# High household indebtedness complicates the Riksbank's interest rate normalization

*by Silvestre Chiara, Economist (UniCredit Bank, Milan)*

- A steadily growing domestic economy and inflation at 2% were not enough for the Riksbank to start its tightening cycle. The reason, in our view, lies with the implications of monetary policy tightening for consumption and inflation in an environment where household indebtedness in Sweden is high.
- We find no evidence of a housing price bubble in Sweden, with the rise in prices explained by developments in real disposable income, mortgage rates and construction costs.
- The issue is that households in Sweden are highly indebted, which increases the sensitivity of economic activity to higher borrowing costs, and complicates the Riksbank's path towards interest rate normalization.

The domestic economy growing steadily above potential and inflation being at target over the last year and a half should have been enough to convince the Riksbank to start raising interest rates from negative territory. However, the cautious stance among its board members has continued to prevail. Falling housing prices at the end of 2017 (see Chart 1) and uncertainty regarding the housing market outlook, as well as the persistently high level of household indebtedness, has sustained the Riksbank's concerns about Sweden's macroeconomic outlook and financial stability. In this note, we analyze recent housing market developments in Sweden and outline a long-run relationship between housing prices and their main macroeconomic drivers. We then analyze household indebtedness and draw implications for the Riksbank's monetary policy.

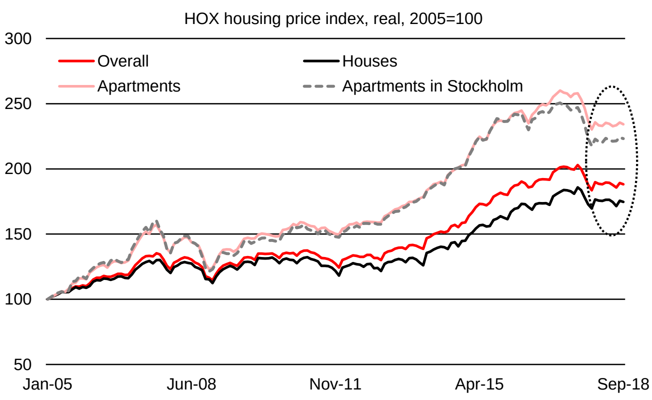
## The Swedish housing market – facts and figures

Chart 1 shows the development of real prices of owner-occupied houses and apartments, as well as an overall value-weighted price index for owner-occupied houses and apartments. The HOX price indices – published by Valueguard as nominal prices – are deflated by the CPIF[1], which is the consumer price index for a broad consumption basket, which includes housing costs that have been calculated with a fixed-mortgage rate.

Between the end of 2012 and the summer of 2017, prices in all segments of the housing market increased at a very strong pace, with market valuations for apartments clearly outperforming.

[1]Since 7 September 2018, inflation measured in terms of CPIF has been adopted by the Riksbank as the formal target variable for monetary policy.

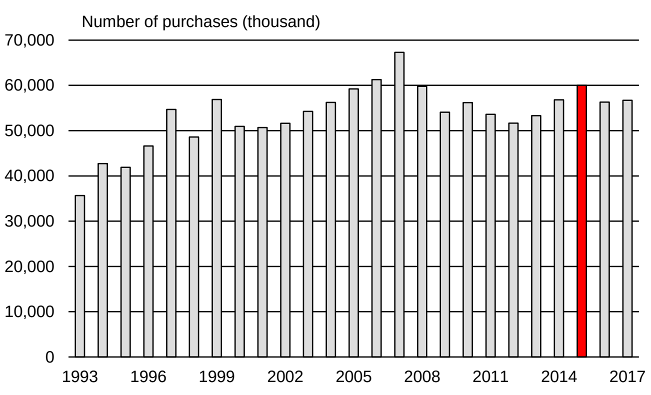
**CHART 1: AFTER FALLING IN 2017, HOUSING PRICES NOW SEEM TO BE STABILIZING**




Source: Statistics Sweden, Valueguard, UniCredit Research

Since then, the overall HOX housing price index declined by about 10% from its peak. The biggest declines were reported in prices for apartments, mainly those located in Stockholm, where the drop was about 10-15%. However, since January 2018, the price dynamics in all segments of the housing market have followed a progressively stabilizing trend, while remaining at a high level.

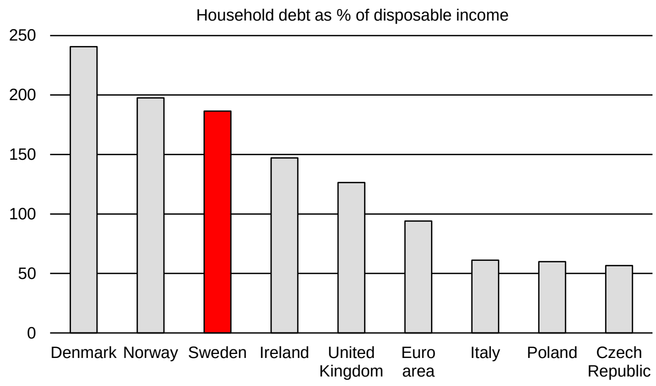
**CHART 2: HIGH DEMAND FOR HOUSING UNITS**




Source: Statistics Sweden, UniCredit Research

Behind soaring housing prices there was strong demand of housing units. In 2015 – when the Riksbank brought interest rates into negative territory for the first time – housing purchases reached another peak (after that of 2007). The number of housing units sold reached 60,000 (Chart 2). As most households have to borrow money for financing housing purchases, mortgage debt has driven the rise in total household debt, which, at 185% of disposable income in Sweden, is historically high and among the highest in Europe (Chart 3).

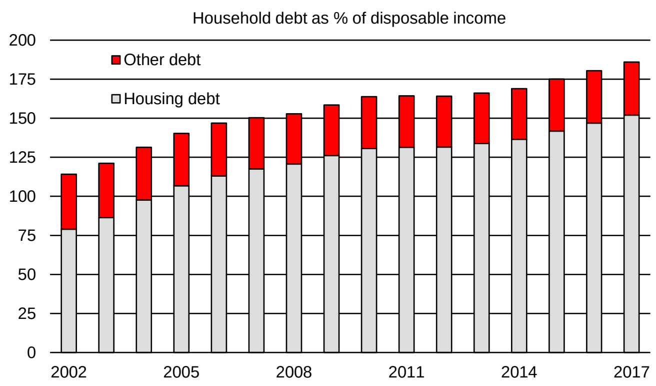
**CHART 3: SWEDISH DEBT-TO-INCOME RATIO IS AMONG THE HIGHEST IN EUROPE**




Source: Eurostat, Riksbank, UniCredit Research

While other categories of household debt have risen slightly over the past years, the composition of household debt is heavily skewed towards housing-related debt. Mortgage debt makes up the bulk of household debt and has dominated the increase in household borrowing. Mortgage debt as a share of household income has risen from about 80% in 2002 to over 150% in 2017, compared to other types of household debt whose share has remained almost stable around 33% over the same period (Chart 4).

**CHART 4: COMPOSITION OF HOUSEHOLD DEBT IS HIGHLY SKEWED TOWARDS HOUSING**




Source: Statistics Sweden, UniCredit Research

Hence, as elsewhere, in Sweden there is a close connection between household debt and housing prices. The relationship among these two variables is positive and implies that, in the long-run, the increase in household debt is due to the increase in housing prices[2].

## The drivers of housing prices in the long-run

Like any other market, the housing market is driven by the balance between supply and demand, each of which can, in turn, be strongly influenced by structural and cyclical factors. One main feature of the housing market is that it is local. Since the construction of new buildings takes time, local supply shortages (or surpluses) can be reflected strongly in housing prices as well as in rents. Similarly, it can take a long time for demand to catch up with any accumulated excess supply of housing.

In very general terms, demand for housing depends primarily on household disposable income, mortgage interest rates, the size of the population requiring accommodation in relation to available supply and production costs. Tax rules can also directly affect the housing market. Additional factors include regulations, such as those that govern rent levels, building permits, mortgage loan-to-value caps and mortgage amortization. Lastly, broader economic trends can also affect the housing market, although there is not always a strong correlation with traditional macroeconomic metrics, such as GDP growth and industrial production data.

To determine whether housing prices in Sweden are broadly aligned with their fundamentals, we looked for a statistical relationship between housing prices and a set of macroeconomic variables that drive prices in the long-run. This allowed us to infer whether there were deviations between estimated and actual housing prices that could pose a risk to the housing market. In equilibrium, the log real housing prices ($p^h$) is a function of the log real disposable income ($y_t$)[3], the real mortgage rate ($rr_t$) and the log real construction cost ($cc_t$)[4]:

$$p^h_t = \beta_0 + \beta_y * y_t + \beta_{rr} * rr_t + \beta_{cc} * cc_t + \varepsilon_t \qquad (1)$$

We estimated equation (1) using Ordinary Least Squares and quarterly data from 1Q88 to 2Q18. The estimation results are detailed in Table 1.

[2] See, for example, Rima A. Turk (2015), "Housing Price and Household Debt Interactions in Sweden", IMF Working Paper.

[3] Gross disposable income is income available to households after the payment of current taxes on income and wealth, social contributions and the receipt of social benefits other than social transfers in kind and other current transfers.

[4] We chose construction costs as the factor affecting supply. A similar formulation of this model, including housing construction costs, can be found in Claussen (2013), "Are Swedish houses overpriced?". According to Statistics Sweden, construction costs comprise the prices for newly built dwellings excluding the land cost, that is, the cost that an investor pays for a new building in a multi-dwelling building or one or two-dwelling buildings.

**TABLE 1: ESTIMATION RESULTS OF HOUSING PRICES**

**Dependent variable – log Swedish housing prices**

| Explanatory variables | Coeffcient | Std. error | Prob. |
|---|---|---|---|
| c | -6.85 | 0.49 | 0.00 |
| $y_t$ | 0.52 | 0.08 | 0.00 |
| $rr_t$ *100 | -2.89 | 0.43 | 0.00 |
| $cc_t$ | 2.03 | 0.16 | 0.00 |
| N. of observations | 122 | | |
| R-squared | 0.97 | | |

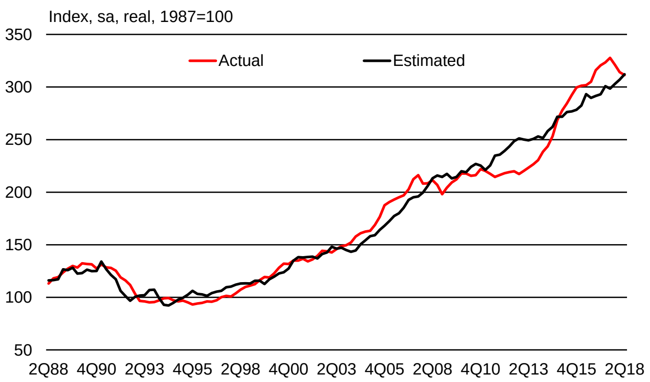
Source: UniCredit Research

The estimated coefficients show that, in the long-run:

- a 1% increase in real disposable income raises housing prices by 0.5%,
- a 100bp increase in the real mortgage rate reduces housing prices by 3%,
- and a 1% increase in construction costs boosts housing prices by 2%.

Chart 5 shows a comparison between actual housing prices and estimated prices, computed by our model.

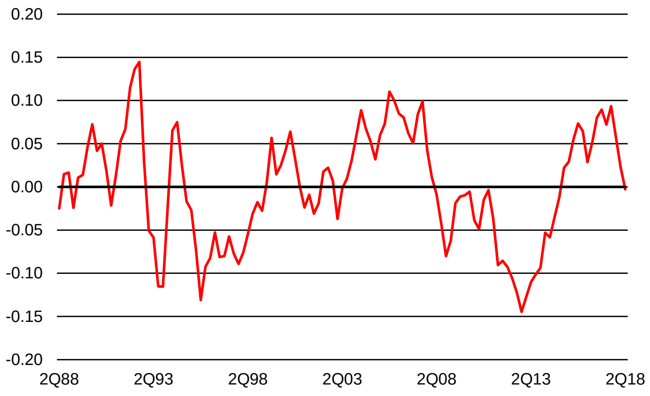
**CHART 5: HOUSING PRICES – ACTUAL VS. MODEL**




Source: UniCredit Research

Chart 6 shows the residuals of the model, which can be regarded as departure from fair valuation.[5] Our finding is that, according to our model, housing prices have corrected moderate overvaluation and are now fairly close to what we regard as their equilibrium level.

**CHART 6: HOUSING PRICES – MODEL RESIDUALS**




Source: UniCredit Research

## How the housing market influences the monetary policy transmission mechanism

Our model shows that Swedish housing prices are currently not meaningfully overvalued. Therefore, we suspect that the housing market alone is not at the root of the Riksbank's extreme caution. What really concerns the central bank is the high level of household indebtedness, which, at over 185% of disposable income (Chart 3), makes households more vulnerable to tighter monetary policy compared to the past. Given that – as we explained at the start of this note – housing prices are the main indicator affecting the household debt in the long-run, the Riksbank has to monitor also developments in this market when it sets its monetary policy. The issue is that growing indebtedness not only poses a risk to households themselves, but also undermines the overall Swedish economy's ability to face rising interest rates. In an economy with high household debt to GDP, monetary policy could have asymmetrical effects, i.e. an interest rate hike would be more contractionary than an equally-sized rate cut would be expansionary[6]. Importantly, the asymmetry increases when the maturity of debt shortens, so that central banks in high household debt countries with a large share of adjustable rate mortgages – as is the case in Sweden – could expect large contractions following small rate hikes. This complicates the interest rate normalization.

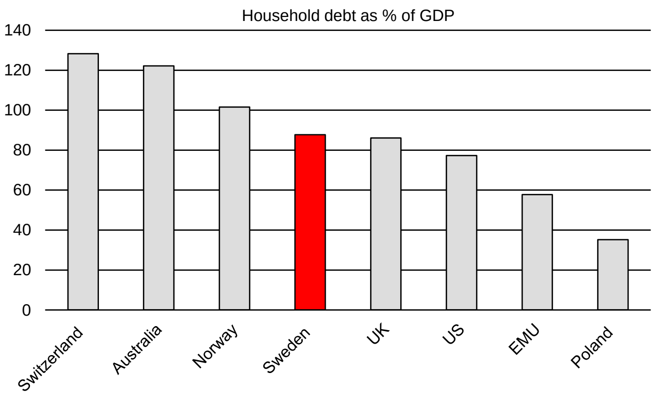
In order to figure out how much household debt weighs on the Swedish economy, an indicator to watch is the level of household debt as percentage of GDP, which in Sweden was 87% of nominal GDP in 2017, 17 percentage points higher than it was at the start of the global financial crisis.

[5] We have tested the residuals of equation (1) and they are stationary or, more specifically, we can reject the null hypothesis of a unit root at standard levels of significance.

[6] Zabai A., "Household debt: recent developments and challenges", BIS Quarterly Review, December 2017".

Although the dynamic of the Swedish household debt-to-GDP ratio follows the renewed increase in household debt worldwide over the past decade[7], Chart 8 shows that Sweden is among countries with high – and trending higher – household debt relative to GDP and follows Australia, Switzerland and Norway where the household debt-to-GDP ratio exceeds 100%[8].

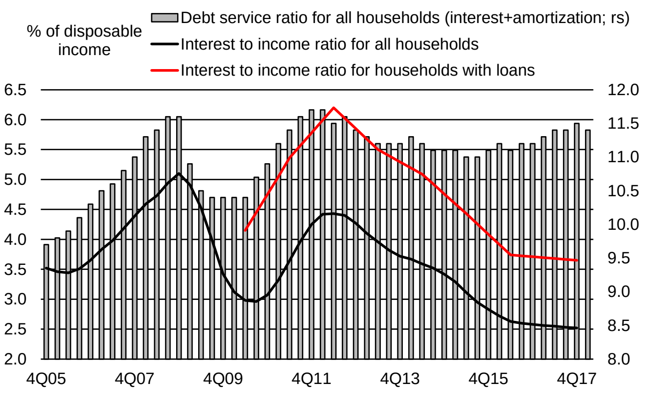
**CHART 8: SWEDEN'S HOUSEHOLD DEBT HAS REACHED ABOUT 90% OF GDP**




Source: BIS, UniCredit Research

Hence, the global financial crisis seemed to not have discouraged Swedish and other countries' households from taking on more debt. While this behavior might be optimal in a low interest rate environment, this might eventually hurt households when they face a rising debt service once interest rates start rising and the credit boom ends. In Sweden, about 2.5% of household income goes to interest expenses. This share rises to 3.5% for households with outstanding loans (Chart 9).

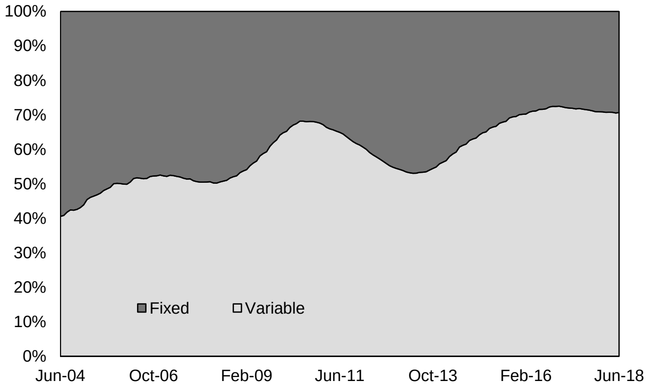
**CHART 9: HOUSEHOLD INTEREST-TO-INCOME RATIO IS HISTORICALLY LOW**




Source: BIS, Riksbank, UniCredit Research

As most loans to households are taken out at variable rate (Chart 10) – about 70%, up from 50% in the pre-crisis years – interest expenditure increases rapidly when interest rates start to increase.

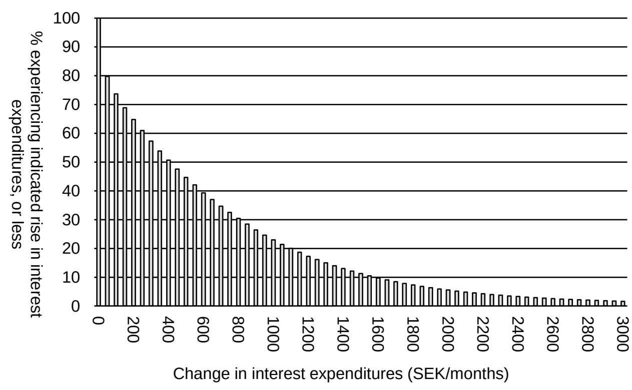
**CHART 10: SWEDES PREFER TO BORROW AT VARIABLE RATES**




Source: Statistics Sweden, UniCredit Research

An increase of 1% in the repo rate – to 0.50% by end-2020 according to Riksbank's main scenario in the latest Monetary Policy Report – would raise the interest expenditure by at least SEK 400 per month for 50% of households with outstanding debts. For 11% of the households (about 300,000 households) included in this data, interest expenses would increase by at least SEK 1,500 (Chart 11)[9].

**CHART 11: ADDITIONAL INTEREST EXPENSES PAID BY HOUSEHOLDS SHOULD THE REPO RATE RISE BY 1%**




Source: Riksbank, UniCredit Research

[7] See IMF's Fall 2017 Global Financial Stability Report (GFSR).
[8] See BIS, Quarterly review, December 2017.

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

Table 2 below shows the debt service (interest plus amortisation) payments for the three household categories belonging to the bottom three quintiles of the wealth distribution: households with a median debt of around SEK 700,000, households with a debt level of around SEK 1.6 million and highly-indebted households with a debt of SEK 3.5 million.

**TABLE 2: MORTGAGE PAYMENTS FOR THREE HOUSEHOLD CATEGORIES**

| | 50th percentile (median) | 75th percentile | 95th percentile |
|---|---|---|---|
| | | | SEK per month |
| Household debt level | 700,000 | 1,600,000 | 3,500,000 |
| Debt amortization | 1,458 | 3,333 | 7,292 |
| Actual interest payments (per month, at mortgage rate of about 2%) | 817 | 1,867 | 4,083 |
| Projected interest payments (per month, at mortgage rate higher by 1%) | 1,225 | 2,800 | 6,125 |

Source: Riksbank, UniCredit Research

When calculating debt service payments, the assumptions are: 1. the actual interest rate on mortgages is 2% (rounded up from 1.66% according to August's lending data release) and 2. the household pays off its loans over 40 years[10]. Based on these assumptions, the three household categories currently pay SEK 817, SEK 1,867 and 4,083 in mortgage interest per month. If the debt is held constant, a 1% increase in the interest rate leads to a 50% rise in households' interest expenses. The macroeconomic impact of the doubling of mortgage interest expenditure is expected to result in a downward adjustment of aggregate household consumption in other goods and services by around 0.7-0.8% in the first year. In following years, given that the rate hike hits indebted households hardest, their consumption drops by almost a further 2%, while other households' consumption remains unchanged. Inflation is also affected and eases by 0.5 percentage points.

These calculations provide an indication of the importance of the household debt-to-income ratio on the transmission mechanism of monetary policy. The higher the debt-to-income ratio, the greater the share of indebted households' income that will be spent on interest payments and consumption of housing services, and the lower the amount that households can spend on consuming other goods and services. This in turn impacts real GDP growth and then inflation, which is an undesirable outcome for the Riksbank, which in recent years made strong efforts to bring inflation to target.

That said, in order to figure out the implications of elevated household debt levels, it is important also to see whether households can bear the resulting debt burdens without resorting to large adjustments in consumption. The household leverage data show that Swedish households seem to have accumulated enough buffers that can help smooth the size of a potential decrease in private consumption resulting from any interest rate hike. Leverage is flat suggesting that households have also seen a rise in the value of their assets, not only an increase of their debt. Also, the current saving ratio at 29.7%, which is historically high, means that Swedish consumers have another cushion that can help to absorb income shocks.

## Conclusions

Our long-run econometric model of housing prices signals that Swedish housing prices are currently not significantly overvalued and that they have been shifting towards their equilibrium level. The Riksbank's concern has to do with how household debt affects monetary policy transmission to inflation through the real economy. As households in Sweden are highly indebted, the Riksbank could expect to see significant slowdowns in both the Swedish economy and in inflation following relatively small rate hikes. This looks set to further complicate the path towards interest rate normalization and indicates that future increases of the repo rate will likely be small and gradual, with the central bank preparing the market for any announcements well ahead of time.

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[10] This is the median number of years until mortgage is repaid.

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