when the interest rate starts to rise. This is partly due to rising wages. In addition, households' consumption possibilities are benefiting from households saving a historically high proportion of their incomes (see Figure 4:8). If households strive to even out consumption, they can reduce their saving to counteract the decline in income growth when interest rates rise. Consumption could therefore continue to grow over the next few years.

The repo rate can be expected to continue rising even beyond the forecast horizon. The midpoint of the interval the Riksbank has stated for the repo rate in the long term, of 2.5-4 per cent, entails an interest rate increase of 3.75 percentage points from the current level. The cashflow effect of such an increase would, all else being equal, dampen disposal household income by almost 3 per cent.[26]

But there are several uncertainty factors

The assessment of how rising interest rates affect consumption is uncertain, however. One factor concerns the extent to which households have taken into account the fact that interest rates will in future be higher than they are now. Studies indicate that on average, Swedish households do not have unreasonable expectations of the variable mortgage rate.[27] However, this does not rule out heavily indebted mortgage holders having much lower expectations than the average. If the expectations prove to have been too low when interest rates rise, these households could need to adjust their consumption more substantially.

A further uncertainty factor is the lack of current data on how saving and assets are divided among households. Many Swedish households currently have a high debt in relation to the value of the housing, which can reinforce the so-called housing collateral effect of monetary policy.[28] If housing prices are dampened by rising interest rates, then households' loan-to-value ratios will increase, which can

[24] The cashflow effect subdues disposable income by 1.6 per cent. The slightly larger effect on consumption is due to the aggregated consumption level being about 90 per cent of the level of disposable income.

[25] For example calculations that illustrate these effects, see Gustafsson, P., Hesselman, M. and B. Lagerwall, "How are household cashflows and consumption affected by higher interest rates?", *Staff Memo*, 2017, Sveriges Riksbank.

[26] The reason why this effect is not even greater is that deposit and lending rates are expected to rise by an equal amount beyond the forecast horizon.

[27] See E. Hjalmarsson and P. Österholm, "Households' mortgage rate expectations – more realistic than at first glance?", *Economic Review* 2017:2, Sveriges Riksbank, and P. Österholm, "Är hushållens förväntningar rörande bolåneräntan realistiska?" (Are housholds' expectations regarding mortgage rates realistic?), Ekonomisk Debatt no. 5, 2017.

[28] The average loan-to-value ratio for new mortgages increased between 2002 and 2010 from below 60 per cent to over 70 per cent, and is now just below 70 per cent. 21 per cent of new mortgage holders had a loan-to-value ratio of 85 per cent in 2016. See "The Swedish Mortgage Market 2017", Finansinspektionen.

make it difficult for them to get money for consumption by increasing their mortgages.[29]

Monetary policy is focused on the inflation target

Higher indebtedness has led to an increase in households' interest-rate sensitivity. The effect of interest rate adjustments on their consumption is thus greater. This indicates that the repo rate should be raised at a slow pace. However, the Riksbank's monetary policy is not determined solely by households' interest-rate sensitivity, but aims to attain the inflation target and contribute to a stable macroeconomic development in general.

[29] A general equilibrium model estimated on Swedish data, which captures the effects of monetary policy via the cashflow and housing collateral channel, indicates that the effect of an unexpected interest raise on household consumption would be twice as large with the current level of household indebtedness as it would have been in the mid-1990s. See D. Finocchiaro, M. Jonsson, C. Nilsson and I. Strid, "Socioeconomic effects of reducing household indebtedness", *Economic Review* 2016:2, Sveriges Riksbank.