

ARTICLE – Higher interest-rate sensitivity in the Swedish economy

Interest-rate sensitivity in the Swedish economy has shown a trend increase over the past thirty years. Households have borrowed increasing amounts for their housing purchases over time. Moreover, the interest-rate fixation period on mortgages is short. When the policy rate is raised, the cash flow of households with loans is affected, at the same time as lower housing prices limit the borrowing capacity for mortgagors. Among companies, it is primarily those in the commercial property sector that have experienced an increase in indebtedness and sensitivity to interest rates.

The Riksbank's analyses show that the increased indebtedness among households has led to monetary policy now having a greater impact on demand in the economy. The policy rate does not need to be raised as much to have the same tightening effect on the economy as before, which is an important aspect to take into account in the monetary policy decisions.

High indebtedness increases sensitivity to interest rates in the economy

According to traditional economic theory, monetary policy impacts demand in the economy mainly by affecting the real interest rate and the balance between consumption now and in the future. The traditional monetary policy analysis is based on a representative household, but more modern analysis has increasingly emphasised other channels and the fact that households differ. Put simply, one can imagine two types of household, one consisting of borrowers and one of savers. Borrowers can be assumed to have a higher propensity to consume than savers, as a result of credit constraints, which means that their consumption is affected more by changes in income and interest rates. When the interest rate changes, a transfer of income occurs between borrowers and savers – a so-called *cash flow effect*.³⁶ The fact that total consumption is affected is due to the borrowers' propensity to consume being higher. If the borrowers are also highly indebted and have mortgages with short interest-rate fixation periods, the effects will be greater and come sooner. As the

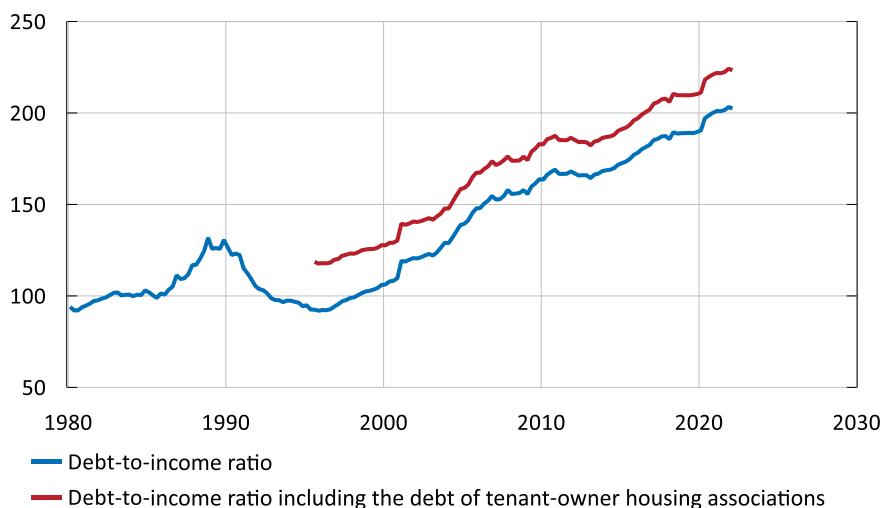
³⁶ For a description and estimate of cash flow effects on Swedish data, see for instance P. Gustafsson, M. Hesselman and B. Lagerwall (2017), "How are household cashflows and consumption affected by rising interest rates?", *Staff memo*, December, Sveriges Riksbank and M. Flodén, M. Kilström, J. Sigurdsson and R. Vestman (2021), "Household Debt and Monetary Policy: Revealing the Cash-Flow Channel", *The Economic Journal*, 131 (636).

interest rate affects housing prices, it can also affect the scope of households to consume by borrowing against their home as collateral – a so-called *loan collateral effect*.³⁷ This effect will be greater if the borrowers have a high level of debt in relation to the value of the home.

The Riksbank has long been analysing the increased risk sensitivity in the Swedish economy, partly because it impacts the effects of monetary policy.³⁸ Debts among Swedish households have shown a trend increase for decades (see Figure 50). Households living in tenant-owned housing also have indirect debts via the loans taken out by their housing cooperatives. The Riksbank has also repeatedly pointed out the risks linked to the increased debts. They are high from both a historical and an international perspective.

Figure 50. Household debt

Percentage of annual disposable income



Note. Households' total debts as a share of their disposable incomes, totalled over the past four quarters. Prior to September 2010, the tenant-owners' associations' debts were calculated on the basis of loans from housing finance institutions.

Sources: Statistics Sweden and the Riksbank.

Compared with many other countries, the interest-rate fixation period is very short in Sweden. The percentage of mortgages with variable interest rates rose from below 10 per cent in 1996 to around 60 per cent in 2015. Even though the percentage of fixed-rate loans among total loans has increased somewhat recently, around 80 per cent of the loans have a remaining interest-rate fixation period of 2 years or

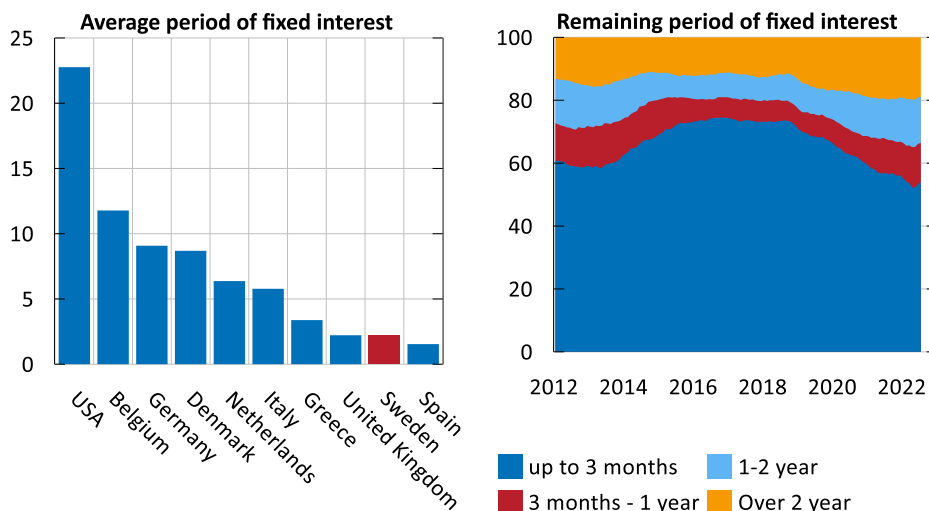
³⁷ See for instance, K. Walentin (2016), "Housing Collateral and the Monetary Transmission Mechanism," *Scandinavian Journal of Economics*, 116 (3).

³⁸ See J. Johansson, B. Lagerwall and H. Lundvall (2011), "Larger share of variable mortgages – how does this affect the impact of monetary policy?", The Riksbank's inquiry into risks on the Swedish housing market, Sveriges Riksbank; the article "Households' sensitivity to interest rates", in *Monetary Policy Report*, October 2014, Sveriges Riksbank; P. Gustafsson, M. Hesselman and B. Lagerwall (2017), "How are household cashflows and consumption affected by higher interest rates?", *Staff Memo*, December, Sveriges Riksbank; the article "How are households affected by rising interest rates?", in *Monetary Policy Report*, December 2017, Sveriges Riksbank and the article "How are household cashflows and consumption affected by rising interest rates?", in *Monetary Policy Report*, December 2018, Sveriges Riksbank.

less (see Figure 51). This means that changes in interest rates have a greater and faster effect on household demand in the economy. And this applies – both compared with most other countries and compared with earlier periods when the Riksbank changed the interest rate.

Figure 51. Average interest-rate fixation period in various countries and remaining interest-rate fixation period for households on total loans from MFIs

Number of years (left) and per cent (right)



Note. The values are calculated as weighted mean values of the interval average, see C. Badarinza, J.Y. Campbell and T. Ramadorai (2018), "What Calls to ARMs? International Evidence on Interest Rates and the Choice of Adjustable-Rate Mortgages", *Management Science* 64. The averages refer to the period 2003-2013 for most countries. The average interest-rate fixation period for Sweden is calculated using the variable interest rate defined as 3 months and two further intervals (3 months to 5 years and more than 5 years) for calculation for Sweden see U. Holmberg, H. Janzén, L. Oscarius, P. van Santen, and E. Spector (2015), "An analysis of the interest-rate fixation period for Swedish mortgages", *Economic Commentaries*, no. 7, Sveriges Riksbank.

Sources: Badarinza et al. (2018), Statistics Sweden and the Riksbank.

Companies' debts have also increased over time. Figure 52 illustrates the effect of higher interest rates on the Swedish household and corporate sectors. With regard to the corporate sector, it is difficult to forecast the interest-to-income ratio, as companies borrow through more sources and use interest rate derivatives. Estimates by the Riksbank last spring indicated that an upturn in general interest rates of 3 percentage points would mean the interest-to-income ratio was back at around the levels prevailing in 2012, when the policy rate was between 1 and 2 per cent. This indicates that companies on the whole are not very sensitive to interest rates.³⁹ One should bear in mind that the denominator in companies' interest-to-income ratio, that is, their earnings, can fall in a deteriorating economic situation and contribute to interest-to-

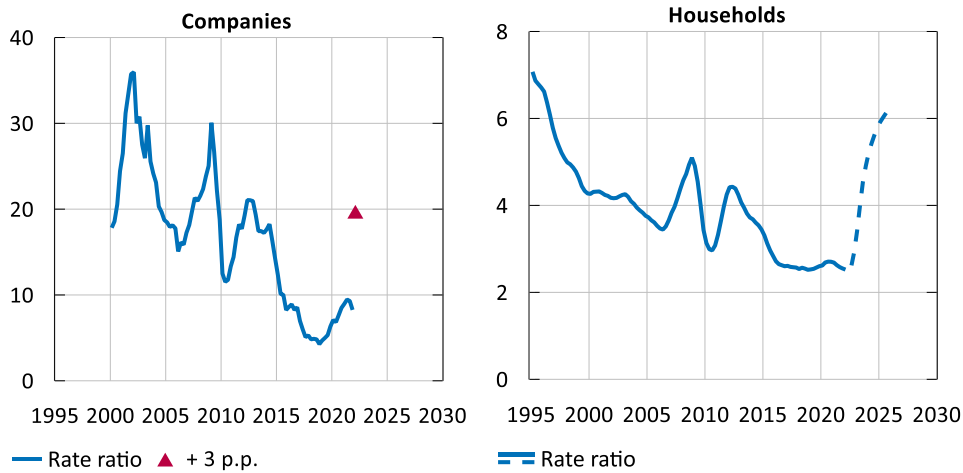
³⁹ See *Financial Stability Report 2,022:1*, Sveriges Riksbank.

income ratios rising more than is shown in Figure 52.⁴⁰ There are also major differences between companies and sectors. As we will see further on, commercial property companies are particularly sensitive to interest rates.

The right hand image in Figure 52 shows that when the policy rate rises in accordance with the Riksbank's forecast, households' interest-to-income ratio will in three years' time be on a par with the levels in the mid-1990s, when the policy rate was over 8 per cent. The high sensitivity to interest rates, together with household consumption comprising around half of GDP, are explanations for much of the earlier analysis having focused on the situation of households. This article also puts greatest focus on households, although we also discuss companies' interest-rate sensitivity.

Figure 52. Companies' and households' interest-to-income ratios in Sweden

Per cent



Note. For companies, the interest-to-income ratio is calculated as interest expenditures after interest deduction in relation to operating profits, for all non-financial corporations. In the scenario with the higher interest rate, it is assumed that the earnings remain unchanged. For households, the interest-to-income ratio is calculated as the households' interest expenditure as a percentage of their disposable income and is based on everyone being able to use a 30 per cent interest deduction. Disposable income is expressed as a four-quarter moving total. Broken line represents the Riksbank's forecast.

Sources: Statistics Sweden and the Riksbank.

Consequences for households and companies when the interest rate rises

Highly indebted mortgagors will experience large negative cash flow effects...

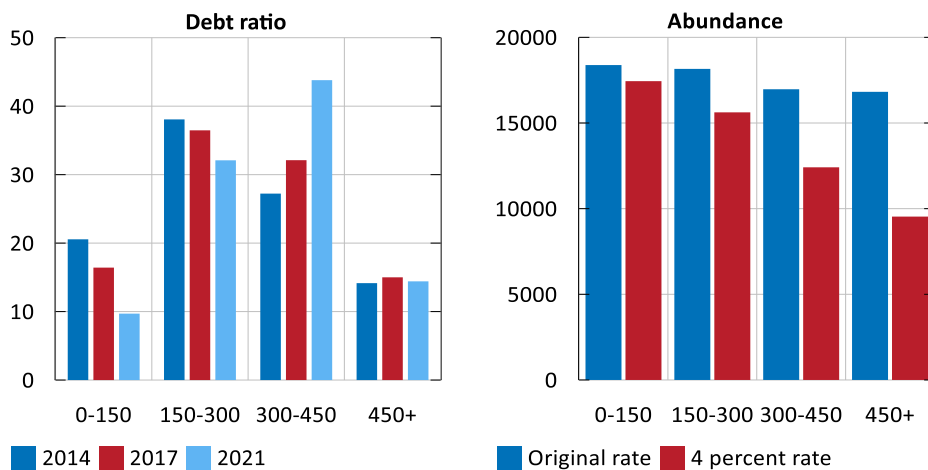
The aggregated debt-to-income ratio of around 200 per cent hides large differences between households, partly dependent on where in Sweden they live and whether

⁴⁰ In the scenario with the rising interest rate, it is assumed that the earnings remain unchanged.

they own their own home.⁴¹ Around half of households in Sweden have a mortgage, and among these the debt-to-income ratio is almost twice as high as for the household sector as a whole. An increasing number of new mortgagors have also taken on more debt in relation to their incomes (see Figure 53).⁴² Almost 60 per cent have mortgaged themselves for more than 300 per cent of their income before tax, corresponding to around 400 per cent of disposable income. The fact that households are more indebted means that the cash flow effect will be greater than on previous occasions when the Riksbank raises the interest rate. For highly indebted mortgagors, the borrowing scope may decline significantly when the interest rate rises in line with the Riksbank's forecast (see Figure 53). As the interest-rate fixation period is so short among Swedish mortgagors, the impact also comes quickly, which is shown in Figure 52.

Figure 53. Percentage of new mortgagors with a certain debt-to-income ratio over time and monthly surplus with original interest rate autumn 2021 and 4 per cent interest rate

Per cent (left) and kronor (right)



Note. The graph on the left refers to debt-to-income ratio calculated on income before tax for new loans (mortgages to buy homes, additional loans and changes of bank). In the graph on the right, the size of the columns shows the median monthly surplus in a discretionary income calculation with the original mortgage rate in autumn 2021, which amounted to 1.38 per cent on average, and an estimate with a 4 per cent mortgage rate, which is roughly equivalent to the Riksbank's forecast for household mortgage rates for the third quarter of 2025. The calculations also include other loans, and the interest rate on these is also expected to increase. The estimate is an interpolation based on the calculations in Finansinspektionen's Mortgage Report 2022.

Sources: Finansinspektionen and the Riksbank.

⁴¹ See S. Laséen (2022), "Hushållens skuldsättning och penningpolitik: ett regionalt perspektiv" (Household indebtedness and monetary policy: a regional perspective), *Staff memo*, September, Sveriges Riksbank and P. van Santen and D. Ölcer (2017), "Household indebtedness: a regional perspective", *Economic Commentaries No. 3*, Sveriges Riksbank.

⁴² See *The Swedish mortgage market, 2022*, Finansinspektionen. New mortgagors refers to households who buy a home, increase their mortgage or change bank.

...and have reduced borrowing scope when housing prices fall

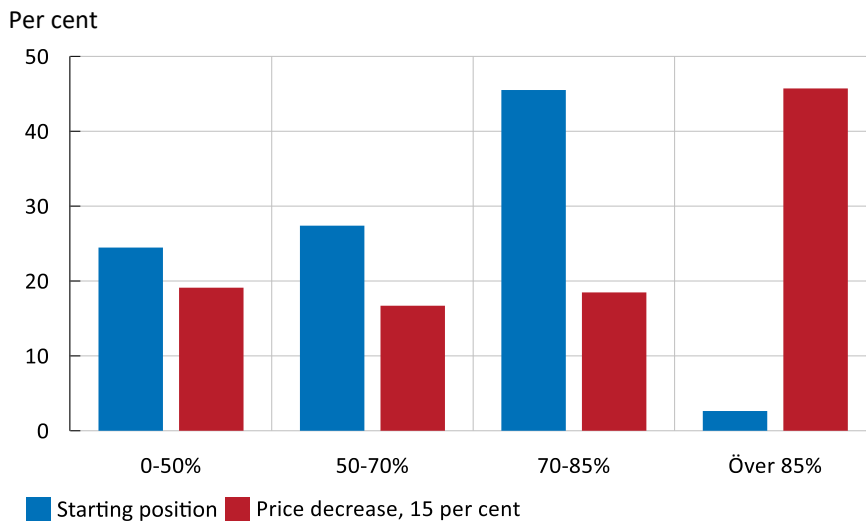
When the Riksbank raises the policy rate, housing prices are also affected. The fact that housing prices have fallen recently, and are expected to continue to fall in the Riksbank's forecast, is linked both to household facing higher mortgage rates in near term and an upward revision in their expectations of interest rates in the long term.⁴³ The falling housing prices in turn have an effect on household consumption via the loan collateral effect.

Many of the new mortgagors are households that are extending the loans on their existing home to finance, for instance, consumption and renovation of their home.⁴⁴ Despite prices having risen substantially over a long period of time, many new mortgagors have a high debt, measured as a share of the home's value, that is, a high loan-to-value ratio (see Figure 54). This means that the scope to take on new loans can be severely limited if housing prices fall. Figure 54 shows that a price fall of 15 per cent, compared with autumn 2021, which is in line with the Riksbank's forecast, means that around 45 per cent of the new mortgagors have a loan-to-value ratio of more than 85 per cent and thereby hit the mortgage cap. The fact that falling housing prices can significantly limit the opportunities to borrow against the home can increase the impact of monetary policy on consumption going forward. At the same time, it is important to point out that the loan-to-value ratio is lower for the stock of all mortgagors than for new ones, as housing prices previously rose over a long period of time.⁴⁵ However, these households will also have a reduced borrowing scope according to the same mechanisms when housing prices fall.

⁴³ For a discussion of the relationship between interest rate expectations and housing prices, see J. Almenberg, M. Ankarhem, K. Blom and T. Jansson (2022), "Housing prices and interest rate expectations", *Economic Commentaries No. 10*, Sveriges Riksbank.

⁴⁴ See *The Swedish Mortgage Market, 2022*, Finansinspektionen; J. Li, P. van Santen and X. Zhang (2020), "Home equity extraction activities in Sweden", Staff Memo, May, Sveriges Riksbank and R. Emmanuelsson, G. Katinic and E. Spector (2018), "Developments on the housing market and their effect on household debt", *Economic Commentaries no. 14*, Sveriges Riksbank.

⁴⁵ According to Finansinspektionen's mortgage survey from 2022, the average loan-to-value ratio in the stock of mortgagors is 53 per cent, which can be compared with 64.5 per cent among new mortgagors in the sample.

Figure 54. Distribution of loan-to-value ratios for new mortgage holders, 2021

Source: Finansinspektionen.

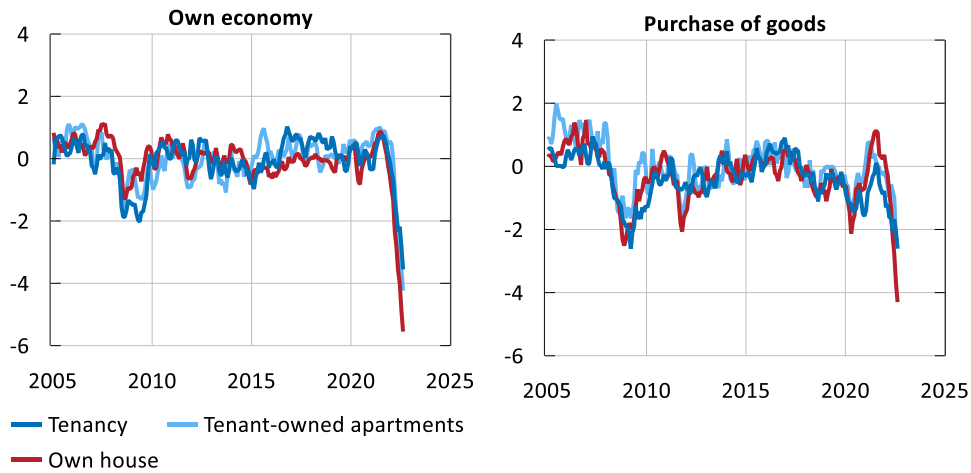
Mortgagors are in general affected more than other households when interest rates rise. The National Institute of Economic Research's Economic Tendency Survey shows that it is owners of single-family dwellings that have become the most pessimistic about their financial situation in the near future and with regard to the purchase of capital goods (see Figure 55).⁴⁶ New analyses from the Riksbank also indicate that the purchases of cars are affected more by higher interest rates in municipalities where household debt is high.⁴⁷

⁴⁶ One possible explanation is that house-owners have previously invested a much larger share of their disposable income in housing expenses than those living in tenant-owned apartments; see *The Swedish Mortgage Market 2022*, April 2022, Finansinspektionen. This reduces the margins for meeting rising interest rates, for instance. A further possible explanation is that house-owners are also affected to a large degree by, for instance, rising energy prices.

⁴⁷ See S. Laséen (2022), "Hushållens skuldsättning och penningpolitik: ett regionalt perspektiv" (Household indebtedness and monetary policy: a regional perspective), Staff memo, September, Sveriges Riksbank.

Figure 55. Households' views of their own finances in 12 months' time and purchases of capital goods, divided according to type of home

Standardised data, mean = 0, standard deviation = 1



Note. The graphs show 3-month moving averages.

Source: National Institute of Economic Research.

The lack of current microdata on household assets and savings makes it difficult to assess how household consumption will react when interest rates rise. One way for households to manage rising interest rates is to use their savings. Even if the household sector as a whole has a substantial holding of liquid assets, the estimates indicate that these are very unevenly distributed.⁴⁸ The Riksbank has for a long time called for up-to-date microdata on households' debts and assets, not least to enable a better understanding of the different channels from monetary policy to households' consumption decisions.

The increasing indebtedness among companies is driven by commercial property companies

As we saw in Figure 52, interest-rate sensitivity does not appear to be especially high in the corporate sector as a whole, when looking at the direct effects of interest rate expenditure. Households' high interest-rate sensitivity, on the other hand, can affect companies indirectly through changes in demand.

In the corporate sector, commercial property companies stand out significantly.⁴⁹ They are more indebted than other companies in general and have driven much of the increase in indebtedness in the corporate sector in recent years (see Figure 56). The increase has been both through bank loans and market funding in the form of debt securities. Commercial property companies are therefore affected substantially by rising interest rates. The Riksbank's analysis from last spring indicates that commercial property companies would see their interest-to-income ratio rise from 25 to

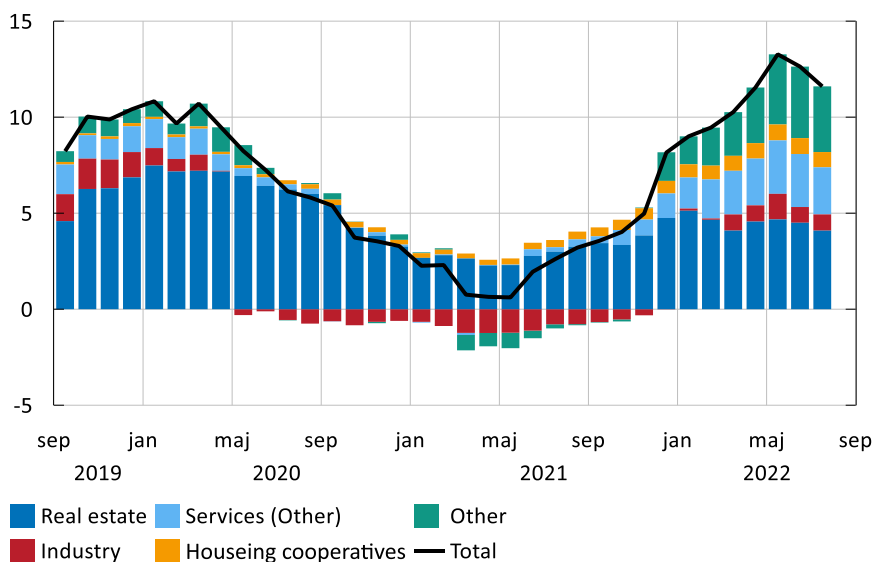
⁴⁸ See, for example, M. Andersson and R. Vestman (2021), "Liquid assets of Swedish households", FI Analysis 28, Finansinspektionen.

⁴⁹ See, for example, *Financial Stability Report 2022:1*, Sveriges Riksbank.

60 per cent if interest rates rise by 3 percentage points. These are much higher levels than for the corporate sector as a whole (see Figure 52).

Figure 56. Growth in corporate debt by sector

Annual percentage change and percentage points respectively



Note. The line refers to annual percentage change in companies' total loans (loans from MFIs and corporate bonds and commercial paper issued). The columns represent each sector's contribution to total debt growth. "Other" refers to the transport, hotel, restaurant, trade, construction and energy sectors. Sector definitions are derived from the KRITA database.

Source: Statistics Sweden (KRITA and SVDB).

The commercial property companies may need to adapt their operations as a result of interest rates rising in coming years.⁵⁰ They can do this by reducing investment in existing or new property, particularly rental and office properties. Rising interest rates can also, when combined with tighter credit terms and weaker economic activity, lead to the value of the companies' properties falling and their earnings deteriorating. As the Swedish banks have large exposures to commercial property companies, potential problems in these companies can have a very negative effect on financial stability.⁵¹ Problems in the property companies can lead to increased credit losses in the Swedish banks and reduced capital levels, which in turn can have consequences for the credit supply in the economy. Ultimately, such a development would have great significance for both the macroeconomy and monetary policy.

⁵⁰ See *Financial Stability Report 2,022:1*, Sveriges Riksbank.

⁵¹ This is been pointed out by both the Riksbank and Finansinspektionen. In January 2020, Finansinspektionen decided to raise the capital adequacy requirements for the banks' lending to commercial properties.

Monetary policy conclusions – interest rate raises have a greater impact than before

One conclusion of the interest-rate sensitivity in the economy showing a trend increase over the past thirty years is that monetary policy has had an increasingly large impact and that smaller interest rate adjustments are needed to attain the same stabilisation policy effects as before. But how large is the quantitative significance?

Figure 57 is based on new analysis from the Riksbank and shows the effect on household consumption of an interest rate increase for various sub-periods that are sorted according to the average debt-to-income ratio.⁵² The debt-to-income ratio is currently around 200 per cent, which is higher than the average debt-to-income ratio for the final sub-period in the figure, which is 170 per cent. A rough estimate based on the correlation in the figure indicates that an increase in the policy rate of one percentage point at present means that consumption is slowed down around twice as much as 15 years ago, when the debt-to-income ratio was around 150 per cent. Although these results cannot show that the greater consumption effect is completely due to higher indebtedness among households, there are good arguments in favour of this from other studies.⁵³ Highly indebted households have thus taken on greater significance for the monetary policy transmission.⁵⁴

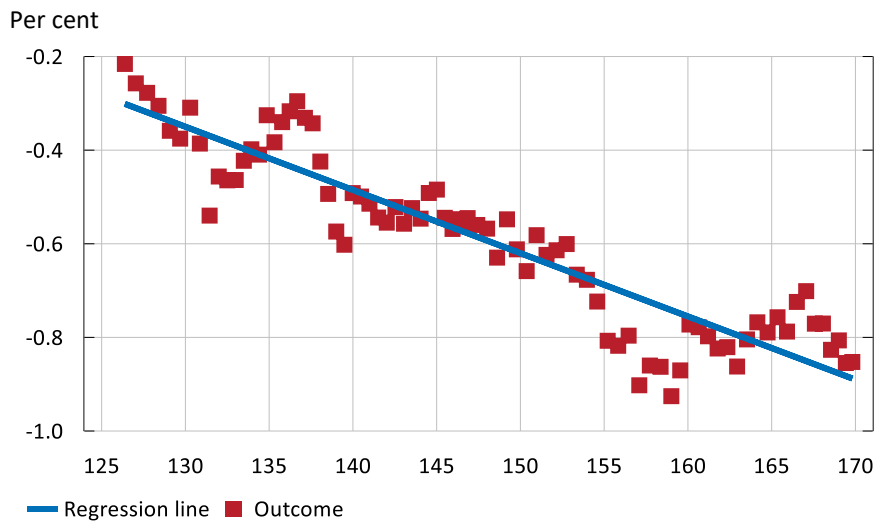
All in all, the Riksbank's analysis indicates that the policy rate does not need to be raised as much as before to obtain the same tightening effect on the economy. Even if the policy rate is expected to rise a lot in the short term, the upturn is nevertheless relatively limited in a historical perspective, with regard to the interest cycle as a whole.

⁵² See P. Stockhammar, I. Strid and T. Tornese (2022), "How has consumption's sensitivity to interest rates changed when the debt-to-income ratio has increased?", *Economic Commentaries* No. 9, Sveriges Riksbank.

⁵³ See, for example, D. Finocchiaro, M. Jonsson, C. Nilsson and I. Strid (2016), "Macroeconomic effects of reducing household debt", *Economic Review*, 2016:2, Sveriges Riksbank and P. Di Casola and J. Iversen (2019), "Monetary policy with high household debt and low interest rates", *Staff Memo*, October, Sveriges Riksbank.

⁵⁴ A new study from the Riksbank also shows that interest rate increases have a greater effect on disposable incomes and the number of newly-registered cars in municipalities with relatively highly indebted households. See S. Laséen (2022), "Hushållens skuldsättning och penningpolitik: ett regionalt perspektiv" (Household indebtedness and monetary policy: a regional perspective), *Staff memo*, September, Sveriges Riksbank.

Figure 57. Estimated effect on household consumption of a policy rate increase of 1 percentage point at different levels of debt-to-income ratio



Note. The Y axis show the maximum effect on consumption after an increase in the policy rate of one percentage point. The model is calculated for 81 sub-periods between 1996 Q1 and 2019 Q4. The X axis shows the average debt-to-income ratio for the sub-period.

Source: P. Stockhammar, I. Strid and T. Tornese (2022), "How has consumption's sensitivity to interest rates changed when the debt-to-income ratio has increased?", Economic Commentaries No. 9, Sveriges Riksbank.