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IS SWEDISH HOUSEHOLD DEBT TOO HIGH? SOLVENCY, LIQUIDITY, AND
DEBT-FINANCED OVERCONSUMPTION

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Overconsumption

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ABSTRACT

Swedish authorities and international organizations that comment on Swedish economic policy have argued that household debt is too high and a threat to financial and macroeconomic stability (FMS). But household debt may become a threat to FMS under essentially three conditions: (1) Household debt becomes too high relative to household assets. (2) Households' debt service becomes too high relative to incomes and payment capacity. (3) Households use home-equity withdrawals—made possible by rising house prices—to finance an unsustainable overconsumption of macroeconomic significance.

Two Swedish structural features mitigate the risks. First, mortgages are a safe cash cow for banks and contribute to financial stability. Second, the mortgage rates are not exogenous but indirectly controlled by the Riksbank, and it sets the policy rate to maintain FMS.

Regarding condition (1), aggregate household assets are much larger and have grown much faster than debt. Net wealth was twice the debt in 1985, five times in 2024. 78% of borrowers have home equity exceeding 30%, more than any housing price fall during the last 50 years. Regarding condition (2), debt service of borrowers is not high relative to incomes, because modest LTV ratios mean that required amortization rates are modest. Regarding condition (3), there is no indication of any debt-financed overconsumption (undersaving) of macroeconomic significance. HEW is not unusually high, the saving rate is at a historical high, and the share of durable consumption in total consumption expenditures is normal.

Thus, none of the three conditions is present. Swedish household debt is neither too high nor a threat to financial or macroeconomic stability.

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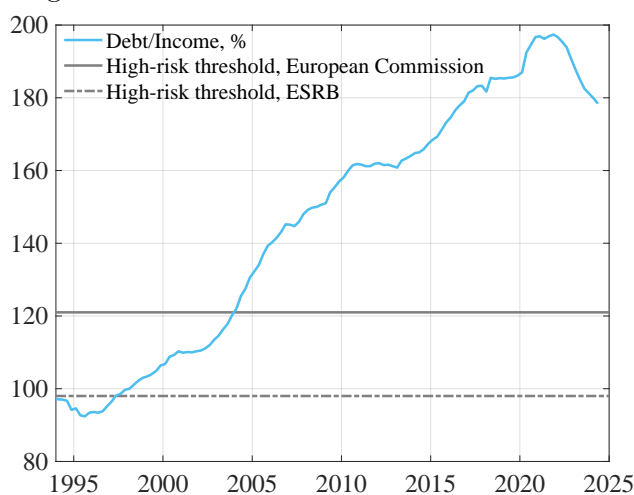
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1 Introduction

Is Swedish household debt too high? “Too high” here is with reference to financial and macroeconomic stability: Is household debt be so high as to pose a threat to financial and macroeconomic stability?

Finansinspektionen (the FI, the Swedish financial supervisory authority), the Riksbank, and international organizations—such as the European Commission and the ESRB (the European Systemic Risk Board)—have regularly warned that Swedish household debt is too high and is a threat to financial and macroeconomic stability. The warnings are often accompanied by a figure of the ratio of household debt to income (the DTI ratio) such as figure 1.1. This figure looks scary to many observers. From 1995 to 2021, the DTI ratio more than doubled, from about 95% to almost 200% in 2021. More recently it has fallen to around 180%.¹

Figure 1.1: The household debt-to-income ratio.



Source and note: [Statistics Sweden \(2024h\)](#). Income is net disposable income (a 4-quarter trailing sum of quarterly net disposable income). The latest observation is 2024q2. The high-risk thresholds of the European Commission and the ESRB refer to thresholds for a high risk of a banking and financial crisis ([European Commission, 2024](#); [Bricongne et al., 2020](#); [ESRB, 2019, 2022](#)). They are explained in the text and footnotes 2 and 3.

The previous Riksbank governor, Stefan Ingves, said in an interview in 2014, when the DTI ratio was about 170%:

[The DTI ratio] must not exceed 180% but should under a few years slowly fall. Otherwise, we will get what I call debt dominance, which means that the economic policy must be exclusively directed towards the debt problems and cannot at the same time deal with other important issues ([Ingves, 2014](#), my translation from Swedish).

Why a threshold of 180%, of all possible levels? For an example of possible innovative reverse engineering (by Bank of Norway and Riksbank staff) of assumptions—alternatively, contrived and far-fetched reasoning—that might rationalize an upper limit of 180%, see appendix A.

¹ It is not surprising that the DTI ratio has fallen in recent years. Housing prices have fallen (figure C.6) and the number of housing sales have fallen (figure 4.10). At constant loan-to-value ratios for new homes, this reduces mortgage growth (figure 4.11). Meanwhile, disposable income has continued to grow (figure C.5).

In 2019, the Riksbank thought that household debt posed the greatest risk in the Swedish economy:

The Riksbank deems that **Swedish households’ indebtedness poses the greatest risk in the Swedish economy**. Household debt has increased for a long time and **households are currently highly indebted, both from a historical perspective and in international comparisons**. (Sveriges Riksbank, 2019, my boldface)

Regarding the European Commission and the ESRB, the grey horizontal lines in figure 1.1 show the Commission’s and ESRB’s thresholds of the DTI ratio for a high risk of a banking and financial crisis. According to the European Commission’s “In-Depth Review 2024” of Sweden, there is a “prudential threshold” for Sweden of a DTI ratio of 121% “above which a banking crises become more likely” European Commission (2024, table 2.2 and note (6), p. 13). The prudential threshold was crossed in 2004q1 and the DTI ratio at about 180% is now about 1.5 times the threshold.²

ESRB (2022, table 1, Scoreboard, part 2) (reproduced as figure C.16) reports the threshold of the household debt-to-gross-income (DTGI) ratio for a high risk of a financial crisis. It is as low as 95%, the same (!) for all countries in the EEA (the European Economic Area is the EU27 as well as Iceland, Liechtenstein and Norway). Relative to net disposable income, the DTI threshold is 98%. That is, the Swedish household DTI ratio has exceeded the threshold for a high risk of a financial crisis since 1997q2, and by now the DTI ratio is almost double that threshold.³

The Commission’s and ESRB’s risk thresholds seem to have lost any touch with reality.

In spite of the warnings from the FI, the Riksbank, and the Commission, and the ESRB about high risks to financial and macroeconomic stability, those risks have still not materialized. This, in spite of large variations in mortgage rates, an international financial and public-finance crisis, a pandemic, stagflation, and a large inflation and interest-rate increase after the Russian attack on Ukraine. This indicates that the Swedish housing and mortgage markets are more robust and resilient to different disturbances than what these public authorities and international organizations have concluded (Boije and Hansen, 2024).

Furthermore, the warnings about high household debt have been presented without relating debt to assets. But one cannot assess the risks from household debt without looking at the assets, without looking at the complete balance sheet, including household assets and net wealth. And the assessments above do not take into account that the DTI ratio is not a good measure of the

² The threshold is 54% expressed in percent of GDP. It has been converted to percent of net disposable income by me, see figure C.9. According to European Commission (2024, table 2.2, note 6, p. 13): “Prudential thresholds identify a threshold **above which a banking crises become more likely**. The... prudential benchmarks are calculated following Bricongne et al. (2020).” Previous years’ in-debth reviews (European Commission, 2023, table 2.1, note 6, p. 13) are more explicit: “Prudential thresholds represent the debt threshold beyond which **the probability of a banking crisis is relatively high, minimising the probability of missed crisis and that of false alerts**.”

³ ESRB (2019, Table A.3, rows (8)–(10), column “Threshold”), specifies how three risk thresholds—low, medium, and high risk—are determined. For the DTGI ratio, the thresholds are 75%, 85%, and 95%: “The first threshold is set close to the pre-crisis average across countries.” There is no specific information on how the second and third threshold is set. As shown in figure C.9, gross disposable income is about 3.5% larger than net disposable income, so relative to net disposable income, the three thresholds are about 78%, 88%, and 98%, respectively. An update of ESRB (2022), ESRB (2024), did not publish any update of the Scoreboard.

risks from household debt. (See appendix B for some expressed skepticism against the DTI ratio as indicator of risk from the FI, the Bank of England, and the Reserve Bank of Australia.)

Interestingly, the warnings of a financial crisis from the international organizations stand in stark contrast to the views of Finansinspektionen. The FI sees only relatively small risks to financial stability from household debt:

Finansinspektionen’s current assessment [in 2017] is that the risks to financial stability associated with household debt are relatively small. This is because mortgagors generally have good potential to continue paying the interest and amortisation on their loans, even if interest rates rise or their incomes fall. On average, households have comfortable margins with which to cope with a fall in housing prices. Swedish mortgage firms are also deemed to have satisfactory capital buffers should credit losses still arise. (FI, 2017, p. 9)

Instead, the FI is worried about household debt causing a threat to macroeconomic stability:

The risks associated with household debt are primarily related to the possibility that highly indebted households may sharply reduce their consumption in the event of a macroeconomic shock. This development was noted in other countries during the financial crisis in 2008–2009. If many households reduce their consumption at the same time, this can amplify an economic downturn. (Finansinspektionen, 2017, p. 1)

More recently, in 2023, it is still the case that “the FI assesses that the primary risk associated with high household debt is a decrease in consumption, which can amplify a macroeconomic downturn” (FI, 2023c, p. 4). The idea that highly indebted households would reduce their consumption more in a crisis than less indebted ones, and that the relation would be a causal one, is actually the “debt-overhang” hypothesis of Dynan (2012) and others. But in section 6, we will see that debt-overhang hypothesis lacks scientific support. The household spending drops observed in a few countries during the 2008–2009 financial crisis is better explained by pre-crisis debt increases used to finance overspending—the “debt-financed overspending” hypothesis (Andersen et al., 2016; Broadbent, 2019; Svensson, 2020, 2021a,b). As Bank of England’s then Deputy Governor Ben Broadbent summarized the main result of Andersen et al. (2016):

There is a correlation, it turns out, between the level of household gearing prior to the crisis and the drop in its consumption spending afterwards. But this goes away once you also take into account the prior growth rate of debt. Once you know the change in a household’s indebtedness ahead of the crisis, knowing the level tells you nothing more about its subsequent spending (Broadbent, 2019, p. 7)

It is important to remember that household debt has a productive function. Debt allows households to better smooth consumption and investment over time. Debt also finances investments. Mortgages finance household investments in owner-occupied housing. Mortgages allow households to become homeowners much earlier than if they would first have accumulate savings equal to the price of the home. Without the availability of mortgages, the housing assets would not be as large, and the housing would not be of the same high standard. Home ownership would be excluded

or long delayed for many households. In Sweden, this means going to a very dysfunctional rental market (Svensson, 2020).

Broadbent has emphasized that people who argue that household indebtedness is unsustainable seem to believe that you could have lower debt but unchanged assets:

This view [that household debt is “unsustainably” high] is ubiquitous. My suspicion is that, at least in some cases, people come to it because they have in the back of their minds an alternative and rather attractive world in which we all have fewer debts but the same assets. In this imagined and happy place, we would all have lower mortgages but own the same houses. Firms too would have fewer liabilities but possess the same productive capital. In other words, people might implicitly be assuming that less debt would necessarily mean greater net wealth. If that is really what is being asked—would we be better off if we were all better off?—then the answer is obvious. (Broadbent, 2019, p. 13).

But the misunderstanding Broadbent emphasizes is not just with “people.” The Riksbank, the FI, and the above international organizations all seem to be the victims of this powerful but mistaken illusion, that you can decouple the debt from the assets. That you can have a “debt-to-income break” [“skuldkvotsbroms”], one of the FI’s favorite expressions over the years, without having an “asset-to-income break,” an expression never used. That we can have lower debt and largely the same assets and thus have larger net wealth.

Housing and mortgage markets can have an impact on financial and macroeconomic stability through several channels.⁴ The risks and threats can be organized in several ways. I find it practical to start from the view that, in general, household debt may become a threat to financial and macroeconomic stability under essentially three conditions:

- (1) **The debt becomes too high relative to the assets.** The debt becomes too high relative to assets. That is, the households’ **solvency** (net wealth relative to total assets) becomes too low. Then the households’ resilience to negative asset-price shocks may be too low.
- (2) **The debt service becomes too high relative to incomes and debt-service capacity.** The debt service becomes too high relative to households’ incomes and debt-service capacity. The households then have insufficient margins and liquidity buffers to continue to service their debt, if interest rates rise or incomes fall. The households’ **liquidity** and resilience to interest rises and income falls becomes too low.
- (3) **The debt is used for debt-financed overconsumption of macroeconomic significance.** Households indulge in debt-financed overspending relative to their disposable income of macroeconomic significance. When housing prices rise, households use home-equity withdrawals (HEWs) for consumption purposes. This makes household spending very sensitive to the rate of housing-price growth and credit conditions. A fall in housing-price growth or tighter credit conditions may have a large negative impact on spending and consumption.

The focus here is on the about 80% of total Swedish household debt that is mortgage debt. The non-mortgage household debt includes consumer debt and other debt. Consumer debt—including

⁴ For examples, see BIS (2023, section 2).

the prevalence of “buy now, pay later,” more appropriately “buy now, pain later” (Jenkins, 2024)—causes increasing individual and consumer-protection problems in Sweden, but it is not a threat to financial and macroeconomic stability.

Under condition (1), a fall in housing prices may result in negative home equity for some borrowers. Under condition (2), borrowers may face difficulties fulfilling their debt service. These conditions may cause credit losses and non-performing loans, in particular if the two conditions occur at the same time. This may threaten financial stability, if lenders have insufficient capital buffers. Negative home equity and high debt service may also cause borrowers to reduce their consumption substantially, which may threaten macroeconomic stability and indirectly financial stability.

Under condition (3), household consumption becomes very sensitive to the rate of housing-price growth and just an end to rising housing prices may cause a substantial reduction in consumption, as further discussed in section 6 and Andersen et al. (2016), Broadbent (2019), and Svensson (2020, 2021a,b). Consumption also becomes sensitive to a tightening of credit conditions. Again, a large fall in consumption may threaten macroeconomic stability and indirectly financial stability.

Structural features of the housing and mortgage markets can amplify or mitigate risks. There are two structural features in Sweden that have a big impact on the risks to financial and macroeconomic stability.

First, as explained in section 2.1, mortgages are for several reasons actually a safe cash cow for banks in Sweden and do not pose a threat to financial stability. Credit losses on mortgages are insignificant, also in crises. The main banks are in a cozy oligopoly and make a safe profit from the spread between mortgage rates and the mortgage financing costs. The Riksbank has the tools and practical experience to keep the financing costs down in a crisis, if needed. Should credit losses nevertheless arise, the banks have satisfactory capital buffers.

Second, as explained in section 2.2, Swedish mortgage rates are in fact not exogenous but endogenous, in a way that strengthens macroeconomic stability. Swedish mortgages have mostly variable rates. Under the Riksbank’s flexible inflation targeting, these mortgage rates are indirectly controlled by the Riksbank. The Riksbank has tools and practical experience in maintaining a stable spread between the mortgage rates and the policy rate. High mortgage debt and variable mortgage rates create a strong and fast cash-flow channel of monetary policy. Normally, for aggregate-demand shocks, policy rates and mortgage rates become procyclical. If incomes fall in a downturn, mortgage rates and borrowers’ interest payments also fall—a kind of insurance for mortgagors against economic downturns. For the relatively rare supply and inflation shocks, the Riksbank’s policy rate is carefully calibrated to be a compromise between reducing inflation and not reducing aggregate demand so much as to threaten financial and macroeconomic stability. High mortgages and variable mortgage rates to a considerable extent make it easier for the Riksbank—and requires smaller policy-rate changes—to maintain macroeconomic stability.

The FI’s annual mortgage market report (FI, 2024c) provides a thorough analysis of new mortgages and new borrowers. But the turnover of Swedish housing is relatively small; on average 5.4% of the stock of homes are sold and bought each year (section 4.7). As a result, the total stock of

mortgages is much larger than the annual flow of new mortgages. This means that the total stock of mortgages matters much more for financial and macroeconomic stability.

In a pioneering report, [Boije and Hansen \(2024\)](#) have convincingly argued that there has been too much focus on new mortgages and new borrowers, of which a few groups, in particular the young, have relatively high loan-to-value (LTV) and loan-to-income (LTI) ratios. To get a more complete view of the risk to financial and macroeconomic stability from Swedish mortgages, they choose instead to focus on the total stock of mortgages. They use data from Statistics Sweden, UC (Sweden's leading business and credit reference agency), Booli, a survey ordered by SBAB and done by Kantar, and unpublished data collected by the FI during the annual mortgage survey [FI \(2024b\)](#). With such a focus and this data, they conclude that the risks associated with Swedish mortgages have been exaggerated.

I follow the example of Boije and Hansen and include an analysis of the total stock of mortgages and its borrowers, with the data from the FI that they have used but also some additional data from [FI \(2024b\)](#). I confirm their finding that, considering the total mortgage stock and its borrowers, the risks associated with Swedish mortgages have been exaggerated.

There is considerable overlap in analysis and results between [Boije and Hansen \(2024\)](#) and this paper. One difference is that I organize the discussion around the above-mentioned conditions (1)–(3) under which household debt may be a threat to financial and macroeconomic stability. I also emphasize the role of the above-mentioned two structural features that mitigate the threats to financial and macroeconomic stability: mortgages being a safe cash cow for banks, and mortgage rates being endogenous. Another difference is that I include an analysis of the of new mortgages and borrowers (the distribution of LTV and debt-service-to-income ratios among new borrowers), to allow an explicit comparison between them and the total stock of mortgages and its borrowers. I also have a method to calculate the distribution of interest-to-income ratios among the borrowers of the stock, in spite of some limitations of the data. With new informative figures of the cumulative distributions of LTV and interest-to-income ratios, it is easy to compare the distributions among new borrowers, the borrowers of the stock, the owner-occupiers, and all households. Other differences and similarities are mentioned in the text or footnotes.

The results of the paper are summarized in section 7. The main conclusion is that that Swedish household debt is not too high and not a threat to financial and macroeconomic stability.

The paper is organized as follows: Section 2 explains two structural features of the Swedish housing and mortgage markets that impact financial and macroeconomic stability: mortgages are in fact a safe cash cow of the banks and not a threat to financial stability, and mortgage rates are endogenous in a way that improves the macroeconomic stability. Section 3 examines whether Swedish household debt stands out internationally or not. Section 4 examines whether the household debt is too high relative to household assets, both for aggregate data and for individual data for the mortgages as well as the total mortgage stock. Section 5 examines whether household debt service is too high relative to incomes, both for aggregate data and for individual data for the mortgages as well as the total mortgage stock. Section 6 examines whether there is any debt-financed overconsumption of macroeconomic significance. Section 7 includes a summary and conclusions.

An appendix includes additional material. Appendix [A](#) includes a comment on the thresholds for the DTI ratio that have been discussed at the Riksbank and Norges Bank. Appendix [B](#) reports some expressed skepticism about the DTI ratio as an indicator of risk. Appendix [C](#) includes additional figures.

2 Structural factors reduce the risks household debt poses to financial and macroeconomic stability

There are several structural features of the Swedish housing and mortgage markets that mitigate the risks to financial and macroeconomic stability. There are hardly any features that amplify the risks, counter to what is often said.⁵

Swedish households' mortgages are about SEK 4,100bn (EUR 360bn), excluding agricultural mortgages. The consumer loans were about SEK 300bn (EUR 26bn) ([Statistics Sweden, 2024d, 7.1.2, table 2](#)). Consumer loans are thus a relatively small part of household debt. They lead to a big social and consumer-protection problems, but they are not a threat to financial and macroeconomic stability in Sweden.⁶

Mortgages, with owner-occupied housing as collateral, are thus the main part of household debt. Are mortgages a threat to financial and macroeconomic stability in Sweden?

The restriction to Sweden is crucial. Mortgage and housing markets, legal and institutional circumstances, and households' habits and preferences differ a lot between countries. Conclusions from any other country are therefore not necessarily applicable or relevant for Sweden. This is especially the case for experience and conclusions from the US, where clearly mortgages were a threat to financial stability before the financial crisis and the Great Recession. Instead, for mortgages and housing issues, each country and economy normally needs to be analyzed separately.

2.1 Financial stability: Mortgages are a safe cash cow for banks

So, do Swedish mortgages pose a threat to financial stability? Everything considered, the answer to this question is no, by considerable certainty.

For Swedish banks, mortgages are in fact a very safe cash cow, in upturns and downturns, with very little—even insignificant—credit risk. Because of full-regress loans and effective enforcement by the Swedish Enforcement Authority, Swedish mortgagors avoid default. There are no strategic

⁵ The [BIS \(2023\)](#) report on macroprudential policies to mitigate housing market risks notes that structural features of housing markets may amplify or mitigate risks to financial and macroeconomic stability. The report includes case studies of 14 economies, but not of Sweden, unfortunately.

⁶ Considerable media attention, public discussion, and public inquiries concern “overindebtedness”, debt traps, and the Swedish Enforcement Authority’s collecting delinquent debt from households and subjecting them to stringent multi-year debt settlements ([Överskudsättningsutredningen, 2023](#); [Utredningen om överskudsättning, 2013](#)). But all that refers to consumer loans, not to mortgages. “Buy now, pay later”—more appropriately “buy now, pain later,” ([Jenkins, 2024](#))—is prevalent. Several irresponsible lenders provide easy credit to—and trap—individuals with insufficient self-control and financial literacy and make a profit from excessive interest rates and delinquency fees. This is a substantial social and consumer-protection problem, but it is not a problem that poses any risks to financial and macroeconomic stability in Sweden.

defaults, if the value of the home falls below the mortgage. This is in contrast to what was the case in the US. Swedish households make debt-service payments on mortgages a priority over other payments. They have bought housing to live in, not to flip or let. And their average tenure in each dwelling is long, about 10 years for tenant-owned apartments and about 33 years for single-family houses.

Flipping homes—purchases of homes that are renovated and put back on the market to make a profit—is rare. It is certainly not of a magnitude that has any impact on financial and macro-economic stability.

There is no buy-to-let to speak of in Sweden. In contrast to many other countries, there is thus no significant group of investors that create a pure investment demand for owner-occupied housing, with accompanying speculation in future capital gains. Tenant-ownership associations restrict or forbid subletting of tenant-owned apartments, and there are hardly any private investors or firms that buy single-family houses to let.

Mortgages are safe. Credit losses are insignificant after the deep 1990s banking crisis. Even during the crisis, credit losses on mortgages were hardly a problem. Of the loan losses in the four major bank groups at the height of the bank crisis in 1992, only 6% came from the household sector (Sveriges Riksbank, 1998, pp. 15–16). The credit losses during the crisis were mainly on loans to the commercial-property sector and to other non-financial corporations.

Swedish mortgage lenders maintain strict lending standards and subject mortgagors to stringent affordability tests. This way, they make sure that mortgagors can indeed fulfill their debt-service obligations. Typically, mortgagors must be able to manage a stressed mortgage rate of 6–7%. These lending standards were tested in 2022 and 2023, when Swedish mortgagors were subject to a real-time stress test, with rising interest and inflation rates and falling real incomes and housing prices. How did the borrowers that were subject to those lending standards manage? Were there any non-performing mortgages?

The largest mortgage lender in Sweden is Swedbank. Its total mortgage lending in Sweden in 2022 and 2023 was about SEK 1,100bn (about EUR 95bn in 2023), which is just over half of its total lending. In its annual report Swedbank (2024), it reports credit losses during 2022 and 2023 for the so-called stage 3 loans, “mortgages where interest is still being paid [that] could go into default in a forward-looking assessment.” They were 0.05% and 0.19%, respectively, of Swedbank’s total mortgage lending (pp. 37, 92–94). The stage 3 mortgages in 2023 are thus more than three times those in 2022, but they are still only 0.19% of the total mortgage lending. This is a very small fraction, in spite of a large disturbance. These losses are neither a threat to Swedbank nor to financial stability.

Furthermore, the major Swedish banks form a cozy oligopoly. They make profits in both booms and recessions. A large fraction of their profits come from mortgages. The mortgages are to a large extent financed by covered mortgage bonds. This works well. Because the mortgages are so safe, the covered bonds are also safe. Covered bonds are also different from other bonds in that the bond holders (investors, holders) have not only a claim on the bank but also a special right of priority

to assets in a cover pool.⁷ This combination is called dual recourse and distinguishes covered bonds from other bonds. The key components in the credit risk of covered bonds are therefore, first, the issuer’s ability to meet its payment obligations; second, the borrowers’ ability to meet their payment obligations; and third, the value of the underlying collateral for the loans.⁸ All of the Swedish covered bond programs have the highest possible credit rating from credit rating institutions and get a low risk premium relative to Swedish government bonds (Hellström et al., 2019). So the interest rate on the covered bonds is low, and the banks can make a comfortable profit on the spread between mortgage rates and the interest on covered bonds.

Foreign investors buy some of the covered bonds. If some of them—for example, because of imperfect information about the Swedish housing and mortgage markets—would suddenly have doubts about the safety of the banks, mortgages, and the covered bonds, the covered bonds might be difficult to issue and be underpriced. But this would be good opportunity for the Riksbank—and indirectly the tax payers—to, if needed, buy these underpriced bonds. Alternatively, the Riksbank may lend to the banks with these covered bonds as excellent collateral. The Riksbank has practical experience of lending of last resort to the banks, with covered bonds as collateral. The Riksbank also has experience of direct purchases of these bonds.

The Riksbank’s mandate includes to “contribute” to financial stability (Sveriges Riksbank Act, 2023, chapt. 3, section 1). Should problems with the financing of the bank’s lending threaten financial stability, the Riksbank is thus obliged to intervene.

Swedish mortgages have mostly variable mortgage rates or rates with short fixation periods. This has the considerable advantage relative to fixed-rate mortgages with long fixation periods that there are no capital gains or losses on mortgages when interest rates change. The mortgages are not only safe with respect to the debt service. They are also safe with respect to the price of the mortgage.

Swedish banks are subject to regular stress tests specified by the European Banking Authority (ESRB, 2023). Because Sweden have been—mistakenly, according to Svensson (2024)—considered to have the largest overvaluation of its housing, Swedish banks are subject to more demanding stress tests than other EU banks, including a large housing-price fall. Nevertheless, Swedish banks have managed the tests quite well (FI, 2023a).

Overall, because mortgages are such a safe cash cow for banks, at a closer watch they rather support financial stability than threaten it.

2.2 Macroeconomic stability: Mortgage rates are not exogenous

However, given that mortgagors make it a priority to fulfill their debt-service obligations, one might think, as does the FI, “that highly indebted households may end up reducing their consumption if

⁷ This cover pool consists of assets that are held on the bank’s balance sheet but must be separate from the other assets of the business. Assets can be loans collateralised by tenant-owned apartments or single-family homes. The interest rate on a covered bond must be paid by the issuer, but investors also have additional layers of protection in the form of the loans in the cover pool and the collateral pledged for these loans (Hellström et al., 2019).

⁸ The collateral is good. Swedish housing is not overvalued but undervalued, according to Svensson (2024). See also section 4.3 and figure C.4.

interest rates rise, if household income falls or if both of these happen at the same time, and that this, in turn, may intensify a future economic downturn” (the second FI quote on page 3).

We can agree that, *if* incomes would fall and at the same time interest rates rise, highly indebted households would be in a tight spot. This would especially be the case if mortgages mostly have variable rates, as in Sweden. But how likely is it that income drops and interest rises would happen at the same time?

The quote above may misleadingly give the impression that income and interest-rate movements are independent and exogenous. But this is not so, under a monetary policy of flexible inflation targeting. Then, policy-rate movements are the Riksbanks endogenous responses to disturbances to incomes, inflation, and other variables in the economy. As a result, income drops are likely to be correlated with interest-rate *falls*, *not* rises. And for the rare occasions when income drops and interest-rate rises go together, the interest-rate rise is carefully calibrated by the Riksbank to reduce inflation but *not* to decrease incomes, consumption and aggregate too much and risk macroeconomic instability.

2.2.1 The Riksbank sets interest rates to maintain macroeconomic stability

High mortgages with variable interest rates make the household cash flows sensitive to interest rate changes. However, it is important to recognize that changes in Swedish mortgage rates are not exogenous shocks but rather changes consciously tolerated or purposefully intended by the Riksbank. The Riksbank can, for example, influence the spread between (variable) mortgage rates and the policy rate, and thus indirectly control mortgage rates by influencing banks’ financing costs, such as by purchasing covered mortgage bonds. In practice, short-term mortgage rates move almost one-to-one with the policy rate, see figure C.10.⁹

High mortgages with variable rates create a strong cash-flow channel for monetary policy (La Cava et al., 2016; Flodén et al., 2021; Di Casola and Iversen, 2019). Through this channel, the Riksbank can influence the cash flow and consumption of mortgage holders, thereby affecting aggregate demand. This gives the Riksbank significant opportunities to maintain macroeconomic stability during periods of income and housing price declines. The strong cash flow channel also means that smaller interest rate changes and less interest rate volatility are required to maintain macroeconomic stability. This in turns means that the effective lower bound (ELB) for the policy rate is less likely to bind.

In addition, the ELB is likely to be lower in Sweden than in most (or all) other countries. The banks, according to the reasoning in section 2.1 above and the experience 2015–2019 also make profits with negative policy rates. Bank’s gross mortgage margin between mortgage rates and covered bonds rates stayed high during those years of negative policy rates (figure C.11). Cash use is also very low and falling in Sweden. Many stores and bank offices do not accept cash. Attempting to make large cash payments gives rise to money-laundering suspicions and inquiries by the banks.

⁹ The exception is the poorly justified hike in the policy rate in December 2019 and 2020, where mortgage rates did not follow suit and instead fell slightly.

The Riksbank’s mandate includes “to maintain permanently low and stable inflation” and “to contribute to a balanced development of production and employment” (Sveriges Riksbank Act, 2023, chapt. 2, section 1). This means that the Riksbank is responsible for maintaining macroeconomic stability. The Riksbank must use the policy rate and other tools to maintain macroeconomic stability; otherwise, it would be violating the Riksbank Act.

It is common in discussions about risks and macroprudential oversight to unreflectively claim that high mortgages and variable rates make borrowers more vulnerable. But that alone is not sufficient. One must also consider the cash flow channel and how mortgage rates systematically vary when the Riksbank sets the policy rate to maintain macroeconomic stability. The net result of high mortgages and variable mortgage rates is rather that borrowers become less, rather than more, vulnerable.

In the event of a negative aggregate-demand shock, a general fall in incomes, and economic downturn, the normal policy response is to lower policy rates and indirectly mortgage rates. This way the Riksbank reduces mortgage holders’ interest payments and helps them maintain their consumption to a greater extent. This limits the decline in mortgage holders’ consumption and the economic downturn. Mortgage holders thus have a kind of insurance against a general fall in incomes. Homeowners with smaller or no mortgages (or mortgages with fixed rates) and renters do not have this insurance. Paradoxically, they are therefore more sensitive to income declines than mortgage holders with large loans.

Recently, following a negative supply shock and a positive inflation shock resulting in high inflation 2022–2023, the Riksbank has raised interest rates to reduce aggregate demand—including through the cash-flow channel—in order to return inflation to the inflation target. However, this interest rate hike is carefully calibrated to maintain an appropriate balance between inflation reduction and a decline in consumption and aggregate demand. Of course, the Riksbank does not want to raise interest rates so much that consumption collapses uncontrollably. If the rate hike in any way affects banks, threatening financial stability, this would also be taken into account in the calibration. After all, the Riksbank’s mandate also includes to contribute to financial stability, as noted above in section 2.1.

Absent debt-financed overconsumption (section 6), a decline in housing prices does not necessarily affect mortgage holders’ consumption, as it does not necessarily impact their cash flow. There are no margin calls on mortgages. Should mortgage holders nevertheless reduce their consumption in response to a general housing-price decline to an extent that is deemed too large by the Riksbank, the Riksbank can, if necessary, lower the policy rate, reduce mortgage holders’ interest payments, and thus stimulate their consumption. A drop in mortgage rates also increases demand for housing and limits the price decline. High mortgages and variable mortgage rates provide mortgage holders with a kind of insurance also against a general housing price decline.¹⁰

The risks and consequences of homeowners getting negative home equity is further discussed in section 4.7.2.

¹⁰ The marginal propensity to consume (MPC) for changes in cash flow is normally much larger than for changes in housing prices.

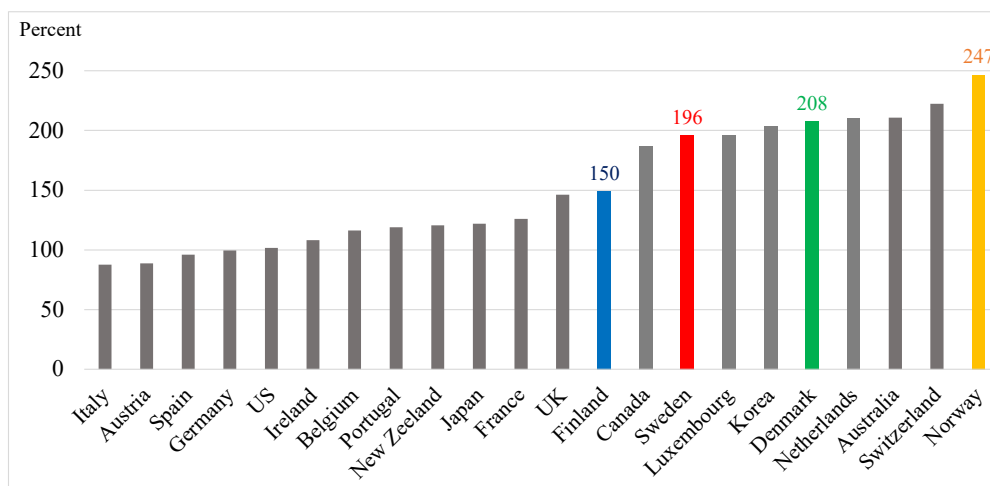
The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes.

3 Does Swedish household debt stand out internationally?

Does Swedish household debt stand out in an international perspective and relative to comparable countries? This has been a common view among several authorities, including the Riksbank. Recall in the quote from the Riksbank on page 2 that the Riksbank thought that household indebtedness posed the greatest risk in the Swedish economy and that households were highly indebted in international comparisons. (Sveriges Riksbank, 2019)

But what does the data show? Figure 3.1 shows household DTI ratio for OECD countries with a DTI ratio of 85% or more. It is not clear that Sweden stands out in any sense. The most comparable group of countries are the Nordic ones of Denmark, Finland, and Norway. Sweden does neither stand out among those. Denmark and Norway have higher DTI ratios. Among the other OECD countries, Luxembourg, Korea, the Netherlands, Australia, and Switzerland had higher DTI ratios in 2022. Canada had a marginally lower DTI ratio.

Figure 3.1: Household debt-to-income ratio for OECD countries with a DTI ratio of 85% or more in 2021.



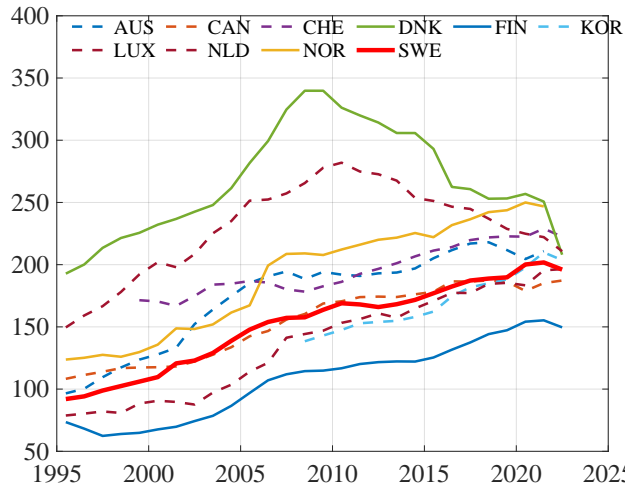
Source and note: OECD (2024a). Annual data, 2022 or latest available. Percent of net disposable income.

Figure 3.2 shows a time series of DTI ratios for the ten countries with at least 150% DTI ratio in 2021. The time series for Sweden hardly stands out.¹¹

Furthermore, country differences in DTI ratios are affected by a number of factors such as the structure of housing and mortgage markets, household customs and preferences, the share of owner-occupied housing, the availability of rental housing, the average LTV ratios, and so on. Countries

¹¹ See Evidens (2015) for an early thorough and extensive scrutiny of Riksbank assertions about Swedish household debt, including a similar figure with similar conclusions.

Figure 3.2: Household debt-to-income ratio for OECD countries with a DTI ratio of 150% or more in 2021, 1995–2022.



Source and note: OECD (2024a). Annual data. Percent of net disposable income.

are very different in these aspects. Superficial international comparisons of DTI ratios have little or no informational value. In such superficial comparisons, Swedish household debt hardly stands out among comparable countries.¹²

The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes. The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes.

4 Debt relative to assets: Solvency

Household debt can become a threat to financial and macroeconomic stability under condition (1) mentioned in the introduction: The debt becomes too high relative to assets, that is, the households' solvency (net wealth relative to total assets) becomes too low. Then households' resilience to negative asset-price shocks may then become too low.

How large are household assets relative to household debt? And how have assets been growing relative to debt?

4.1 The debt-to-income ratio and its growth in the long run

But first, let us look at the DTI ratio and its growth in a longer run. Many seem to consider a growing DTI ratio as unsustainable. Many think that the DTI ratio should not rise but be about

¹² Boije and Hansen (2024, pp. 28–30) provide a comparison between Swedish and Finnish households' assets and debt.

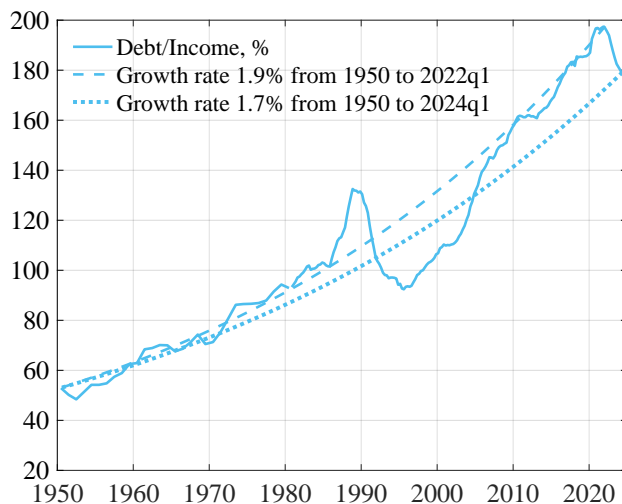
constant or even fall over time, as [Ingves \(2014\)](#) in the above quote on page 1.

However, we have already seen in figure 3.2 that a steady increase in the DTI ratio since 1995 has not been uncommon among comparable OECD countries. For Sweden, figure 4.1 gives a longer-run perspective, from 1950 to now. The figure reveals that the recent growth rate of the DTI ratio since 2010 to 2022q1 has been rather normal during the last 70 years.¹³

The main exception to a relatively steady growth rate of the DTI ratio of about 1.9% is during the overheating before the 1990s crises, the deep recession during the crises, and the slow recovery after. Another exception is the recent fall of the DTI ratio after the Russian attack on Ukraine and the subsequent rise in energy prices, inflation, the policy rate, and mortgage rates. Because of the rise in inflation, the Riksbank has increased the policy rate, and thereby mortgage rates. Rising mortgage rates have reduced housing prices, and the fall in housing prices have reduced mortgage and debt growth. Meanwhile, the growth of disposable income has held up (figure C.5) so the DTI ratio has fallen.

It is common to show a DTI figure with a starting point in mid 1990s, as in figure 1.1. But using the trough of the DTI ratio as the starting point arguably creates a somewhat biased impression.

Figure 4.1: Household debt-to-income ratio and its growth rate, 1950–2024q2. Percent.



Source and note: [Statistics Sweden \(2024h,i\)](#) and own calculations. Income is net disposable income, annual or a trailing moving 4-quarter sum. Quarterly data from 1980q4. The latest observation is 2024q2.

4.2 Assets-to-income ratios and their growth rates

As said, looking at the household DTI ratio only is common. But looking at debt without looking at assets and net wealth provides a partial and misleading picture. One needs to look the whole balance sheet, not just the debt. Are there enough assets? Are the households solvent? Can they repay their debt by selling assets?

Figures 4.2 shows household assets, net wealth, and debt, all relative to income. The light-blue line at the bottom of the figure shows the DTI ratio and corresponds to the DTI ratio in figures 1.1

¹³ [Boije and Hansen \(2024, pp. 16–18\)](#) discuss reasons for the growth of the DTI ratio.

and 4.1. When compared to the assets- and net-wealth-to-income ratios in figure 4.2, the DTI-ratio definitely looks much less scary than in figure 1.1. Total assets and net wealth in 2024q2 were more than 5.5 and 4.5 times debt, respectively (figure C.3). The ratios to debt have increased substantially since 2010.

Figure 4.2: Ratios of household assets, net wealth, and debt to income from 1980 and growth rates from 1985. Percent.

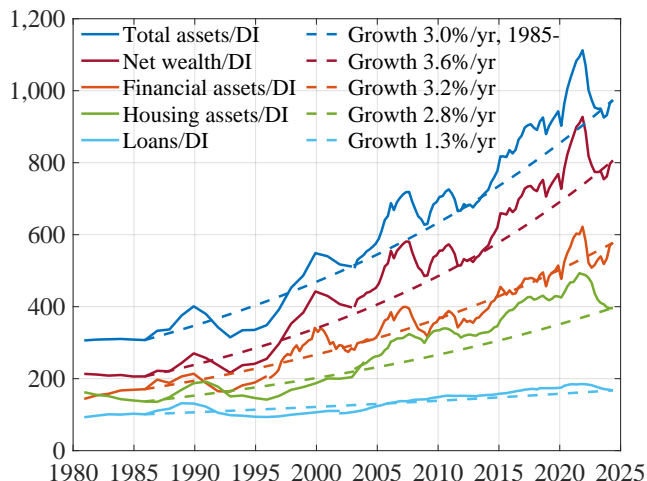
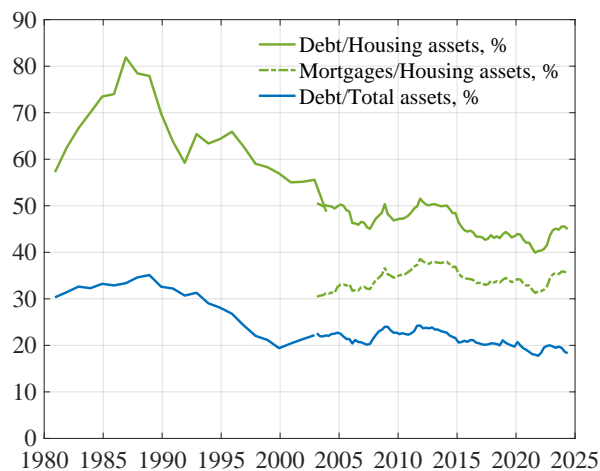


Figure 4.3: Ratios of household debt and mortgages to housing and total assets from 1980. Percent.



Source and note: [Statistics Sweden \(2024a,b,d\)](#), and own calculations. Financial assets exclude tenant-owned apartments (which are considered financial assets by Statistics Sweden). Housing assets include owner-occupied single-family houses, tenant-owned apartments, and seasonal and secondary homes. Total assets are the sum of housing and financial assets. Farm mortgages are excluded from 2006. Quarterly data from 2003q1. The latest observation is 2024q2.

Figure 4.2 also shows average annual growth rates for the period from 1985 to 2024q2. We see that the ratios of total assets, net wealth, financial assets, and the owner-occupied housing assets to income have all grown faster than the DTI ratio, at double or even close to triple rates. Figure C.1 shows that assets have grown much faster than debt also for the period from 1995. Thus, a rise in assets- and debt-to-income ratios over time has been completely normal in Sweden during the last almost four decades. Whereas the DTI ratio has grown by 1.3% per year since 1985, the net-wealth-to-income ratio has grown by 3.6%, almost triple the rate. Net wealth has grown from about 2 times the debt in 1985 to almost 5 times the debt in 2024q2 (figure C.3).¹⁴

4.3 The debt-to-housing-assets ratio and the average loan-to-value ratio

Figure 4.3 further illustrates that the increase in the DTI ratio does not seem too high relative to the increase in assets-to-income ratios. The debt-to-housing-assets ratio has been on a downward trend since the late 1980s and was about 45% in 2024q2. Mortgage debt is about 80% of total debt. The mortgage-debt-to-housing-value ratio, the average LTV ratio in the stock of housing, was about 35% in 2024q2.

¹⁴ [Boije and Hansen \(2024, pp. 23–28\)](#) provide a detailed discussion of Swedish households' debt and different assets.

Figure 4.4 shows monthly data on households’ housing assets and mortgages in SEK bn. The solid green line shows housing assets peaking in May 2022 and then falling through 2023 and stabilizing in 2024. The solid blue line shows mortgages. The dash-dotted green line shows the mortgage-to-housing-assets ratio, the aggregate LTV ratio. It fell to close to 30% at the end of 2021 and has since risen to about 35% in July 2024, about the same value as in March 2015.

Figure 4.4: Household housing assets and mortgages. SEK bn.

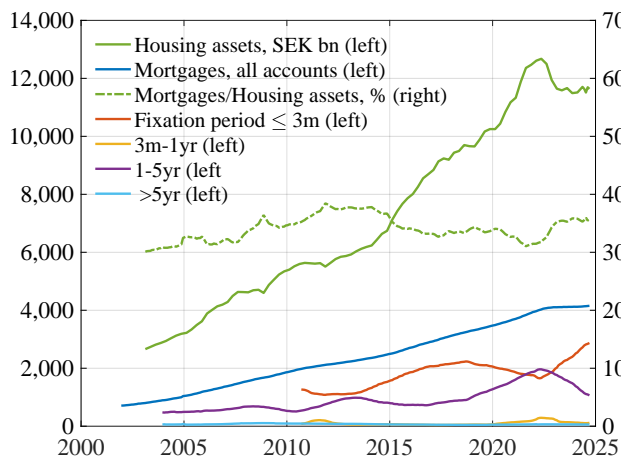
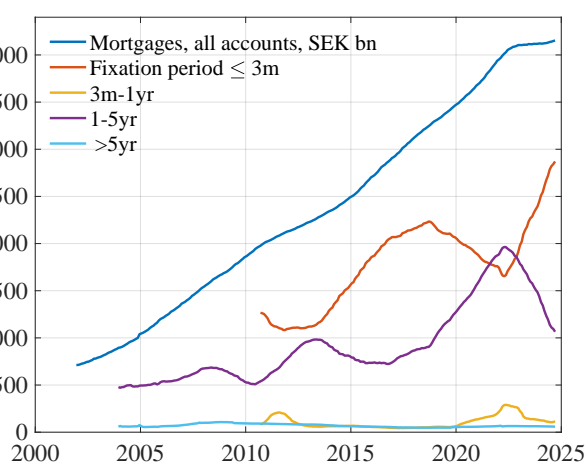


Figure 4.5: Household mortgages. SEK bn.



Source and note: [Statistics Sweden \(2024a\)](#), [Valueguard \(2024\)](#), and [Statistics Sweden \(2024d, 7.3.1, table 1; 7.5.1, table 1.\)](#). The latest observation for housing assets (owner-occupied single-family houses, tenant-owned apartments, and second homes) is 2024q2. Housing assets have been extrapolated beyond 2024m5 with the price index HOXSWE. The latest observation is September 2024.

Figures 4.2–4.4 indicate that the Swedish households’ aggregate balance sheet is strong and healthy, and far from fragile, also after recent housing-price falls. Just plotting DTI ratios give a rather misleading impression. Adding assets-to-income ratios to the plot is informative and gives a more relevant impression.

Furthermore, the collateral of the mortgages is good. According to the user-cost-to-income calculations in [Svensson \(2024\)](#), Swedish housing price are not too high. Instead, Swedish houses were undervalued by about 20% in 2024q2, according to the user-cost-to-income ratio and its percentage deviation from its historical average. This calculation takes into account a preferences shift 2020–2021 in favor of better and larger housing ([Sveriges Riksbank, 2021](#)). See figure C.4, which reproduces [Svensson \(2024, figure 1.1\)](#).

In addition, households are not overoptimistic but have realistic expectations of future mortgage rates and housing-price growth. This is illustrated in figures C.7 and C.8, respectively. See [Svensson \(2024, section 3.2\)](#) for further discussion.

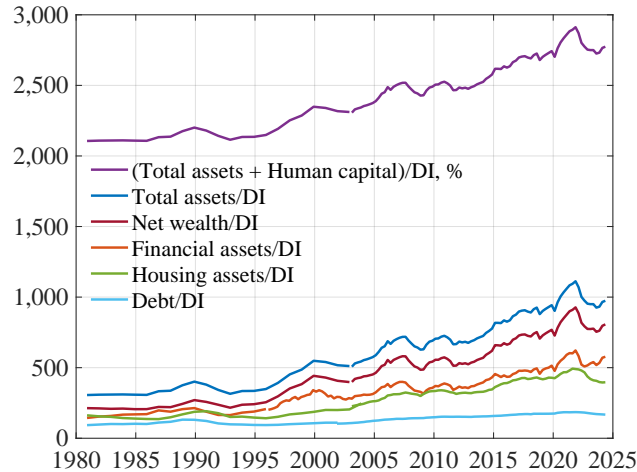
In summary, according to aggregate data, household debt is not too high relative to assets. Household solvency is high and has grown steadily over time.

4.4 Human capital

Households’ human capital is large and adds to the picture. Households as owner-occupiers differ from commercial-property and rental-property firms in that they normally have a substantial income

in addition to the (imputed) income from their property, namely their earned disposable income. The human capital, the earnings capacity, can be measured by the present value of future after-tax earnings. It is a large off-balance-sheet item of the households.

Figure 4.6: Ratios of household assets including human capital to income, 1980–2021. Percent.



Source and note: See note to figure 4.2. Human capital is the present value of 30 years of earned disposable income, which is set to 60% of disposable income (Statistics Sweden, 2017; Ekonomifakta, 2024). The discount and growth rates are assumed to be the same, so the present value is just the sum of 30 years of earned income. The latest observation is 2024q2.

Consider the after-tax earned income in Sweden to be about 60% of disposable income (Statistics Sweden, 2017; Ekonomifakta, 2024). Let human capital be approximated by the present value of 30 years of earned income. From figure C.5, we see that net disposable income has grown by 4.3% per year since 1995. Assume that the growth rate will be about 4% for the next 30 years. Assume that the relevant nominal discount rate will also be about 4%. Then the present value of 30 years of after-tax earned income is simply 60% of 30 times current disposable income, that is, 18 times disposable income.

Thus, whereas the DTI ratio is about 190% and the total-asset-to-income ratio is about 950% in 2024q2, the human-capital-to-income ratio is about 1,800%. Thus, the ratio of the sum of the total-assets-and-human-capital-to-income ratio is about 2,750% (figure 4.6). Debt is thus only about $1.9/27.5 = 7\%$ of the sum of total assets and human capital (see Svensson, 2014, for similar earlier calculations).

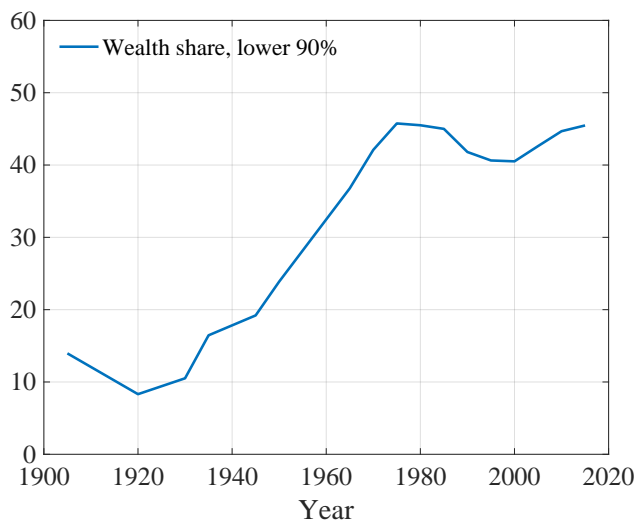
4.5 The distribution of net wealth: Not more unequal

When people hear that Swedish households' assets and net wealth have grown significantly faster than their debt, a frequent response is that the assets and net wealth are unequally distributed and that the distribution has become even more unequal during the last few decades, in Sweden and other countries. This is often with reference to the narrative in Piketty (2014).

However, the common view that the wealth distribution has become more unequal in recent decades has recently been challenged, in general and for Sweden, by Waldenström (2024a,b). According to Waldenström, wealth gaps are much smaller today than they were a hundred years ago,

and they have not increased during the latest decades.

Figure 4.7: The wealth share of the lower 90% in Sweden, 1905-2015. Percent



Source and note: [Waldenström \(2024b, figure 5.1\)](#). The figure shows the share of the total private wealth that is held by the lower 90%, the 90th percentile, of the adult population in Sweden. Five-year averages.

As an example, figure 4.7 shows the rising wealth share of the lower 90% of the Swedish adult population (and indirectly the falling wealth share of the top 10%). In particular, the figure shows that the wealth share of the lower 90% rose rapidly from about 10% in 1920 to about 45% around 1975. Then it fell to about 40% around 2000, but has recently risen again to about 45%, the same level as around 1975.

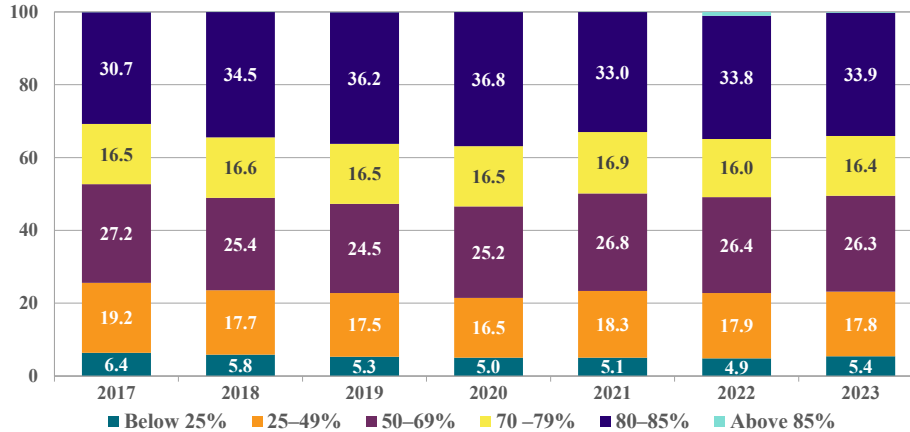
Waldenström shows that the increasing housing wealth and pension claims are the main explanations of this overall fall in wealth inequality.

4.6 Individual household data: New borrowers

The above discussion refers to aggregate data. So do most warnings about household debt from Swedish authorities and international organizations. But disaggregate and individual data provides more precise information.

For mortgages and the related collateral, owner-occupied housing, the FI's annual report *The Swedish Mortgage Market* presents and analyzes disaggregate data on individual new mortgage borrowers ("new borrowers"). The latest issue ([FI, 2024c](#)) uses data from the early fall of 2023. The contracts were likely to have been concluded a few months earlier, that is, during the summer of 2023 at the corresponding housing prices and mortgage rates then ([FI, 2024c, p. 5](#)).¹⁵

Figure 4.8: The distribution of LTV ratios among new borrowers. 2017–2023. Percent.



Source and note: FI (2024c, diagram 14). Refers to new loans (mortgages for home purchases, home-equity-withdrawal loans, and loan moves—bank switches).

4.6.1 The distribution of LTV ratios among new borrowers

Figure 4.8 (FI, 2024c, diagram 14) shows the distribution of LTV ratios over time among new borrowers. We see that about 50% of the new borrowers have LTV ratios above 70%. Almost none has an LTV ratio over 85%.

Figure 4.9 (FI, 2024c, diagram 15) shows the distribution of LTV ratios among new borrowers in 2023, with loans separated into loans intended for home purchases and home-equity withdrawals. We see that 46% of the new borrowers with loans intended for home purchase had LTV ratios in the 80–85% interval. Those that withdrew home equity had lower LTV ratios.

For new borrowers with loans intended for home purchases, the average LTV ratio was just under 68%, which was slightly lower than in 2022. For those withdrawing equity, the average LTV ratio was approximately 61%, which was about the same as in 2022. The average LTV ratio for all new borrowers was approximately 64% in 2023. It has remained approximately the same since 2017 (FI, 2024c, p. 22).

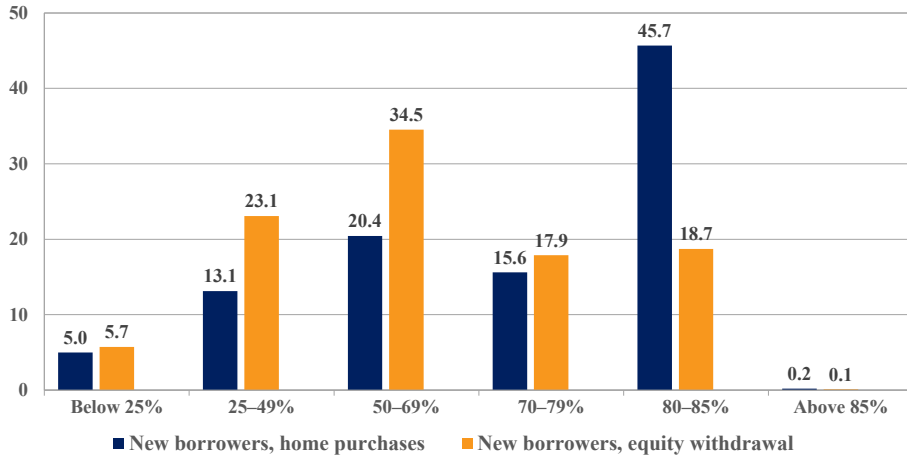
4.7 The total mortgage stock matters more for financial and macroeconomic stability than the annual flow of new loans

The annual turnover of the total stock of Swedish owner-occupied homes is relatively small. Only about 3% of all owner-occupied single-family houses and 10% of all tenant-owned apartments in Sweden are sold each year.¹⁶ Of the total stock of owner-occupied homes, on average 5.4% are sold

¹⁵ The sample includes all new mortgage agreements for which the mortgage was paid out during the periods August 24–September 4, 2023, and September 25–October 2, 2023, with the eight largest mortgage institutions, which accounts for approximately 93% of the total mortgage lending in 2023. New mortgages include those for the purposes of buying a home as well as home-equity withdrawal and loan moves (meaning mortgages moved from one lender to another).

¹⁶ This implies that an approximate measure of the average length of home ownership is about 33 years for single-family houses and 10 years for apartments. See Bengtsson (2022) for a thorough discussion of the mobility of owners and renters over time in the Swedish housing market.

Figure 4.9: The distribution of LTV ratios among new borrowers by type of mortgage. Percent.



Source and note: FI (2024c, diagram 15). Refers to new mortgages for home purchases and for home-equity withdrawals, respectively.

each year (figure 4.10).

Figure 4.10: Owner-occupied housing stock, annual sales, and the share of annual sales, 2001–2022.

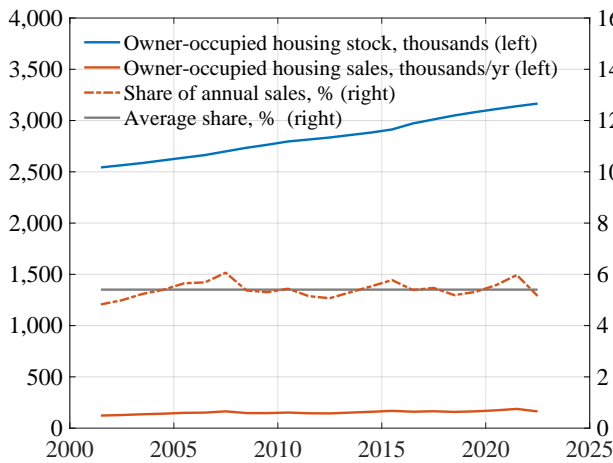
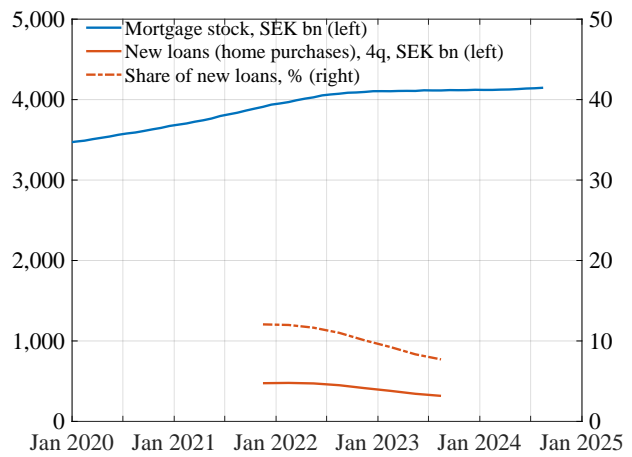


Figure 4.11: Mortgage stock, annual new loans intended for home purchases, and the share of new loans, 2021q4–2023q3.



Source and note: Figure 4.10: Statistics Sweden (2024,n,o). Figure 4.11: Statistics Sweden (2024d, 7.3.1, table 1. MFIs', mortgage credit companies and AIFs' lending to households, excluding NPISH), FI (2024b), and own calculations. New loans are 4-quarter trailing sum of quarterly loans. The data for new loans include HEW. The average of HEW for a subset of lenders that separately report HEW is about 23% of the new loans. New loans intended for home purchases are therefore approximated as 77% of the new loans.

Given that there are about 1.04 dwellings per owner-occupying household in Sweden, one may take the flow of annual new borrowers to be about 5.2% of the owner-occupiers. The number of new borrowers is indeed a small fraction of the owner-occupiers.¹⁷ Boije and Hansen (2024) report

¹⁷ In 2022, the number of owner-occupied dwellings was 3,165,405 (figure 4.10). The number of owner-occupiers (owner-occupying households) was 3,031,628 (Statistics Sweden, 2024k), implying 1.04 dwellings per owner-occupier. The number of sales was 163,301 (figure 4.10). Assume that the same proportion of dwellings to households apply to the annual sales and purchases, and that all purchases involve a mortgage. (Real-estate agents have confirmed that

that only 65% of the owner-occupiers have a mortgage. Given this, the annual number of new borrowers are 7.9% of the borrowers of the stock.

The annual flow of new loans intended for home purchases was about 12% of the stock in 2021–2022 and fell to 8% in 2023 (figure 4.11). The share of new loans is larger than the share of sales and new borrowers, because the new loans are on average larger than the old ones, but the share of new loans intended for home purchases is still relatively small. The stock therefore matters more for financial and macroeconomic stability than the annual flow.

Boije and Hansen (2024) have collected quite a few key facts on the Swedish housing, mortgage market, and total stock of mortgages. Two basic facts and an implication are:

- Of the Swedish households, 38% are renters and 62% are owner-occupiers (Statistics Sweden, 2024k).
- Of the owner-occupiers, only 65% have a mortgage (Boije and Hansen, 2024).
- This implies that only a minority of all households, $(0.62 \times 0.65 =)$ 40%, have a mortgage.

These basic facts will be used below to infer the distribution of LTV ratios among owner-occupiers and among all households from the distribution among the borrowers of the mortgage stock.

4.7.1 The distribution of the LTV ratios in the total stock of mortgages

In connection with its annual mortgage survey (FI, 2024b), the FI also collects data about the total mortgage stock, including the distribution of LTV and LTI ratios among borrowers. Figure 4.12 shows the distribution over time of the LTV ratios among the 40% of Swedish households that have a mortgage, the “borrowers.” This should be compared to the distribution over time of the LTV ratios among the “new borrowers” in figure 4.8.¹⁸ We see that the LTV ratios are substantially lower among the borrowers than among the new borrowers.¹⁹

In figure 4.13, the dark-blue bars show the distribution of LTV ratios among new borrowers with loans intended for home purchases in 2023, the same as the dark-blue bars in figure 4.9. (From now on, “new borrowers” refer to those with loans intended for home purchases.)

The light-blue bars show the distribution of the LTV ratios among the borrowers of the total mortgage stock in 2023. The orange bars show the distribution of the LTV ratios among the owner-occupiers—the borrowers of the mortgage stock plus the outright owners. Of the owner-occupiers, 35 percent have no mortgage and are outright owners. The green bars show the distribution of the LTV ratios among all households—the 62% that own their housing plus the 38% that rent. Of these, 60% have no mortgage.

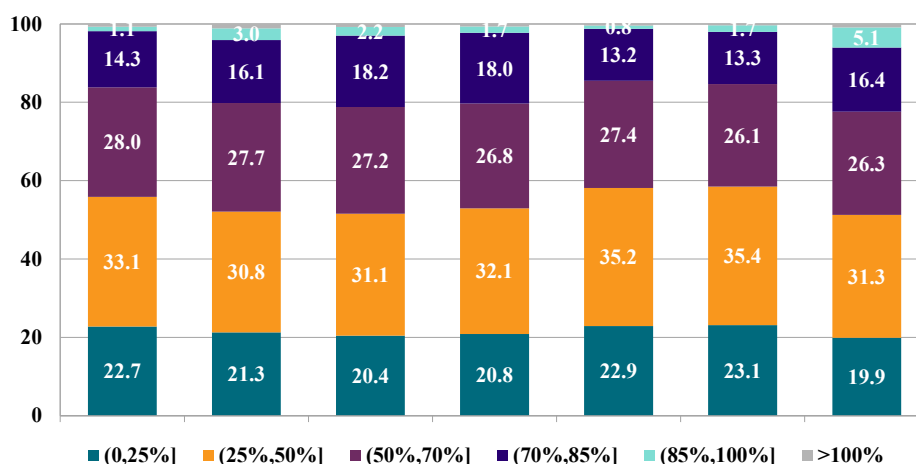
In figure 4.14, the dark-blue histogram shows the exact cumulative distribution of the LTV ratios among new borrowers, which follows from the scatter plot in figure 5.3. The light-blue,

almost all new home purchases involve a mortgage.) Then, the number of new borrowers (borrowing households) with loans intended for home purchases is 156,400, about 5.2% of the owner-occupiers. Lacking more direct and precise data on the annual number of new borrowers, I take 5.2% as an approximate share of new borrowers among owner-occupiers.

¹⁸ Note that, by the FI’s original data, the LTV interval of 70–85% is separated into the two intervals of 70–79% and 80–85% for new borrowers in figure 4.8 but not for borrowers in figure 4.12.

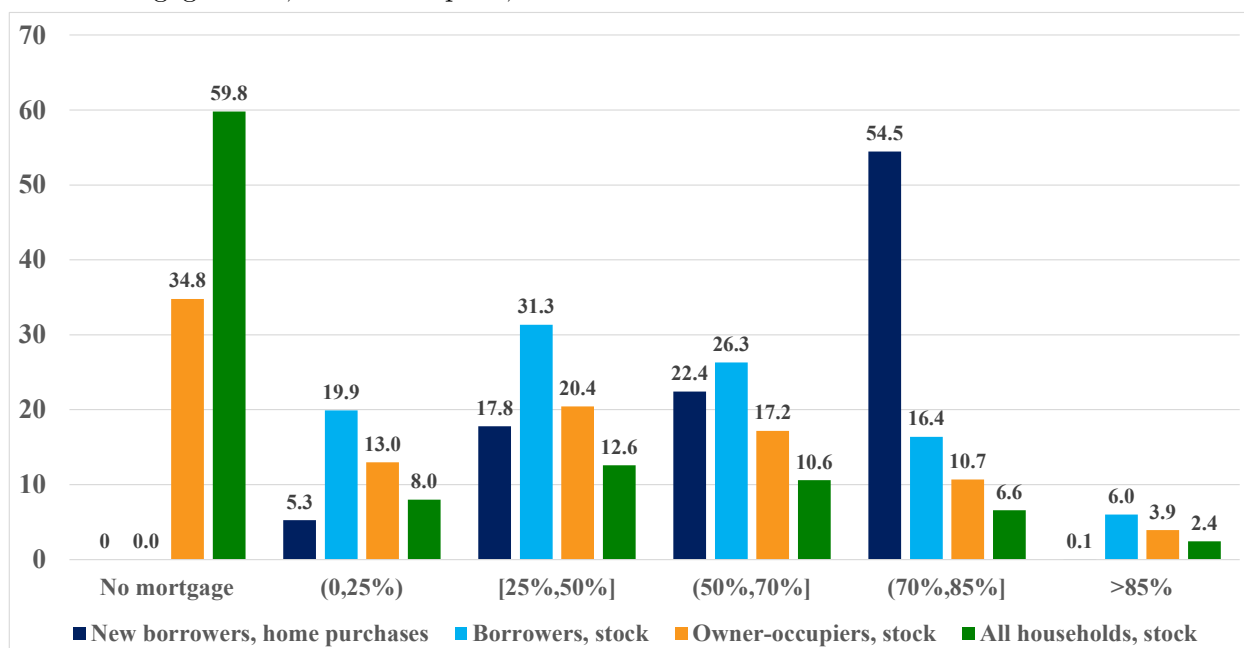
¹⁹ See Boije and Hansen (2024, pp. 11–13) for their discussion the LTV ratios in the mortgage stock.

Figure 4.12: The distribution of LTV ratios among borrowers of the total mortgage stock, 2017–2023. Percent.



Source and note: Mortgage stock data from the FI, not published in FI (2024c). Also published in Boije and Hansen (2024, table 2). During 2017 and 2018, 7 of 8 banks reported their data, from 2019 all 8 banks. The interval $(a\%, b\%)$ is equivalent to $a\% < LTV \leq b\%$.

Figure 4.13: The distribution of LTV ratios among new borrowers (home purchases) and borrowers of the mortgage stock, owner-occupiers, and all households. 2023. Percent.

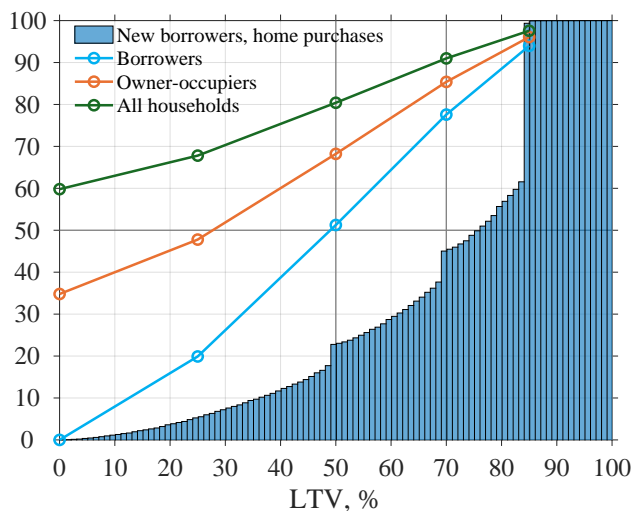


Source and note: Boije and Hansen (2024), FI (2024b), FI (2024c, diagram 15), Statistics Sweden (2024k). Borrowers refer to the borrowers of the total mortgage stock. Owner-occupiers include borrowers of the total mortgage stock and outright owners. The intervals 70–79% and 80–85% in diagram 15 have been combined to 70–75% to simplify comparison with the stock data, and LTV ratios above 85% have been consolidated. The interval $(a\%, b\%)$ is equivalent to $a\% < LTV \leq b\%$.

orange and green lines and markers show the approximate cumulative distribution of the LTV ratios among borrowers, owner-occupiers, and all households, respectively. They are constructed from the distributions in figure 4.13.

Here we clearly see a dramatic difference between the LTV ratios of the new borrowers and those

Figure 4.14: The cumulative distribution of LTV ratios among new borrowers with loans intended for home purchases and the approximate cumulative distribution of LTV ratios among borrowers, owner occupiers, and all households, 2023. Percent.



Source and note: For the light-blue, orange, and green lines, see notes to figure 4.13. The piecewise linear approximation is equivalent to assuming a constant probability density between edges. The dark-blue histogram: Data for FI (2024c) and own calculations. The sample includes all mortgage contracts intended for home purchases entered into during the periods August 28–September 4, 2023, and September 24–October 2, 2023 (FI, 2024c, p. 7). For a scatterplot of the data, see figure 5.3.

of the borrowers of the mortgage stock. Whereas 55% of the new borrowers have LTV ratios above 70%, only 22% of the borrowers of the stock have LTV ratios above 70%. For the owner-occupiers and for all households, only 15% and 9% have LTV ratios above 70%.

It is difficult to see that these small percentages of borrowers, owner-occupiers, and all households with LTV ratios above 70% can be threat to financial and macroeconomic stability. And the annual flow of new borrowers, with higher LTV ratios, are only about 8% of the borrowers.

Furthermore, whereas the median LTV ratio of the new borrowers is 76%, the median for borrower is marginally just below 50%, and for owner-occupiers it is marginally above 25%.

So, what are the risk and consequences of a fall in housing prices?

4.7.2 What are the risks and consequences of negative home equity from a fall in housing prices?

From figure 4.14 we can see that not more than 22% of the borrowers have LTV ratios over 70%. This means that for a very large fall of housing prices by 30%, a only 22% of the borrowers would have negative equity. Of the owner-occupiers, only 15% would have negative equity, and of all households, only 9% would not have negative equity. These are rather modest shares, in spite of a very large fall in prices.

Thirty percent is indeed a very large fall. Not even during the deep banking crisis in the 1990s, did housing prices fall by so much.²⁰

²⁰ As noted in Svensson (2024), the ESRB has—mistakenly, due to the use of misleading indicators—considered that Swedish housing was overvalued by about 55% in 2021 (ECB, 2023; ESRB, 2022), the largest reported overvaluation in the European Economic Area (the EU as well as Iceland, Liechtenstein, and Norway). This affected the stress tests of the European Banking Authority that Swedish banks are subject to (ESRB, 2023). Because Sweden is

Figure 4.15: Housing-price peaks and falls.

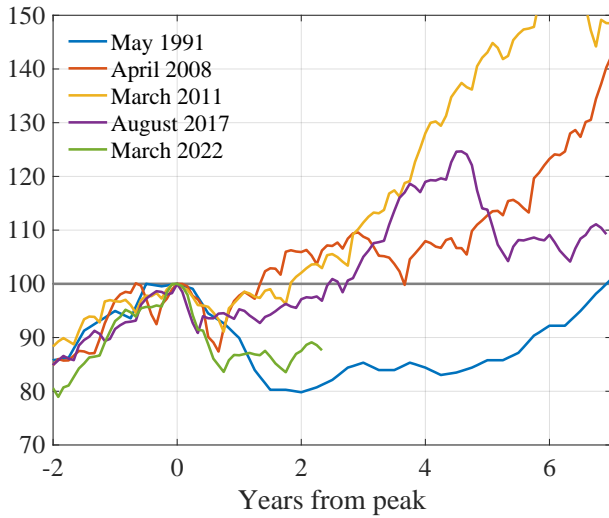
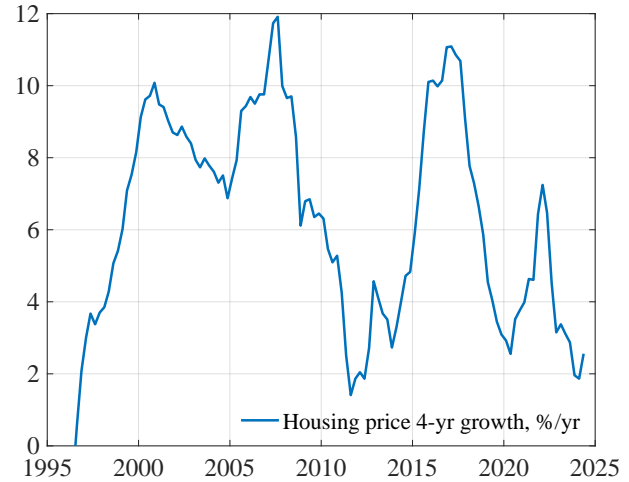


Figure 4.16: Four-year housing-price growth, annual rate.



Source and note: Figure 4.15: May 1991, [Statistics Sweden \(2024m\)](#); April 2008–March 2022, [Valueguard \(2024\)](#); and own calculations. Figure 4.16: [Statistics Sweden \(2024m\)](#) before 2005q1, [Valueguard \(2024\)](#) from 2005q1, and own calculations.

What examples of housing-price falls are there during the last 40 years in Sweden? Figure 4.15 shows the five peaks and falls of Swedish housing prices since 1975.²¹ We see that the fall in housing prices after the peak in May 1991, during the banking crisis of the 1990s, is an exception. It was deep, 20% from the peak, and it took a full 7 years for prices to recover. The crisis in the 1990s was indeed an exception, in several ways. There was a fixed exchange rate; monetary policy was aimed at defending the fixed exchange rate. The economy was quite overheated before the crisis, due to lax fiscal policy. Lending standards were also lax, for loans to corporations, commercial property, and households. Monetary policy became extremely tight in defending the fixed exchange rate against speculative attacks, before the krona was floated in November 1992. Monetary policy remained very tight after, in order to achieve credibility of the inflation target of 2%, which was introduced in January 1993. Policy rates were thus countercyclical instead of procyclical, the latter being normal under credible inflation targeting and mostly aggregate-demand shocks. A tax reform in 1990–91 implied a large sudden increase in real after-tax mortgage rates ([Englund et al., 1995](#)). (See figure 5.1 for the resulting before-tax interest rate and after-tax interest-to-income ratios.) Several banks were in deep crisis. Unemployment reached unprecedented levels, and GDP fell a large amount. Nevertheless, perhaps somewhat surprising, credit losses from mortgages were hardly a problem. Of the loan losses in the four major bank groups at the height of the banking crisis in 1992, only 6% came from the household sector ([Sveriges Riksbank, 1998](#), pp. 15–16).²²

considered having the largest overvaluation, Swedish banks are subject to more demanding stress tests than other EU banks, including a 33% fall in housing prices. Nevertheless, Swedish banks managed the tests quite well ([FI, 2023a](#)). (According to the analysis in [Svensson \(2024\)](#)—with appropriate indicators—Swedish housing was instead *undervalued* by about 20% in 2021.)

²¹ See also [Boije and Hansen \(2024\)](#), pp. 14–15).

²² In 1990 and 1991, the household sector’s share of the banks’ reported credit losses were only 13% and 7%,

For a long list of reasons, including an established credible flexible inflation-targeting regime with normally cyclical policy rates, a fiscal framework that is a model for the rest of the world, active macroprudential policy, including the FI keeping a very close watch on mortgage lending standards through its mortgage survey, the 90s crisis is most unlikely to return.

The other examples of housing-price falls are less deep, and prices have taken shorter to recover. After the April 2008 peak, during the financial crisis prices dropped by 12 percent but recovered after only 16 months. The price falls starting in March 2011 and August 2017 were less deep and recovered in less than 2 and 3 years, respectively.

The fall after the peak of March 2022, with increases in inflation, energy prices, and mortgage rates, was 16%. Housing prices were in July 2024 by figure 4.15 still down 12 percent. At the time of writing policy rates and mortgage rates have started to fall and prices are likely to rise, but it is not clear how soon prices will have recovered (figure 5.2).

However, these times to recovery of housing prices should be seen in relation to the average length of tenure after the purchase. As mentioned above, new borrowers for house purchases would have the highest LTV ratios and the lowest percentage of home equity. But buyers of single-family houses would on average stay in their dwelling for 33 years; buyers of tenant-owned apartments for about 10 years. Even for the 90s crises, the average length of tenure is significantly longer than the recovery time, and much longer than the recovery time for the other price falls.

Furthermore, figure 4.16 shows that 4-year housing-price growth has been positive since 1997 and fluctuated between 2% and 12%. Any owner-occupier staying in the home for at least a four-year period has seen the value of the home increase by 2–12% or more and not fall.

Also, for initial LTV ratios below 100% and thus a positive initial equity share, recovery of housing prices and ending up with positive equity is not the same. For a positive equity share of 15% to turn into negative equity, the price fall has to exceed 15%. For then ending up with a positive equity only requires for prices to rise to undo the excess of the price fall over the 15% equity share.

For most new buyers for house purchases, the risk of negative equity when later moving is small. Most buyers of a new home stay for more than four years. With negative equity, the cash flow is not affected. There are no margin calls for mortgages. The best option is in most cases to stay put and wait for a recovery of home price. And, as discussed in section 2.1, there are hardly any flippers in Sweden. For most borrowers of the total mortgage stock, with much lower LTV ratios, the risk of negative equity is very small or negligible.

4.8 Summary

Overall, the aggregate data shows that households' assets are much larger than their debt. And the households' human capital is almost double the value of their assets. Furthermore, assets have been growing much faster than debt, so the ratio between debt and assets shows a declining trend. According to the aggregate data, household debt is not too high relative to household assets, and respectively (Eklund et al., 1993, table 6.2).

the households' solvency is not too low, by a substantial margin.

Furthermore, according to [Waldenström \(2024a,b\)](#), whereas the households have become much more wealthy, the distribution of net wealth as has become much more equal since 1920 and not become more unequal since 1975. The wealth share of the top 90% of Swedish households is about the same as around 1975 (figure 4.7).

Regarding the individual data collected by the FI on the new borrowers, and by the FI and [Boije and Hansen \(2024\)](#) on the borrowers of the total mortgage stock, there is a substantial difference between the LTV ratios of the new borrowers and the borrowers (of the total mortgage stock). Whereas 55% of the new borrowers have LTV ratios above 70%, only 22% of the borrowers have LTV ratios above 70%. The annual new borrowers are only 8% of the borrowers, and the annual flow of new mortgages is only about 10–12% of the stock of mortgages. The borrowers and the mortgage stock matter much more for financial and macroeconomic stability. The borrowers' mortgage debt is not too high relative to the value of their housing. Their solvency is not too low.

Furthermore, a housing-price fall of 30% has not been observed in Sweden during the last 50 years. The largest fall was 20% during the extreme 1990's crisis, when it also took 7 years for prices to recover. Recent price falls have been smaller and prices have recovered in 1–3 years, including during the financial crisis. The most recent price fall was 15%, and 2 years out housing prices are still down 12%.

But these times to recovery of prices must be seen in relation to the average tenure of owner-occupied housing, 33 years for single-family houses and 10 years for tenant-owned apartment, 18 years on average. Given the above, the risk of having to move with negative home equity is very small. It may be an individual problem for unfortunate borrowers, but it is not a threat to financial and macroeconomic stability.

Thus, from both the aggregate and the individual data on mortgage borrowers and their homes, it follows that the household debt is not too high relative to their assets and that the households' solvency is good. Condition (1) under which household debt can become a threat to financial and macroeconomic stability is currently not present in Sweden, by a substantial margin.

The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes.

5 Debt service relative to incomes and debt-service capacity: Liquidity

As mentioned in section 1, condition (2) under which household debt may become a threat to financial and macroeconomic stability is when the debt service becomes too high relative to households' incomes and debt-service capacity. Even if they are solvent, households may have insufficient margins and liquidity buffers to continue to service their debt if interest rates rise or incomes fall. We can express this as the households' liquidity and resilience to interest rises and income falls may be too low.

Solvency of an household in the narrow sense of an LTV ratio below 100% ensures that the borrower can always fulfill its debt-service obligations by first selling the property and then repay the mortgage. Even if the LTV ratio would exceed 100%, solvency in the less narrow sense of the sum of the value of the property and liquid assets exceeding the size of the mortgage would ensure the borrower can repay the mortgage by selling not only the property but also some of the liquid assets.

What we instead consider in this section is the situation when the household prefers to keep the property and the mortgage and are subject to regular deb-service payment in form of interest and any amortization payments over time. Can the payments become too high relative to the payment capacity?

5.1 Aggregate data

Figure 5.1 shows the aggregate debt-to-income ratio, the average interest rate on the debt, and the after-tax interest-to-income ratio. We see that the after-tax interest-to-income ratio had in 2022q1 fallen to its lowest level since the mid 1970s. However, during the spring of 2022, interest rates and average interest payments as a share of disposable income rose quickly. Figure 5.2 shows the policy rate and the average mortgage rate on new and outstanding loans. We see that these interest rates have all peaked by July 2024.²³

As we shall see below, the FI's mandatory amortization requirements have a substantial impact on households' debt service. A first amortization requirement was introduced in 2016. According to it, mortgages with an LTV ratio above 50% must amortize at least 1% annually of the loan amount at origination. Mortgages with an LTV ratio above 70% must amortize at least 2% of the loan amount at origin (FI, 2016). A second amortization requirement was introduced in 2018. According to it, mortgagors with a loan-to-gross-income ratio above 450% must amortize an additional 1% of the loan at origination (FI, 2017). A total amortization of 3% is from a cash-flow point of view equivalent to a before-tax mortgage-rate increase of 4.3 percentage points.²⁴

As mentioned in section 2.2, the fact that Swedish mortgages have mostly variable rates, which implies that there is a strong cash-flow channel of monetary policy. Through this channel, policy-rate changes quickly affect households' cash flow and consumption (La Cava et al., 2016; Flodén et al., 2021; Di Casola and Iversen, 2019).

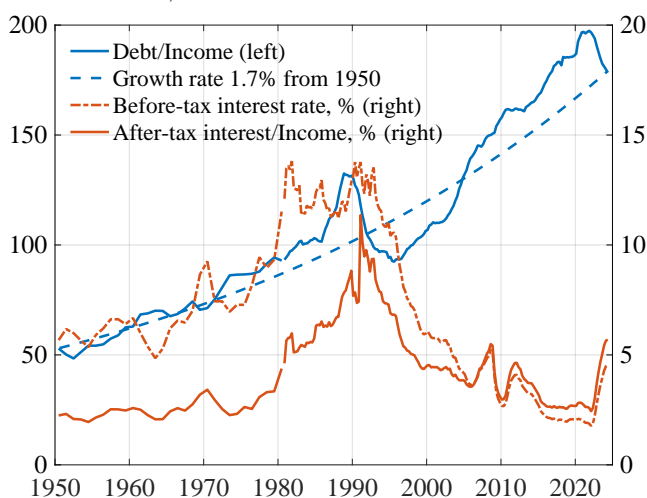
The cash-flow channel makes monetary policy more powerful and makes it easier for the Riksbank to stabilize consumption and aggregate demand. With a floating exchange rate and flexible inflation targeting, the policy rate and variable mortgage rates will normally be low in a downturn—not high, as during the Swedish 1990s crisis with a fixed exchange rate. This reduces the interest payments of indebted households and makes it easier for them to maintain their consumption in case of income disturbances.

The cash-flow channel thus normally reduces rather than increases the risk of consumption cuts

²³ Boije and Hansen (2024, pp. 18–20) discuss the households' aggregate interest payments.

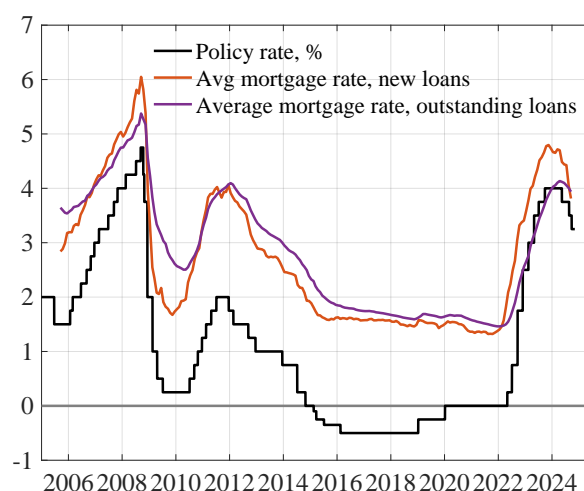
²⁴ $3\% / (1 - 0.3) = 4.3\%$.

Figure 5.1: Household debt-to-income ratio, before-tax interest rate, and after-tax interest-to-income ratio, 1950–.



Source and note: Figure 5.1: Englund (2020), Du Rietz et al. (2013), Statistics Sweden (2024h,i,j), and own calculations. Income is net disposable income. The large jump in the after-tax interest-to-income ratio from 1990q4 to 1991q1 is due to a tax reform that reduced the deductible marginal tax rate from around 55% to 30%. The latest observation is 2024q2. Figure 5.2: Statistics Sweden (2024j) and Sveriges Riksbank (2024). The latest observation is September 2024.

Figure 5.2: Policy rate and average mortgage rate, new and outstanding loans.



and deeper downturns. From this point of view, variable interest rates are less risky than interest rates with long fixation periods, counter to conventional wisdom. This means that highly indebted households with variable interest rates effectively have some insurance against crisis and bad times. Renters do not have any such insurance.

Against this insurance aspect of variable mortgage rates, it has been argued that some disturbances can increase the margin between mortgage rates and policy rates. However, as discussed in section 2.2, the Riksbank has the tools to keep spreads down, if needed. The tools were used with great effect during in 2008–2009 during the financial crisis and again during the coronavirus crisis. As an example, figures 5.1 and 5.2 shows that the interest-to-income ratio fell quickly during 2009, when the Riksbank lowered the policy rate dramatically. The interest-to-income ratio rose again during the Riksbank’s mistaken policy-rate hikes 2010–2011 (Svensson, 2018), but since the Riksbank’s policy U-turn 2014 it fell in 2022q1 to the lowest level since the mid 1970s (figure 5.1).

Figure 5.1 also illustrates the dramatic difference between the 1990s banking crisis under a fixed exchange rates, when the crisis was associated with high interest rates because of the Riksbank’s defense of the fixed exchange rate, and the 2008–2009 and coronavirus crisis under a floating exchange rates and flexible inflation targeting, when the crises were associated with low interest rates.

Another argument against this insurance aspect of variable mortgage rates is that the central bank’s policy rate may already be at its effective lower bound. But, as discussed in section 2.2, the ELB is likely to be lower and less of a restriction in Sweden than in other countries.

Furthermore, the policy rate may not be exactly at the lower bound, and some further lowering of the policy rate and mortgage rates may be possible. Figure C.10 shows how Riksbank asset

purchases, including of covered mortgage bonds, have kept the spread between the average mortgage rate for new loans and the policy rate very stable and allowed a more-or-less one-to-one pass-through to mortgages rates during the policy-rate cuts to minus 0.5%.²⁵

Recently, following a negative supply shock and a positive inflation shock resulting in high inflation 2022–2023, the Riksbank has raised interest rates to reduce aggregate demand—including through the cash-flow channel—in order to return inflation to the inflation target. However, this interest rate hike is carefully calibrated to maintain an appropriate balance between inflation reduction and a decline in consumption and aggregate demand. Of course, the Riksbank does not want to raise interest rates so much that consumption collapses uncontrollably. If the rate hike in any way affects banks, threatening financial stability, this would also be taken into account in the calibration. After all, the Riksbank mandates includes to contribute to financial stability, as noted above in section 2.1.

5.2 Individual household data: New borrowers

The above refers to aggregate data. What about the disaggregate individual data? For individual data on new borrowers, the stress tests in the FI’s annual mortgage market report have shown that new mortgage borrowers have good debt-service capacity and can fulfill their debt service also if interest rates rise or incomes fall (even though the mandatory amortization requirements reduce the debt-service capacity). Mortgage borrowers’ liquidity and resilience to interest-rate rises and income falls is thus good. This is especially the case if the FI allows temporary exemptions from the amortization requirements if needed.

The most recent report, [FI \(2024c\)](#), reports and analyses data from the early fall in 2023. Inflation was high in the fall of 2023, and mortgage rates continued to rise. The Swedish economy was in a downturn. Home buyers bought somewhat cheaper homes and their mortgages were somewhat smaller. Their interest payments were higher than previous years.²⁶

Figure 5.3 shows a scatter plot of LTV and loan-to-gross-income (LTGI) ratios among new borrowers with loans intended for home purchases in 2023 (referred to as “new borrowers” below). The thresholds for the amortization requirements are marked in the figure. They are the LTV ratios of 50% and 70%, for a minimum of 1% and 2% amortization, respectively, and the LTGI ratio of 450%, for a minimum of 1% additional amortization. Figure 5.4 shows a 2-dimensional histogram for the amortization thresholds and the LTV cap of 85%. In 2010, the FI introduced an LTV cap of 85% ([FI, 2010](#)).

Figure 5.5 shows a more detailed histogram of the LTV ratios among the new borrowers. The

²⁵ Interestingly, the more or less one-to-one passthrough from the policy rate to average new mortgage rates did not work when the Riksbank—mistakenly, in my view—raised the policy rate to zero before the pandemic, from December 2018 to December 2019 (figure C.10). The spread actually fell in 2019–2012. In my view, it has also been a mistake not to lower the policy rate back to the negative range, and even further down than before, during the pandemic. This would in my mind have been better than undertaking large asset purchases. A negative policy rate can easily be eliminated. But a large asset portfolio is not so easy to get rid of, and it may result in substantive capital losses when interest rates rise back to normal.

²⁶ The share of non-performing mortgages for 2023 remained insignificant (see section 2.1 above and [Swedbank, 2024](#), pp. 37, 92–94).

Figure 5.3: Scatter plot of loan-to-value and loan-to-gross-income ratios among new borrowers with loans intended for home purchases and amortization-requirement thresholds.

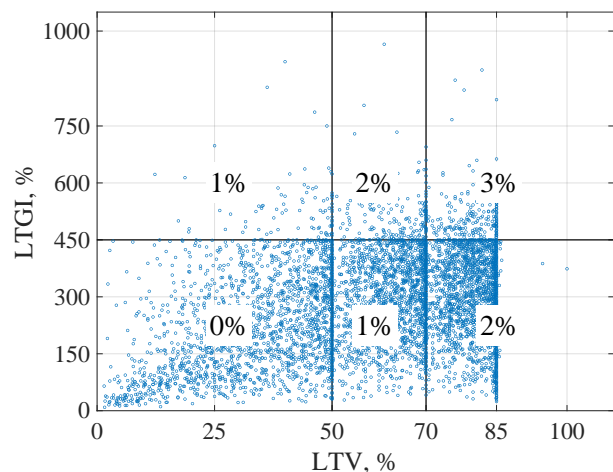
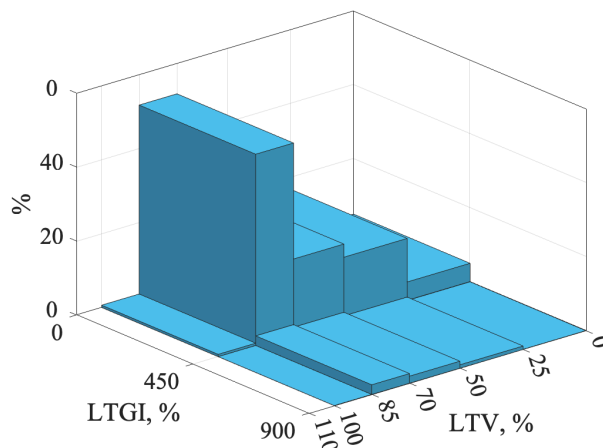


Figure 5.4: Histogram of loan-to-value and loan-to-gross-income ratios among new borrowers with loans intended for home purchases.



Source and note: Data for [FI \(2024c\)](#) and own calculations. (The figure is the same as diagram 31 in [FI \(2023d\)](#), except that the data is collected in 2023 and is the subset of new loans intended for home purchases.) Each dot represents one household; the number of households is 9,413. The sample includes all mortgage contracts intended for home purchases entered into during the periods August 28–September 4, 2023, and September 24–October 2, 2023 ([FI, 2024c](#), p. 7).

bunching is rather conspicuous, especially for the LTV cap. A full 38% of the new borrowers have an LTV ratio at or just under 85%. Only 0.6% of the new borrowers have LTV ratios above 85%. Regarding the amortization thresholds, 7% and 5% of the new borrowers are at or just below 70% and 50%, respectively. Very few are just above the thresholds. This shows that the LTV cap and amortization thresholds are binding and restrict the choices for many new borrowers, in particular the LTV cap.²⁷

Figure 5.6 shows a detailed histogram for the LTGI ratio among the new borrowers, with bunching at the threshold of 450%. Here, 3.8% of the new borrowers are at or just below 450%; only 0.04% are just above. The amortization threshold of 450% clearly restricts mortgagors’ choices; the new borrowers seem to make an effort of not exceeding the threshold.

The bunching thus shows that the amortization requirements and the LTV cap are binding. The LTV cap forces buyers to buy cheaper and worse housing than they would prefer because they get a smaller mortgage than they would prefer. This induces them to finance the remaining deposit by their liquid financial assets and if necessary also take an unsecured loan at a higher interest rate and higher amortization rate. As a result they lose welfare by not getting their preferred dwelling and by getting higher interest and amortization rates ([Svensson, 2020](#)). In particular, they will have less or no liquid assets after the purchase and are less resilient towards income falls and interest-rate rises. They would be less vulnerable if they could take out a larger mortgage and keep the extra borrowing as a liquidity buffer. ([Aastveit et al., 2021](#))

²⁷ The bunching has previously been studied by [Bäckman et al. \(2024\)](#).

Figure 5.5: Histogram of loan-to-value ratios among new borrowers with loans intended for home purchases.

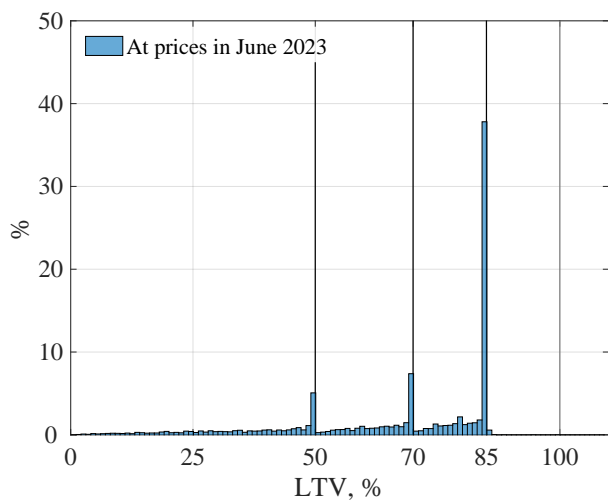
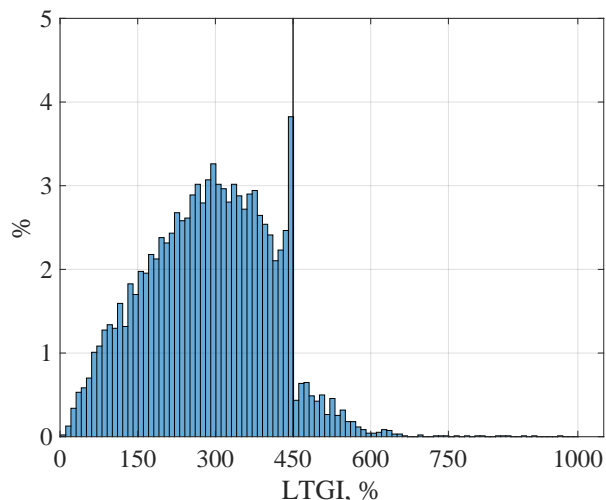


Figure 5.6: Histogram of loan-to-gross-income ratios among new borrowers with loans intended for home purchases.



Source and note: See note to figures 5.3 and 5.4.

However, some of the borrowers at the LTV cap may be financially literate households that “max out”, that is, borrow as much as they can, and more than needed to finance their homes. Consider a household that has found its preferred home and has liquid asset equal to 30% of the purchase price. It then only needs to borrow 70% of the purchase price. But it may prefer not to exhaust all its liquid assets. It may prefer to borrow more, up to the maximum 85%. The excess borrowing of 15% can then be kept as liquid financial assets. They can be used to pay the required amortization over time and this way undo the constraint of the amortization requirements in an optimal way (Svensson, 2016). They can be used as a liquidity buffer, to increase the resilience against interest-rate increases and income falls. They can also be used for risky investment in stocks and mutual funds.

This way, a financially literate household can have its own optimal portfolio of housing equity, financial assets, and debt. It can use part of its mortgage with its favorable interest rate due to the housing collateral to finance risky investments with a substantially higher average rate of return over a longer period. Historically, the longer-run average rate of return in the stock market has exceeded the mortgage rate.

5.2.1 The distribution of debt service relative to incomes among new borrowers

In order to calculate the distribution of the debt-service-to-income among the new borrowers, I first calculate the distribution of the after-tax interest-to-net-income (ATIntTNI) ratios, using a before-tax mortgage rate of 4% and a deductible capital-income tax rate of 30%. The assumption of a 4% mortgage rate can be justified by observing in figure 5.2 that the average outstanding mortgage rate has just peaked at 4%, and will certainly come down when the Riksbank now has started a series of policy-rate cuts. From this point of view an assumption of 4% is on the high side.

The level can also be justified by an assumption of the mortgage rate being the sum of a neutral real rate of about 0.5%, an expected inflation rate of 2%, and a spread between the mortgage and policy rates of about 1.5%. Or a neutral real rate of about 0.25% and a spread of about 1.75% (figure C.10).²⁸

Figure 5.7 shows a histogram of the loan-to-net-income (LTNI) ratio among new borrowers. We see that the 450% threshold for the LTGI ratio seems for many borrowers to correspond to a bit less than 600% for the LTNI. The distribution of the average income tax rate is shown in figure C.14, with the median and mean being 22% and 23%, respectively.²⁹

Given the distribution of the LTNI ratios, we can calculate the distribution of the ratios of after-tax interest payments to net income (the ATIntTNI ratio), for a given mortgage rate and tax-deduction rate. Figure 5.8 shows a histogram of the ATIntTNI ratio for a before-tax mortgage rate of 4% and a tax deduction of 30%.

Figure 5.7: Histogram of the ratio of loans to net income (LTNI) among new borrowers with loans intended for home purchases.

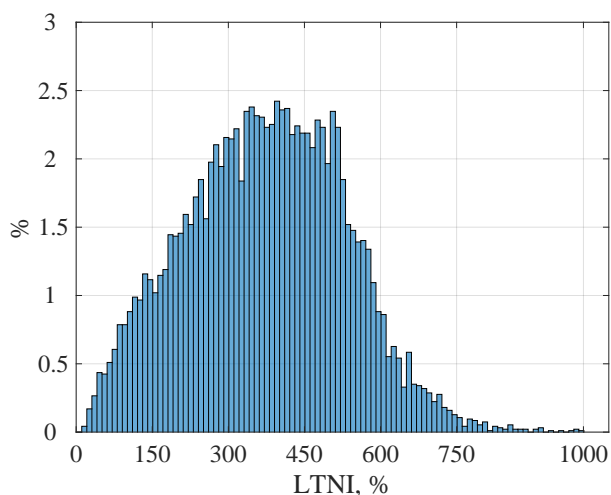
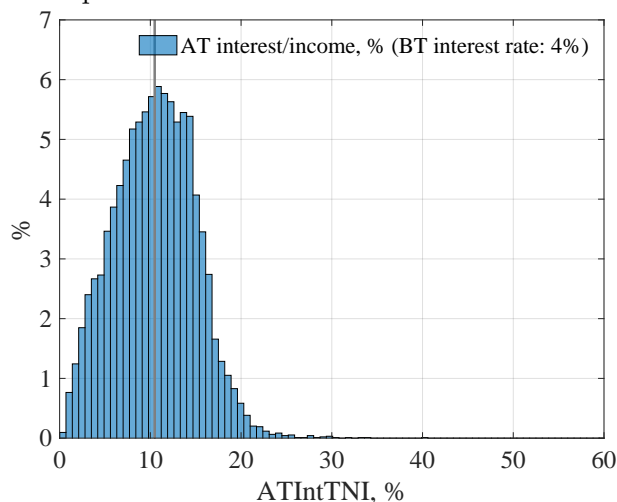


Figure 5.8: Histogram of the ratio of after-tax interest payments to net income (ATIntTNI) among new borrowers with loans intended for home purchases.



Source and note: See note to figures 5.3 and 5.4. The gray vertical line shows the (unweighted) mean of the ratios, 10.5%. The median equals the mean in this case. The before-tax interest rate is 4%. Tax deduction is 30%.

In order to calculate the distribution of the ratio of required debt service to net income (the DSTNI ratio), we need to calculate the distribution of the ratio of required amortization payments to net income (the AmtTNI ratio). Given the required amortization rates displayed in figure 5.3, we can calculate the required amortization for each individual mortgagor.³⁰

In figure 5.9, the light-red histogram shows the resulting distribution of the AmtTNI ratios. A share of 22% of the borrowers have zero amortization. They are the new borrowers with LTV and LTGI ratios not exceeding 50%, and 450%, respectively. The red superimposed histogram in the figure shows the AmtTNI ratios for the borrowers that are subject to the second amortization

²⁸ The NIER estimates a long-run neutral rate to be about 0.6% (Österholm, 2024).

²⁹ $NI/GI \approx 450\% / (1 - 0.23) = 584\%$ (disregarding Jensen's inequality).

³⁰ This calculation disregards that some borrowers have received temporary exceptions from the amortization requirements (FI, 2023b).

Figure 5.9: Histogram of the ratio of required amortization payments to net income (AmtTNI) among new borrowers with loans intended for home purchases. LTG ratios above 450% are marked.

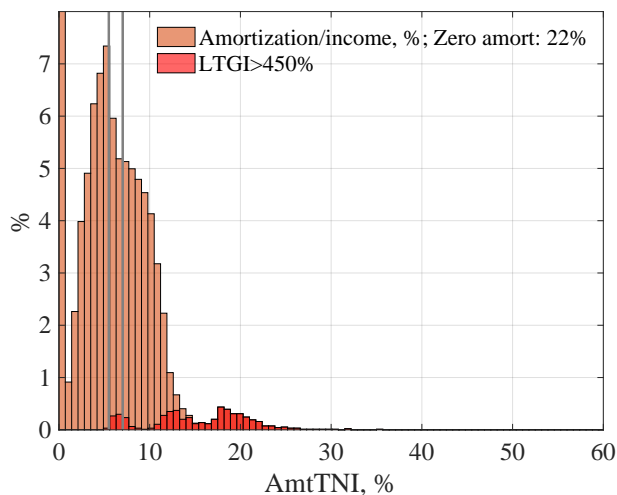
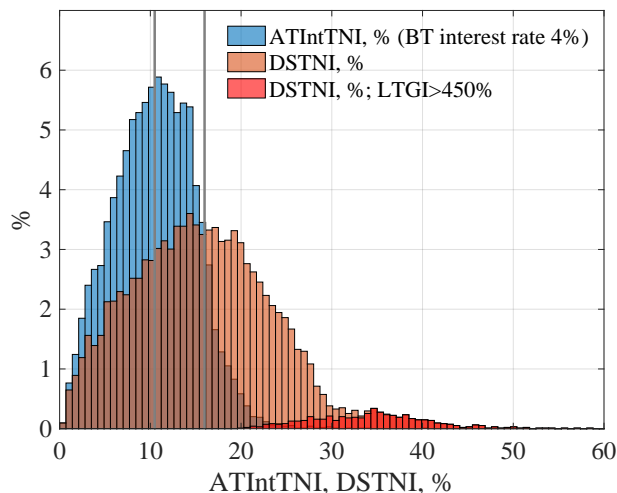


Figure 5.10: Histogram of the ratios of after-tax interest and total debt-service payments to net income (ATIntTNI and DSTNI) among new borrowers with loans intended for home purchases. LTG ratios above 450% are marked.



Source and note: See note to figures 5.3 and 5.4. Figure 5.9: The left gray vertical line shows the (unweighted) mean of the ratios. The right line shows the mean excluding zero amortization, 7%. Figure 5.10: The superimposed red histogram corresponds to new borrowers with an LTGI ratio above 450% and subject to the second amortization requirement and its additional amortization of 1%. The left gray vertical line is the mean of the ATIntTNI ratio, 10.5%. The right line is the mean of the DSTNI ratios, 16%. The before-tax interest rate is 4%. Tax deduction is 30%.

requirement and its extra 1% of amortization. We see that all AmtTNI ratios above 13% are due to the second amortization requirement.

The debt service is the sum of interest and amortization payments. Figure 5.10 shows the distributions of the ratios of after-tax interest-payments and required debt service to net income (the ATIntTNI and DSTNI ratios). We see that without any amortization, interest payments and debt service would be at most 20% of net income. With amortization payments, debt service exceed 40% for some borrowers. We see that almost all debt service over 30% of net income is due to the second amortization requirement.

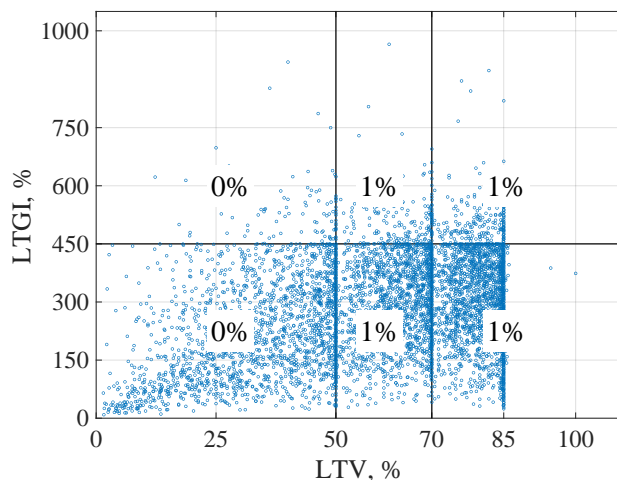
5.2.2 Alternative amortization requirement: 1% for LTV ratios above 50%

Assume instead an alternative single amortization requirement of simply 1% for LTV ratios above 50%. This is shown in the scatter plot 5.11. It results in the amortization and debt-service distribution shown in figures 5.12 and 5.13. They should be compared to figures 5.9 and 5.10, respectively.

5.2.3 Discussion

We see in figure 5.10 that the ATIntTI ratios are not that demanding, with an average of 10.5% and not exceeding 20%. But the amortization requirements add substantially to the debt-service

Figure 5.11: Scatter plot of loan-to-value and loan-to-gross-income ratios among new borrowers with loans intended for home purchases. Minimum amortization requirements (here 1% for LTV > 50%).



Source and note: See note to figure 5.3.

Figure 5.12: Histogram of the ratio of amortization payments (1% for LTV > 50%) to net income (AmtTNI) among new borrowers with loans intended for home purchases.

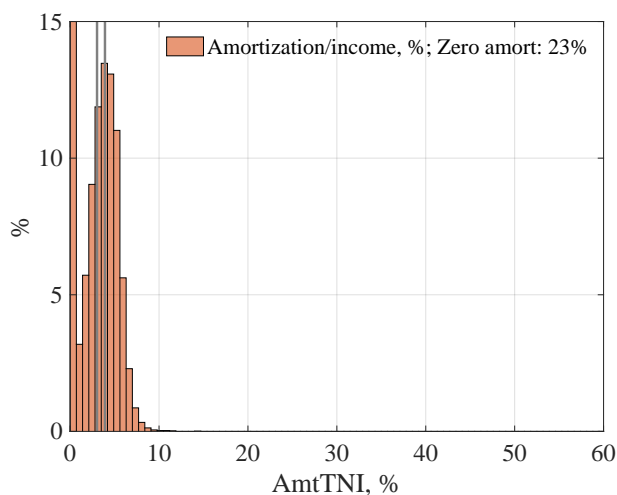
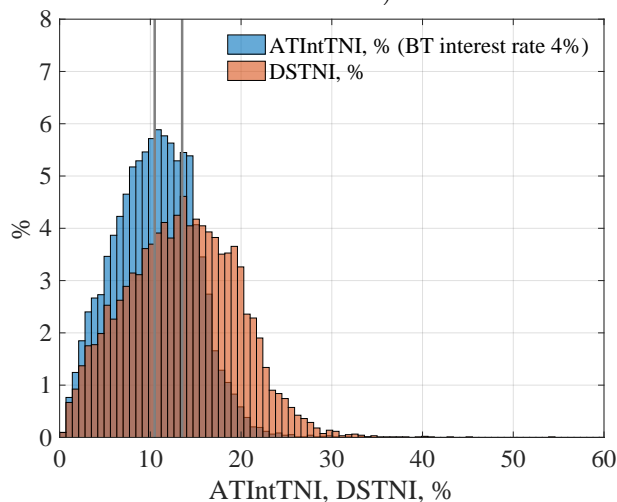


Figure 5.13: Histogram of the ratios of interest and total debt-service payments to net income (ATIntTNI and DSTNI) among new borrowers with loans intended for home purchases. (1% amortization for LTV > 50%.)



Source and note: See note to figures 5.3 and 5.4. Figure 5.12: The left gray vertical line shows the (unweighted) mean of the ratios. The right line shows the mean excluding zero amortization, 4%. Figure 5.13: The gray vertical lines refer to (unweighted) means of the ATIntTNI and DSTNI ratios, 10.5% and 13.5%, respectively. The before-tax interest rate is 4%. Tax deduction is 30%.

payments, making the average DSTNI ratio increase to 16% and the highest DSTNI ratios to above 40%. In particular, the second amortization requirement adds to the debt-service burden. Without it, the highest DSTNI ratios would have been around 30%.

The high amortization payments involve a forced saving into illiquid home equity. This makes it difficult to build up and maintain a liquidity buffer. From a resilience point of view, it would be

better if the new borrower would amortize less and build up a liquidity buffer instead.

The amortization requirements are particularly problematic because they lead to a much front-loaded debt-payment profile, with particular liquidity stress immediately after the home purchase. This means that fewer potential buyers pass the bank's strict affordability tests (Svensson, 2020).

The new borrowers must pass the banks affordability tests, according to which they must be able to manage a higher before-tax interest rate of 6–7% together with the required amortization. Such a high mortgage rate would thus not necessarily imply any delinquent debt payments. But the affordability tests are a high threshold for presumptive buyers.

In figure 5.13 we see that the alternative amortization requirement leads to substantially lower DSTNI ratio, with an average ratio of 13.5% instead of 16% and the highest DSTNI ratios equal 30% instead of 40%.

Furthermore, as shown in figure C.5, the average annual growth of disposable income and disposable income per capita have since 1996 been 4.3% and 3.7%, respectively. It would be strange if housing prices would not be growing at at least a similar rate, say at least at about 4%, in particular given a structural shortage of owner-occupied housing in Sweden. Indeed, figure C.6 shows that the average annual housing-price growth since 2007 has been above 4%.

Housing-price growth of 4% implies that the LTV ratio falls by about 4% (not 4 pp) for a fixed nominal loan, absent any amortization payment. This is a substantial effective amortization rate. With the alternative amortization requirement of 1% for LTV ratios above 50%, the effective amortization rate would be 5%. This means that an LTV of 90% would fall to 50% in 12 years.³¹ There is hardly any reason for a more rapid effective amortization.

But the total mortgage stock and its borrowers matter more for financial and macroeconomic stability. We now turn to the total mortgage stock.

5.3 The total mortgage stock

As explained in section 4.7, the total mortgage stock matters more than the annual flow of new loans for financial and macroeconomic stability.

Ideally, we would like to be able to calculate the precise distribution of debt-service-to-income ratios for the mortgage stock among the different categories of household. For this, we would need to have access to individual household data of the LTV, LTGI, and LTNI ratios of the borrowers of the total mortgage stock so, we could construct the analogue of figure 5.3. This would allow us to calculate the individual amortization rates according to the two amortization requirements, as done in section 5.2. Unfortunately, I only have access to the marginal distributions of the LTV and LTGI ratios among the borrowers of the mortgage stock, and I don't have access to the distribution of the LTNI ratios.

This means that, what is feasible is, first, to calculate an approximate distribution of LTNI ratios among the borrowers of the mortgage stock and, second, for a given mortgage rate and tax-deduction rate to calculate the approximate distribution of the after-tax interest-to-net income

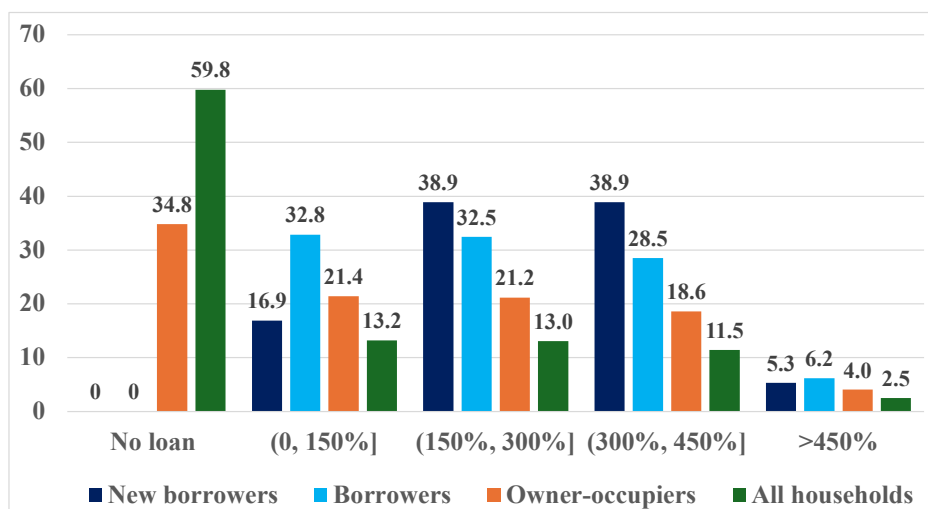
³¹ $\log(0.9/0.5)/\log(1.05) = 12.0$.

(ATIntTNI) ratios among the borrowers of the mortgage stock.³²

5.3.1 The distribution of interest payments relative to incomes in the stock of mortgages

The distribution of LTGI ratios for new loans among new borrowers is shown for 2017–2023 in figure C.12. The distribution of LTGI ratios among borrowers of the mortgage stock is shown for 2018–2023 in figure C.13.

Figure 5.14: Distribution of LTGI ratios among new borrowers with loans intended for home purchases and among borrowers of the mortgage stock, owner-occupiers, and all households, 2023. Percent.



Source and note: FI (2024b), FI (2024c, diagram 18), and own calculations. The interval $(a\%, b\%]$ is equivalent to $a\% < \text{LTGI} \leq b\%$.

Figure 5.14 shows the distribution of LTGI ratios in 2023 for new loans among new borrowers and for the mortgage stock among borrowers, owner-occupiers, and all households, for 2023.

Absent data on the distribution of LTNI ratios, except for new borrowers, I use the mean average tax rate of 23% from figure C.14 to convert gross incomes to net incomes. This results in the distribution in 2023 of approximate LTNI ratios in figure 5.15 with the resulting new intervals for the LTNI ratios.³³

Then I calculate the distribution of after-tax interest-to-net-income (ATIntTNI) ratios, using a before-tax mortgage rate of 4% and a deductible capital-income tax rate of 30%. The 4% mortgage rate was justified in section 5.2.1. This results in figure 5.16 with new corresponding intervals for the ATIntTNI ratios.³⁴

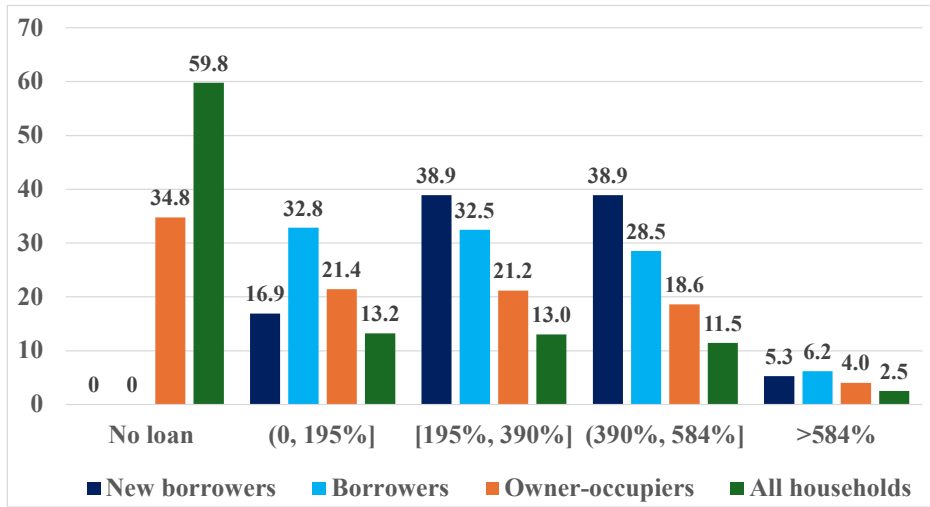
The histogram in figure 5.17 shows the cumulative distribution of the ATIntTNI ratios for new borrowers that follows from the histogram in 5.8. The light-blue, orange, and green lines show piecewise linear approximations to the cumulative distributions among borrowers, owner-occupiers,

³² Boije and Hansen (2024, pp. 20–21) use a different approach. They use the distribution of loan size in the mortgage stock from FI (2024b), multiply that by a 4% mortgage rate, and get the distribution of interest payments among borrowers of the mortgage stock expressed in SEK, not as a share of income.

³³ The edges of the LTNI ratios are simply calculated as the edges of the LTGI ratios divided by $(1 - 0.23)$.

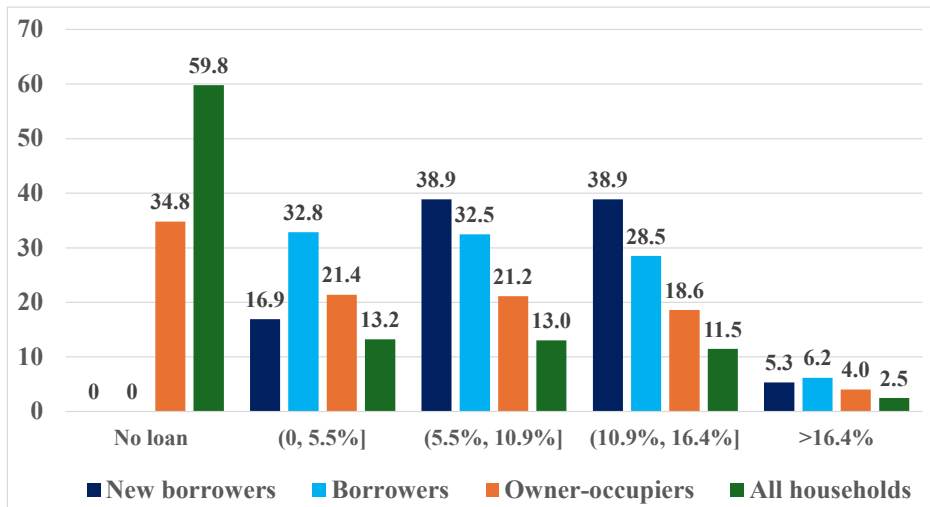
³⁴ The edges of the ATIntTI ratios are simply calculated as the edges of the LTNI ratios multiplied by $(1 - 0.3) \times 0.04$.

Figure 5.15: Distribution of LTNI ratios among new borrowers with loans intended for home purchases, borrowers of the mortgage stock, owner-occupiers, and all households, 2023. Percent.



Source and note: FI (2024b), FI (2024c, diagram 18), and own calculations. The average income tax rate used is 0.23%, cf. figure C.14. The interval ($a\%$, $b\%$) is equivalent to $a\% < \text{LTNI} \leq b\%$.

Figure 5.16: Distribution of ATIntTNI ratios among new borrowers with loans intended for home purchases and among borrowers of the mortgage stock, owner-occupiers, and all households, 2023. Percent.



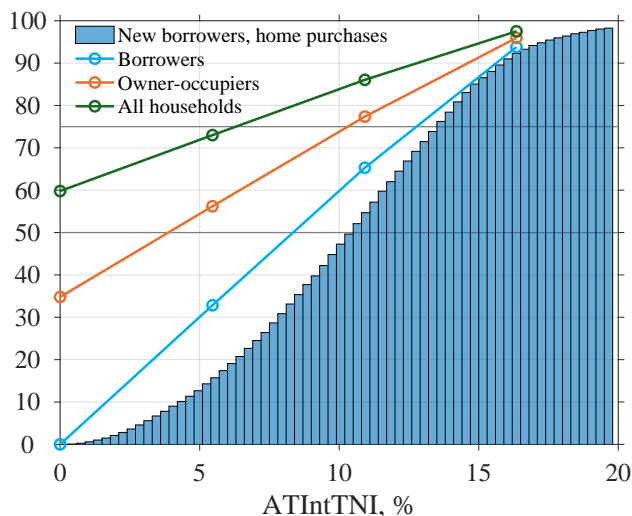
Source and note: FI (2024b), FI (2024c, diagram 18), and own calculations. The average income tax rate used is 0.23, cf. figure C.14. The before-tax mortgage rate is set to 4%. The interval ($a\%$, $b\%$) is equivalent to $a\% < \text{ATIntTNI} \leq b\%$.

and all households. These approximations are derived from the numbers in figure 5.16. The piecewise linear approximation implies that the probability density function is assumed to be a step function, with constant probability density between the edges.³⁵

From figure 5.17, we can see that, for new loans, the median of the ATIntTNI ratio among new

³⁵ Figure C.15 shows that the corresponding piecewise linear approximation for new borrowers good and close to the actual known cumulative distribution that follows from figure 5.8. This indicates that this method of calculating the distribution of LTNI and ATIntTNI ratios for the other categories of households may be acceptable, as long as the mean average tax rates for those categories is not too different from that of the new borrowers.

Figure 5.17: The cumulative distribution of ATIntTNI ratios among new borrowers with loans intended for home purchases and the approximate cumulative distribution among borrowers, owner-occupiers, and all households, 2023. Percent.



Source and note: See notes to figure 5.16. The distribution among new borrowers is the cumulative distribution corresponding to the histogram in figure 5.8. The piecewise linear approximation for the other categories of households is equivalent to assuming a constant probability density between edges.

borrowers is about 10%, as in figure 5.8. For the mortgage stock, this median among borrowers and owner-occupiers is about 8% and 4%, respectively.

The upper quartile for new borrowers, borrowers, owner-occupiers, and all households are about 14%, 13%, 10%, and 6% respectively. That is, 75% of the owner-occupiers have an ATIntTI ratio of at most about 10%.

5.3.2 Discussion

In section 5.2.3, we concluded that the mean and distribution of the after-tax-interest-to-income ratio for new borrowers with a mortgage rate of 4% was not very demanding, with an average and median ratio of about 10%. In figure 5.17, we have seen that the median of the ATIntTI ratios for borrowers and owner-occupiers are significantly lower, 7% and 4% respectively. Thus, the interest payments for borrowers and owner-occupiers are clearly less demanding than those for borrowers.

However, we also saw that, for new borrowers, the FI's two amortization requirements add substantially to the debt-services burden, making it quite high.

What about the effect of the amortization requirements in the mortgage stock, on borrowers and owner-occupiers? Unfortunately, as mentioned, in contrast to what is the case for new borrowers, I do not have access to the trivariate distribution of LTV, LTGI, and LTNI ratios, but only the marginal distributions of LTV and LTGI ratios. This means that the calculation of the debt-service-to-income ratios for the mortgage stock cannot be made with the same precision as for new borrowers.

From figure 5.14 we see that there are only small fractions of new borrowers, borrowers, owner-occupiers, and all households that have LTGI ratios above 450% and are required to amortize an

extra 1% of the highest loan amount.

However, in figure 4.14, we have noted a dramatic difference in LTV ratios between the new borrowers and the borrowers of the mortgage stock. Whereas 77% of the new borrowers have LTV ratios above 50% and are required by the first amortization requirement to amortize at least 1%, this is the case for only 49% of the borrowers and 32% of the owner-occupiers. Furthermore, 55% of the new borrowers have LTV ratios above 70% and are required to amortization at least 2%. In contrast, only 22% of the borrowers and 15% of the owner-occupiers have LTV ratios above 70%.

Put differently, according to the first amortization requirement, 51% of the borrowers do not have to amortize, $78 - 51 = 27\%$ have to amortize at least 1%, and $100 - 78 = 22\%$ have to amortize at least 2%. For the new borrowers, the three numbers are 23%, 22%, and 55%. Clearly, the required amortization payments are much less of a burden for the borrowers, not to speak of the owner-occupiers.³⁶

The 78% of the borrowers with LTV ratios below 70% are in effect living in an economy with at most 1% required amortization rates (disregarding those subject to the second amortization requirements, which probably anyhow are among those with LTV ratios above 70%). That is, they live in the benign situation discussed in section 5.2.2, with only a 1% amortization requirement for LTV ratios above 50%, which was much less burdensome for the new borrowers than the current two requirements.

5.4 Summary

The results indicate that neither the interest nor the amortization payments relative to income is much of a burden for the borrowers of the mortgage stock. But the amortization requirements may be a sizable burden among some new borrowers, as we saw in section 5.2.1. However, the new borrowers have passed the banks' affordability tests, which make sure that they can manage mortgage rates as high as 6–7 percent. The stress tests in FI (2024c) also show that new borrowers have good debt-service capacity and can fulfill their debt service also if interest rates rise or incomes fall (even though the mandatory amortization requirements reduce the debt-service capacity). The new borrowers' liquidity and resilience to interest-rate rises and income falls is thus good. This is especially the case if the FI allows temporary exemptions from the amortization requirements if needed.

Under flexible inflation targeting, the Riksbank monetary policy normally reduce interest payments in downturns, which reduces interest payments provides some insurance to borrowers against downturns. Interest hikes are carefully balanced to achieve a good compromise between achieving the inflation target and maintaining full employment/resource utilization and macroeconomic stability. The Riksbank shall also contribute to financial stability and will not set a policy rate that threatens financial stability, in contrast to what was the case when the Riksbank defended the fixed exchange rate during the 1990s banking crisis.

³⁶ In addition, some of the borrowers of the mortgage stock may have old loans from before the first amortization requirement in 2016. These are exempt from the amortization requirements.

The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes.

Overall, taking the mortgage stock into account, the mortgage debt payments are not too high relative to the incomes of the borrowers of the mortgage stock. The borrowers' liquidity is not too low. In line with this, the fraction of non-performing mortgages is completely insignificant (section 2.1). Condition (2) under which household debt can become a threat to financial and macroeconomic stability is currently not present in Sweden, by a substantial margin.

The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes.

6 Debt-financed overconsumtion

Condition (3) under which household debt may become a threat to financial and macroeconomic stability is that households engage in debt-financed overconsumtion of macroeconomic significance. Debt-financed overconsumtion refers to a situation in which mortgage borrowers use home-equity withdrawals (HEWs) to finance overconsumtion relative to their disposable income. If this occurs on a macroeconomic scale, it becomes a threat to macroeconomic and possibly financial stability. Consumption then becomes highly sensitive to the rate of increase in housing prices, which determines the room for new HEW.

At the micro level, several papers—including [Mian and Sufi \(2010\)](#) and [Dynan \(2012\)](#) for the US, [Andersen, Duus, and Jensen \(2016\)](#) (ADJ) for Denmark, and [Bunn and Rostom \(2014, 2015\)](#) for the UK—have documented a *correlation* between the level of household indebtedness before the Global Financial Crisis and consumption spending cuts during the crisis. But, as emphasized by ADJ, the mechanism behind this correlation has not been well understood. A common view is nevertheless that the correlation reflects a negative *causal* impact of pre-crisis household indebtedness on spending cuts during a crisis, what can be called the “debt-overhang hypothesis” ([Dynan, 2012](#)).

The debt-overhang hypothesis seems to be taken for granted by macroprudential authorities in several countries, as well as by the international organizations that comment on countries' macroprudential policy. One example is the second quote from the FI on page 3. Another example is from Bank of England's then Governor Mark Carney:³⁷

[H]ighly indebted households are more likely to cut their consumption sharply to keep paying their mortgages, deepening the economic downturn. [Carney \(2020, p. 20\)](#)

³⁷ See [Svensson \(2019b, 2020\)](#) for examples from the international organizations.

The Bank of England introduced an LTI cap of 450% in 2014, with reference to the material in [Bunn and Rostom \(2014\)](#) and implicitly to the debt-overhang hypothesis, as discussed below in footnote 40.

In examining Danish microdata, ADJ first found a strong negative correlation between pre-crisis indebtedness of households and the change in spending during the crisis. But once ADJ conditioned on the size of the pre-crisis *change* in debt, the correlation between pre-crisis indebtedness and the spending change vanished. The fall in spending is entirely explained by the pre-crisis increase in debt. As expressed by Ben Broadbent, then Deputy Governor of Bank of England, in his comments on ADJ ([Broadbent, 2019](#), p. 7, my emphasis):

There is a correlation, it turns out, between the level of household gearing prior to the crisis and the drop in its consumption spending afterwards. But this goes away once you also take into account the prior growth rate of debt. *Once you know the change in a household's indebtedness ahead of the crisis, knowing the level tells you nothing more about its subsequent spending.*

ADJ thus rejects the debt-overhang hypothesis with microdata for Denmark and finds support for what they call the “spending normalization” hypothesis as an explanation for the spending fall. I prefer to call it the “debt-financed overconsumption” hypothesis. A relevant question is whether the ADJ result holds on microdata for other countries than Denmark. [Svensson \(2021a,b\)](#) shows that the ADJ results indeed also hold for Australian and UK microdata, so the debt-overhang hypothesis is rejected also for these countries, and the debt-financed overspending hypothesis is supported.

As discussed in [Svensson \(2019b, 2020\)](#), debt-financed overspending is what [Muellbauer \(2012\)](#) calls the “*housing-collateral consumption demand channel*” and [Mian and Sufi \(2018\)](#) call the “credit-driven household demand channel.” Through this channel, housing prices—or, more precisely, *changes* in housing prices—affect household consumption. As housing prices rose before the crisis, many households increased their mortgages through home-equity withdrawal (HEW), in order to finance overspending relative to their income. This showed up in a lower household saving rate. When the crisis hit and housing prices stopped rising and began to fall, further HEW was no longer possible. When the overspending ceased, spending fell back to a more normal level in relation to income and the saving rate rose. This channel was operating in Denmark, Australia, the UK, and the US before and during the crisis, and in Sweden before and during the 1990s crises.³⁸

39 40

³⁸ As noted by [Guren et al. \(2019, p. 1\)](#): “In the mid-2000s boom and subsequent bust, housing wealth extraction through the mortgage market boosted consumption in the boom and reduced consumption in the bust (e.g., [Mian and Sufi, 2011](#); [Mian et al., 2013](#)).” See also [Guerrieri and Iacoviello \(2017\)](#).

³⁹ The crucial role of mortgage-financed overconsumption in creating a macroeconomic risk is confirmed by seminal work by [Mian et al. \(2017\)](#). They have documented an empirical household-debt-driven business cycle across 30 countries in a panel from 1960 to 2012. The results show that an increase in the household debt-to-GDP ratio finances a simultaneous consumption boom, with the consumption-to-GDP ratio rising. This gives a temporary boost to GDP, but subsequently consumption and GDP fall. Thus, a rise of the household-debt-to-GDP ratio over a three-year period predicts a fall in subsequent GDP growth. A crucial ingredient in this kind of boom-bust cycle is that the increase in household debt is used to finance a consumption boom with a fall in the saving rate.

⁴⁰ Bank of England introduced an LTI cap of 450% in 2014, with reference to the correlation between indebtedness

Fortunately, mortgage-financed overconsumption on a macroeconomic scale would clearly manifest itself in a few informative indicators, such as

- large HEWs,
- a low saving rate, and
- a high share of durable goods in total consumption.

So, is there any indication of debt-financed overconsumption of macroeconomic significance in Sweden?

The FI collects data and reports on HEW in its annual mortgage market report (FI, 2024c), and would discover if the HEWs start to grow too much. There is no indication that HEW currently is becoming unusually high.⁴¹

Figure 6.1: Different saving rates, 1981–2024.

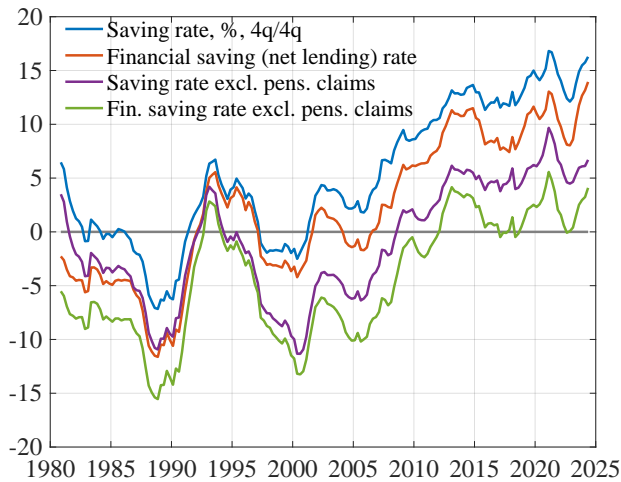
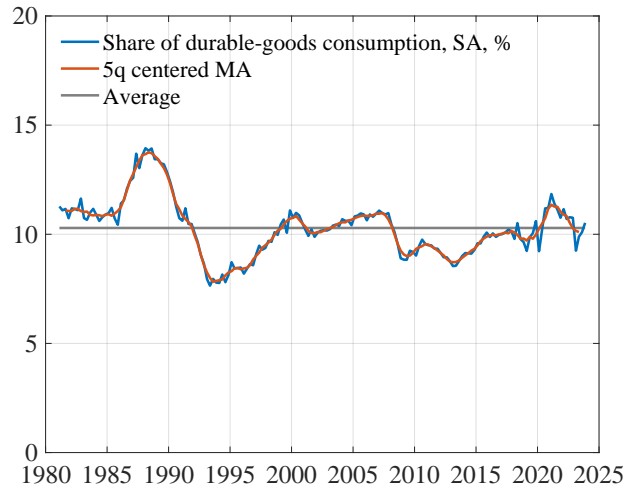


Figure 6.2: The share of durable-goods consumption in total consumption expenditure, 1981–2024.



Source and note: Figure 6.1: [Statistics Sweden \(2024h,i\)](#) and own calculations. “Net lending”—in Sweden called “financial saving,” in direct translation from Swedish—is the difference between net acquisition of financial assets and net incurrence of liabilities ([OECD, 2024b](#)). The saving rates are 4-quarter trailing sums of saving divided by 4-quarter trailing sums of income. Figure 6.2: [Statistics Sweden \(2024e\)](#), additional data from SCB, and own calculations.

and subsequent consumption falls, that is, implicitly to the debt-overhang hypothesis ([Bank of England, 2014](#)). The background analysis was published later in [Bunn and Rostom \(2014\)](#), with regressions showing the correlation for the UK, interpreted as a causal relation. They also summarize: “The potential for household indebtedness to have a large adverse impact on aggregate demand was a key reason why the Financial Policy Committee took policy action at its June 2014 meeting. (p. 314)” [Svensson \(2021b\)](#) tests the debt-overhang and debt-financed hypotheses for the UK on the same microdata as those used by [Bunn and Rostom \(2014, 2015\)](#). By controlling for the pre-crisis debt change—the crucial missing variable—the correlation between pre-crisis debt and the spending fall documented by [Bunn and Rostom \(2014, 2015\)](#) vanishes. Thus, the debt-overhang hypothesis is rejected for this data and the debt-financed overspending hypothesis is supported. The LTI cap in the UK was introduced on an incorrect basis.

Several countries have introduced LTI caps, for example—as far as I know—Denmark, Norway, the UK, Ireland, and the Netherlands. To the extent that they were based on a belief in the debt-overhang hypothesis, they were introduced on an incorrect basis.

⁴¹ It would be useful if the FI or the Riksbank would also publish the same time series of aggregate HEW that Bank of England publishes ([Reinold, 2011](#); [Bank of England, 2024](#)). The Swedish HEW during 2010–2017 is examined in [Li et al. \(2020\)](#).

Figure 6.1 shows the different Swedish saving rates. We see that they are currently at historical high. This is hardly consistent with debt-financed overconsumption (and undersaving) relative to disposable income. Figure 6.2 shows the share of durable goods in total consumption expenditures. There are no signs of mortgage-financed overconsumption in recent years. However, there are strong signs of it before the 1990s crisis, with unsustainably negative saving rates and a historically high share of durable goods in total consumption expenditure.

Through the Kantar Sifo panel, [Boije and Hansen \(2024, p. 35\)](#) asked 1,100 homeowners with mortgages the following question in December 2023: “Have you, at any time during the past five years, borrowed against your home for purposes that are not housing-related (such as financing a car purchase or travel, etc.)?” Of the respondents, 93 percent answered no and 7 percent yes. Considering that only 40 percent of Swedish households have mortgages at all, and only 7 percent of these have borrowed against their homes for pure consumption—which thus corresponds to about 2.8% of all households in Sweden—Boije and Hansen conclude that there is currently hardly any reason to worry about risks to macroeconomic stability from mortgage-financed overconsumption.

In case of indications of appearing HEW-financed overconsumption of significant volumes, the FI has suitable targeted macroprudential measure to use, if needed. The FI could collect additional and more frequent information about HEW and its use, and, if necessary, tighten supervision. It could make it more difficult to use home-equity withdrawal for consumption financing, for example by requiring mortgage borrowers to better justify and document to lenders the need and use of HEW. If required, the FI could simply lower the LTV cap for HEWs.

In case of indications of significant overconsumption and overheating in the economy, the fast and relatively strong cash-flow channel of monetary policy makes it possible for the Riksbank—through timely and appropriate policy-rate hikes—to curb any overconsumption. Interest-rate increases would also slow down the rise in housing prices and thereby reduce the room for additional HEW. The cash-flow channel with increased interest payments is a particularly well-targeted tool against households engaging in mortgage-financed overconsumption.

6.1 Summary

In summary, there is no indication of any debt-financed overconsumption of macroeconomic significance in Sweden. Condition (3) under which household debt can be a threat to financial and macroeconomic stability is not present. Any beginning debt-financed overconsumption of macroeconomic significance would be easily discovered by the FI and the Riksbank, and they have the tools to prevent it from becoming a threat to financial and macroeconomic stability.

The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes.

7 Summary and conclusions

Is Swedish household debt too high? “Too high” here is with reference to financial and macroeconomic stability: Is household debt be so high as to pose a threat to financial and macroeconomic stability?

The focus here is on the about 80% of total household debt that is mortgage debt. The non-mortgage household debt includes consumer debt and other debt. Consumer debt—including the prevalence of “buy now, pay later,” more appropriately “buy now, pain later” (Jenkins, 2024)—causes increasing individual and consumer-protection problems, but it is not a threat to financial and macroeconomic stability in Sweden.

So, is Swedish household mortgage debt so high that it may pose a threat to financial and macroeconomic stability? The short answer is no. Current household mortgage debt does not pose a threat to financial and macroeconomic stability.

A longer and fuller answer may start from the [Sveriges Riksbank \(2019\)](#) press release, stating that Swedish household debt is high “both from a historical perspective and in an international comparison” and that therefore Swedish household debt “poses the greatest risk in the Swedish economy” (see the quote on page 2).

First, as shown in section 3, Swedish household debt does *not* stand out internationally among comparable countries, not even among the Nordics. But it is true that the household debt-to-income (DTI) ratio has grown and is historically high. But it is not so simple that this is sufficient to conclude that household debt poses a risk to financial and macroeconomic stability. The fact is that the DTI ratio is a notoriously unreliable and misleading predictor of future financial and macroeconomic instability (appendix B). For example, it does not indicate a higher risk of future financial stress or consumption drops in a crisis. The “debt-overhang hypothesis”—that there is a causal relation between high DTI ratios and the size of future consumption falls in a crisis—has been rejected (section 6). A more thorough investigation is required. For example, debt is just one part of the household balance sheet. To assess any risks, at a minimum one needs to look at the full balance sheet, including assets and net wealth.

Second, there are two structural features of the Swedish housing and mortgage markets and monetary policy that imply that mortgage debt is less of a risk to stability than one might think. The first structural feature is that, for reasons detailed in section 2.1, mortgages are actually a safe cash cow for Swedish banks. Credit losses on mortgages are insignificant, also in recessions. There is no buy-to-let, loans are full regress, enforcement is efficient, and lending standards are high. Swedish households buy homes to live in, not to speculate in capital gains. Their tenure is long, and they make mortgage debt service a priority. Furthermore, banks are in a cozy oligopoly and make a safe profit in recessions and booms, from the margin between mortgage rates and financing costs through covered bonds that have the highest credit rating. In crises, the Riksbank has through asset purchases (including of covered bonds) and lending of last resort maintained the low mortgage financing costs, in order to maintain financial and macroeconomic stability. Arguably, in Sweden the mortgages *contribute* to financial stability rather than pose a threat.

However, given that Swedish households make mortgage debt service a priority, one might think that there is a risk that consumption might drop substantially, if mortgage rates rise and incomes fall. But the second structural feature is that, as explained in some detail in section 2.2, under flexible inflation targeting, mortgage rates become endogenous and indirectly controlled by the Riksbank to maintain macroeconomic stability. High debt-to-income ratios and variable mortgage rates imply a strong and fast cash-flow channel of monetary policy. This makes it easier for the Riksbank to maintain macroeconomic stability, and smaller policy-rate changes are needed. Normally, for aggregate-demand shocks, policy rates and mortgage rates are procyclical. If incomes fall in a downturn, the Riksbank normally lowers the policy rate, and mortgage rates and borrowers' interest payments become lower—a kind of insurance for mortgagors against downturns. For the relatively rare supply and inflation shocks, the Riksbank's policy-rate increases are carefully calibrated to be a compromise between reducing inflation and not reducing aggregate demand so much as to threaten financial and macroeconomic stability. In times of crisis, the Riksbank has the tools and practical experience to keep the mortgage financing costs down and the mortgage-policy rate spread stable.

Third, in general, as discussed in section 1, household debt can become threat to financial and macroeconomic stability under essentially three conditions:

- (1) The debt becomes too high relative to assets. That is, the households' solvency (net wealth relative to total assets) becomes too low. Then the households' resilience to negative asset-price shocks may become too low.
- (2) The debt service becomes too high relative to households' incomes and debt-service capacity. The households have insufficient margins and liquidity buffers to continue to service their debt, if interest rates rise or incomes fall. The households' liquidity and resilience to interest rises and income falls becomes too low.
- (3) The debt is used to finance overconsumption of macroeconomic significance. Households indulge in debt-financed overspending relative to their disposable income. In particular, when housing prices rise, households use home-equity withdrawals (HEWs) for consumption purposes. This makes household spending very sensitive to the rate of housing-price growth and credit conditions. A fall in housing-price growth or tighter credit conditions may have a large negative impact on spending and consumption.

Conditions (1) and (2) may cause credit losses and threaten financial stability if banks have insufficient capital buffers. High debt service may also cause borrowers to reduce their consumption substantially and threaten macroeconomic stability. Condition (3) may threaten macroeconomic stability and by extension financial stability.

So, regarding condition (1) for a threat to financial and macroeconomic stability (examined in section 4): Is household debt too high relative to assets? Is households' solvency too low?

The aggregate data shows that households' assets are much larger than their debt. And the households' human capital is almost double the value of their assets. Furthermore, assets have been growing much faster than debt, so the ratio between debt and assets shows a declining trend. Net

wealth has grown from twice disposable income in 1985 to five times disposable income in 2024. Household debt is not too high relative to household assets, and the households' solvency is not too low. According to the aggregate data, condition (1) is not present in Sweden, by a substantial margin.

A frequent counterargument is that the wealth and asset distribution may have become more unequal. But according to [Waldenström \(2024a,b\)](#)—and against the narrative of [Piketty \(2014\)](#)—due to increasing housing wealth and pension claims, the wealth distribution among Swedish households has become much more equal since 1920 and not more unequal since 1975.

Individual and more detailed data has been collected by the FI about the new borrowers, and by the FI and [Boije and Hansen \(2024\)](#) about the borrowers of the total mortgage stock. Some basic facts are that 62% of all households are owner-occupiers; 38% are renters. Of the owner-occupiers, 65% have mortgages; 35% are outright owners. The annual number of new borrowers (with loans intended for home purchases) is only about 8% of the borrowers of the total mortgage stock (5% of the owner-occupiers). The value of annual new mortgages intended for housing purchases is only about 10–12% of the total mortgage stock.

Whereas most of the discussion and analysis of mortgages in Sweden has focused on the new borrowers and their mortgages, the total mortgage stock is much larger, and the borrowers of the stock are many more. They matter much more for financial and macroeconomic stability than the new mortgages and the new borrowers.

About 55% of the new borrowers have LTV ratios above 70%. That share may seem high, but, as mentioned, the new borrowers are only about 8% of the borrowers of the stock. In contrast, only 22% of the borrowers of the stock have LTV ratios above 70%. It follows that for the borrowers of the stock, their mortgage debt is not too high relative to the value of their housing, and their solvency is not too low.

Thus, 78% of the borrowers of the stock have at least 30% home equity. That is a large buffer. A housing price fall of 30% has not been observed in Sweden during the last 50 years. The largest fall was 20% during the extreme 1990's crisis, when it also took 7 years for prices to recover. Recent price falls have been smaller, and prices have recovered in 1–3 years, including during the financial crisis. The most recent price fall, in 2022, was 15%, and 2 years out housing prices are still down 12%. But now interest rates have peaked and are coming down.

Furthermore, these times to recovery of prices must be seen in relation to the average tenure of owner-occupiers, 33 years for single-family houses and 10 years for tenant-owned apartments, 18 years on average. Given the above, the risk of having to move with negative home equity is very small. The best option with negative home equity is in most cases to stay put and wait for a recovery of prices. There are no marginal calls on mortgages. The risk of negative housing equity may be an individual problem for unfortunate borrowers, but it is not a threat to financial and macroeconomic stability.

From both the aggregate and more detailed data of the mortgage stock, it follows that household debt is not too high relative to assets. Households' solvency is not too low. Condition (1) for a threat to financial and macroeconomic stability is not present in Sweden, by a substantial margin.

What about condition (2) for a threat to financial and macroeconomic stability (examined in section 5): Is households' debt-service payments too high relative to incomes? Is households' liquidity too low?

The results indicate that neither the interest nor the amortization payments relative to income is much of a burden for the borrowers of the stock. But the amortization requirements can be a substantial burden for some new borrowers, as we saw in section 5.2.1. However, the new borrowers have passed the banks' affordability tests, which make sure that they can manage mortgage rates as high as 6–7 percent. The stress tests in FI (2024c) also show that new borrowers have good debt-service capacity and can fulfill their debt service also if interest rates rise or incomes fall (even though the mandatory amortization requirements may strain the debt-service capacity). The new borrowers' liquidity and resilience to interest-rate rises and income falls is thus good. This is especially the case if the FI allows temporary exemptions from the amortization requirements if needed. In any case, as mentioned, the annual new borrowers are only about 8% of the borrowers of the stock.

The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes.

As noted above regarding the second structural feature, under flexible inflation targeting, interest rates and interest payments normally become lower in downturns, which provides some insurance to borrowers against downturns. The interest hikes are carefully balanced to achieve a good compromise between achieving the inflation target and maintaining full employment/resource utilization and macroeconomic stability. The Riksbank will not set a policy rate that threatens financial and macroeconomic stability, in contrast to what was the case when the Riksbank defended the fixed exchange rate during the 1990s banking crisis.

Overall, taking the mortgage stock into account, there is no indication that mortgage debt payments have become too high relative to the incomes and payment capacity of the borrowers. The share of non-performing mortgages is completely insignificant. Condition (2) is currently not present in Sweden, by a substantial margin.

Regarding condition (3) for a threat to financial and macroeconomic stability (examined in section 6): Is there debt-financed overconsumption of macroeconomic significance?

There is no indication of any debt-financed overconsumption of macroeconomic significance in Sweden. The HEW recorded by the FI is not unusually high. The saving rate is historically high, and the share of durable goods in consumption expenditure is normal. Condition (3) is not present. Any beginning debt-financed overconsumption of macroeconomic significance would be easily discovered, and the FI and the Riksbank could easily prevent it from being a threat to financial and macroeconomic stability.

Overall, the main conclusion is that Swedish household debt is not too high. It is not a threat to macroeconomic or financial stability. Conditions (1)–(3) are not present.

Appendix

A Thresholds for the DTI ratio?

The quote from [Ingves \(2014\)](#) on page 1 suggests a risk threshold of 180% for the DTI ratio ratio? Why 180% of all possible numbers? Ingves did not provide any details.

As discussed in section 1, it is now well known that the DTI ratio is not a predictor of financial crises. And according to appendix B, this was well known at the FI in 2014 ([Braconier, Hansen, and Palmqvist, 2014](#)).

How could one nevertheless somehow around 2014 find a rationale for 180% being a critical DTI level? A look at figure 5.1 shows that the after-tax interest-to-income (ATIntTI) ratio peaked at 10% in 1991, at the start of the 1990s Swedish banking crisis. What if 10% were a critical threshold for the ATIntTI ratio, above which the risk of a financial crisis in Sweden becomes high? Why not?

Furthermore, what if 8% were a suitable stress level of the Swedish mortgage rate? Why not? If so, what DTI ratio would make an 8% stressed interest rate result in a 10% ATIntTI ratio?

With 30% tax relief, the before-tax interest rate of 8% results in a $0.7 \times 8 = 5.6\%$ after-tax interest rate. The resulting ATIntTI ratio is then $0.056 \times \text{DTI}$. Then the DTI ratio is the solution to the equation

$$0.056 \text{ DTI} = 0.1. \tag{A.1}$$

The solution is $0.1/0.056 = 179\%$, almost exactly 180%! Mission accomplished!

In summary, the combination of an assumption of an ATIntTI ratio of 10% being a threshold for a financial crisis and an 8% interest rate in a crisis results in a threshold for a financial crisis of close to 180%.

An example of this explanation of the 180% DTI ratio is presented in [Emanuelsson et al. \(2016, pp. 12–14\)](#).

A problem for this explanation is that there is no indication that the 1990s crisis was caused by the ATIntTI ratio reaching 10%. The 1990s crisis was the result of several factors, including a combination of fixed-exchange rates; an overheated economy with high inflation, thereby loosing international competitiveness; considerable speculation in commercial property; and an extremely high policy rates (up to 500%) to defend the krona against speculative attacks. Nor is there any reason why 10% generally would be a critical threshold for the ATIntTI ratio.⁴²

Another problem for the explanation is, why an 8% stressed interest rate? The 8% stressed interest rate in [Emanuelsson et al. \(2016\)](#) is calculated as the sum of a real neutral policy rate of 2%, an inflation of 2%, a mortgage-policy rate spread of 2 p.p., and a “stress adjustment” of 2 p.p. This does not take into account the fall in the real neutral rate over several decades. It also disregards that the Riksbank may reduce the policy rate to zero or negative numbers in a crisis. It also neglects that the Riksbank has tools to keep the mortgage-policy-rate spread down in a crisis.

In my mind, this presents a pretty weak and unconvincing rational for 180% as a critical DTI ratio for Sweden. The assumptions seem arbitrary and give the impression of having been cherry-picked to get a desired result.

For Norway, [Næss Torstensen \(2016\)](#) follows [Emanuelsson et al. \(2016\)](#) focussing on the historical distribution of the after-tax interest-to-income ratio and the fact that it peaked during the Norwegian banking crises 1988–1993, when housing prices and consumption fell. The 95th percentile of the historical distribution of the ATIntTI ratio, 11.6%, is considered a “critical interest

⁴² See section 4.7.2 on the reasons for the banking crisis of the 1990s.

burden.” Assuming a stressed interest rate of 8%, the resulting threshold of the DTI ratio, the “vulnerable debt ratio,” is reported to be 212%.⁴³

The borrowers of the mortgage stock and the owner-occupiers have much lower LTV ratios and are much less affected by the amortization requirements. They have benefitted from past housing-price increases, have substantial home equity, and have lower debt-service relative to their incomes.

B Some expressed skepticism against the debt-to-income ratio as an indicator of risk

A 2014 memo from Finansinspektionen (Braconier, Hansen, and Palmqvist, 2014) (my translation from Swedish):

The Swedish household debt-to-income ratio is high in a historical as well as international perspective. But **the aggregate DTI ratio is not a good indicator of any risks associated with household debt.** (p. 1, my emphasis)

...

The [household] debt-to-income ratio is not a good measure of risks associated with household debt. [Heading, p. 3]

There are to a large extent structural explanations why the DTI ratio has increased in Sweden. **According to international studies, the level of indebtedness play a small role for the risk and magnitude of financial crises or recessions.** . . . Many countries have had problems in spite of having substantially lower levels of indebtedness than Sweden, and several economies seem to work in a stable manner at higher levels than we have in Sweden today.

International experiences rather indicate that financial crises as well as large macro-economic adjustments mainly occur after a period of rapid credit growth or rising DTI ratios. . . If you look at Swedish financial crises, there is the same pattern for the crises in the 1920s and the 1990s. . . But the relation is not perfect. There are countries that have increased their DTI ratio more than Sweden and yet not had any problems. At the same time, there are countries that have had a smaller increase of the DTI ratio than Sweden and in spite of that have got large problems. **It is hence not possible to draw any unambiguous conclusions about the risks associated with household indebtedness with a one-sided focus on the DTI ratio’s change or level.** (p. 3–4, my emphasis)⁴⁴

Andersen et al. (2016, p. 98)

[O]ur results do not support any interpretation of the data that involves a negative causal effect of a high debt level on subsequent spending growth. This includes the hypothesis that it was the high pre-crisis level of debt among the highly levered households

⁴³ The formula used is, with the notation of this paper, $DTI = 1.065 ATIntTI / [(1 - \tau)i]$, where DTI is the “vulnerable debt ratio”, 1.065 is a 5-year average of ratio between the interest-adjusted and conventional disposable income, ATIntTI is the “critical level of the interest burden (11.6%),” τ denotes the tax rate for tax-deductible interest, and i is the stressed interest rate (8%). The tax rate is not reported, but a tax rate of 28% is consistent with the vulnerable DTI ration being 212%.

⁴⁴ In spite of this 2014 memo, Finansinspektionen would in 2018 introduce a second amortization requirement, with references to households with high DTI ratios having reduced their consumption more during the GFC, in line with the second quote on page 3 from (FI, 2017, p. 1).

that caused them to become credit constrained when the crisis broke out, thus forcing them to cut back on spending more drastically than other households. As mentioned above, **we do not find any negative effect on spending growth of a high pre-crisis debt level, once the change in debt in the years leading up to crisis is controlled for.**

A consultation response by [Englund and Svensson \(2017\)](#) to the FI's proposal to tighten amortization requirements for households with high DTI ratios ([FI, 2017](#)):

We recommend that the FI's proposal to tighten amortization requirements for households with high debt-to-income ratios is rejected. The justification for the proposal is that highly indebted households might significantly reduce their consumption if interest rates rise or in the event of income loss, which could, in turn, exacerbate an economic downturn. However, first, **an economic downturn would normally be met with an interest rate cut by the Riksbank, not a rate hike. This would improve the cash flow of more heavily indebted households more than those with lower debt. In this way, high debt serves as a form of insurance against downturns and would typically mitigate rather than amplify a downturn. In fact, high debt and variable interest rates increase the impact of monetary policy, giving the Riksbank—all else being equal—better opportunities to stabilize the economy.**

Second, **the FI's view that consumption among highly indebted households is more sensitive to income changes lacks empirical support. In fact, it is contradicted by the scientific studies of international experiences that the FI cites to support its position.** (p. 1)

An op-ed by [Boije, Flam, Hassler, and Svensson \(2019\)](#) in *Dagens Nyheter*:

According to the FI, the benefit of the amortization requirements is that they force new homebuyers to take out smaller loans, which would reduce the risks of household indebtedness. This is based on **FI's view that highly indebted households may reduce their consumption sharply in an economic downturn and that a high indebtedness thus constitutes an "elevated macroeconomic risk."** The FI believes that **international experiences from the financial crisis 2008-2009 supports this view.**

However, research contradicts this view (see [Svensson \(2019a\)](#) and [Swedish Fiscal Policy Council \(2019\)](#)). The fall in consumption in other countries was not due to indebtedness itself, but to the fact that increased mortgages before the crisis had been used to finance "overconsumption" in relation to household incomes.

For Sweden, see also [Evidens \(2015\)](#) and [Boije \(2019\)](#) for informed criticism of the use of the DTI ratio as an indicator and predictor of financial and macroeconomic distress and crises.

[Broadbent \(2019, p. 2, my emphasis\)](#): "at least among this mini-sample of three [the Netherlands, the UK, and the US], **prior levels of debt were not a good guide to the scale of the subsequent distress in the mortgage market.**"

Furthermore, **"the comparatively poor predictive power of the level of debt is quite striking** [regarding the predictive power ahead of the financial crisis on the GDP growth rate after, in 15 European countries, Japan, and the US]." (p. 4)

With reference to the results of the above-quoted [Andersen et al. \(2016\)](#) study of Danish microdata on the relation between household pre-crisis debt and subsequent consumption falls during the financial crisis:

There is a correlation, it turns out, between the level of household gearing prior to the crisis and the drop in its consumption spending afterwards. But this goes away once you also take into account the prior growth rate of debt. **Once you know the change in a household’s indebtedness ahead of the crisis, knowing the level tells you nothing more about its subsequent spending** (Broadbent, 2019, p. 7)

Kearns et al. (2020) provide a both broad and detailed analysis of the riskiness of Australian household debt, including stress tests of banks and households. One of their results is that “**the household DTI ratio is a poor measure of the extent of risk** [posed by Australian household debt] (p. 2).”

B.1 A new report in the series *FI Analysis* from Finansinspektionen, with some new conclusions

A new report in the series *FI Analysis* from Finansinspektionen (Almenberg et al., 2021) has some new conclusions regarding the risks from household debt and the amortization requirements compared to previous reports and memos. Below are some quotes referring to household debt (my emphasis):

Debt makes household consumption more sensitive to certain kinds of economic shocks, but this does not necessarily imply that a measure that leads to lower debt increases resilience. To assess the effects of measures that lower debt, it is necessary to look at households’ liquid assets, as these constitute a key buffer that increases households’ resilience. It is also necessary to consider effects on households’ cash flow. If households can use their disposable income in a flexible manner, this increases their resilience. (p. 1)

In Sweden, household debt has been growing faster than household income for many years. The aggregate debt ratio, household debt as a share of disposable income, is now at the highest level observed so far, 180 percent. The increase in debt has occurred against a backdrop of a secular decline in interest rates that has pushed up the prices of houses and other assets while also enabling households to take on more debt. **Despite increased debt, the interest ratio—household interest payments as a share of disposable income—has declined to a historically low level of slightly less than 4 percent. In aggregate, the net wealth of the household sector has increased, i.e., the value of assets has increased more than the debt...** (p. 2)⁴⁵

The cash flow channel means that highly indebted households have a greater importance for the transmission of monetary policy, but this does not necessarily mean that their consumption is more vulnerable.²⁶ In a normal business cycle, the Riksbank raises the interest rate when the economy is performing strongly and lowers it when the economy is performing weakly. As a result, part of household disposable income is redistributed over the business cycle. Increased interest rate sensitivity can make it easier for monetary policy to smooth fluctuations in aggregate demand; all else equal, smaller interest rate changes are needed to achieve the same stabilising effect on the economy... (p. 12)

²⁶ See, for example, Di Casola and Iversen (2019) and Svensson (2020).

⁴⁵ The number 4% seems to refer to the before-tax interest-to-income ratio. The after-tax interest-to-income ratio is less than 3% (figure 5.1).

[Regarding the importance of controlling for the change in debt when predicting the consumption response in crises], **the state of knowledge has progressed thanks to more recent studies** such as Andersen et al. (2016), Baker (2018) and Svensson (2020, 2021a,b). **That a change in debt has greater importance than the level of debt also fits better with consumption theory and cross-country studies of the correlation between aggregate consumption and aggregate debt. The latter typically find a connection between crises and a build-up of aggregate debt rather than the level of debt.** (p. 18)

In previous reports, the FI has pointed to experiences from Denmark, the UK and the US during the financial crisis as support for the view that highly indebted households may cut consumption more in a crisis. . . As described above, **more recent research casts a somewhat different light on these experiences. In order not to draw erroneous conclusions**, it is important to consider (i) the prevalence of liquidity and credit constraints as illustrated by Baker (2018), and (ii), the change in debt and the level of consumption, as illustrated by Andersen et al. (2016). (p. 18)

The new results also matter for the choice of indicators for assessing risks linked to household debt and the interpretation of these indicators. **To observe that debt has increased in relation to income, for example, is not sufficient to establish with certainty that risks have increased or resilience declined.** Household debt-carrying capacity could also have increased, and the rest of the balance sheet is also important. . . (p. 18)

[H]igh debt-to-income ratios are not in themselves sufficiently informative to conclude that resilience has diminished. (p. 38)

C Additional figures

Figure C.1: Ratios of household assets, net wealth, and debt to income, 1980–, and growth rates from 1995. Percent

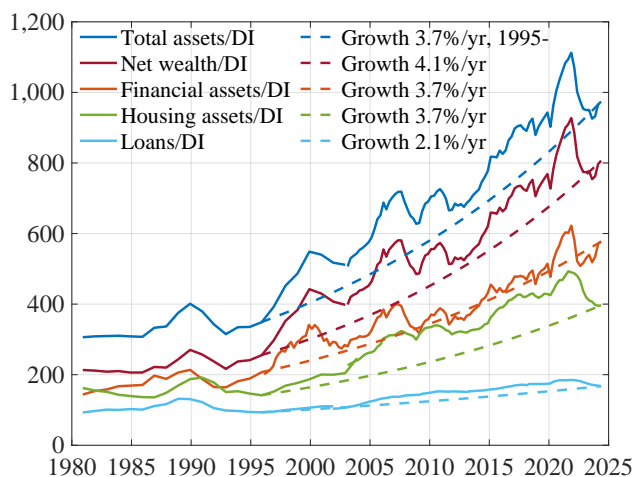
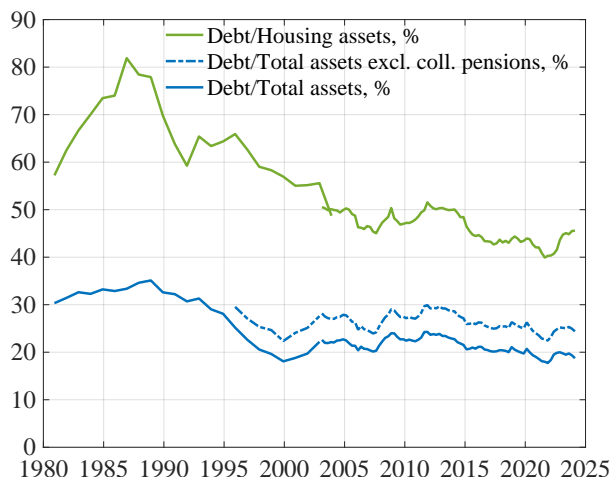
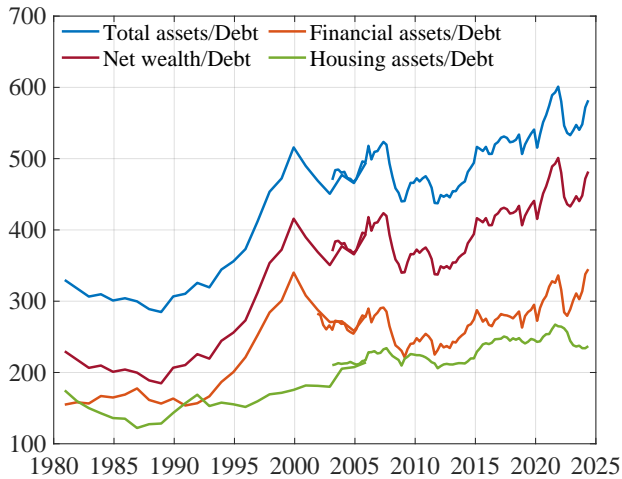


Figure C.2: Ratios of household debt to housing and total assets, 1980–, with and without collective pension claims.



Source and note: Statistics Sweden (2024a,b,c), and own calculations. Figure C.1: Total assets and financial assets with and without collective pensions and insurance. Financial assets exclude tenant-owned apartments (which are considered financial assets by Statistics Sweden). Housing assets include owner-occupied single-family houses, tenant-owned apartments, and second homes. The latest observation is 2024q2.

Figure C.3: Ratios of household assets and net wealth to debt, 1980–. Percent.



Source and note: Figure C.3: See figure 4.2. Figure C.4: Svensson (2024, figure 1.1). See that paper for details. The dash-dotted blue and red lines take into account an assumed preference shift 2020–2021 in favor of better and larger housing (Sveriges Riksbank, 2021).

Figure C.4: Price-to-income and user-cost-to-income ratios (percentage deviation from historical averages) and the user cost of capital (percent), Swedish single-family houses.

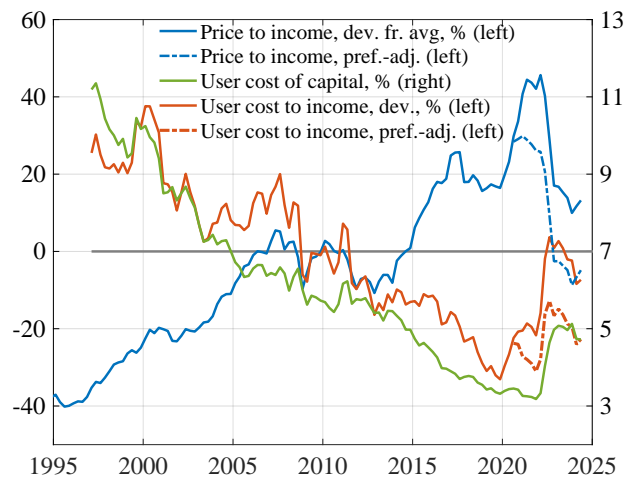
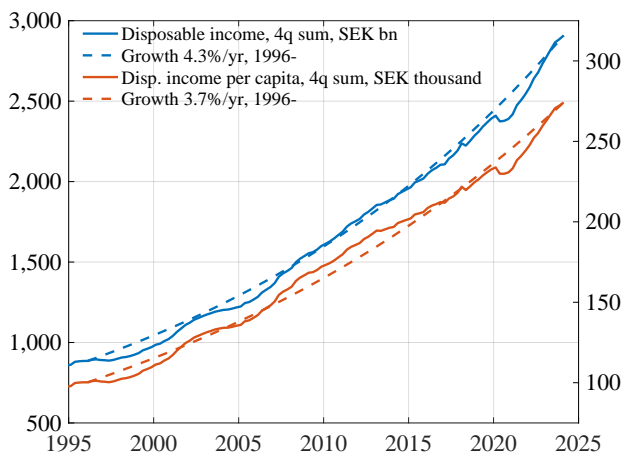


Figure C.5: Disposable income, disposable income per capita, and annual growth rates.



Source and note: Nominal disposable income and housing prices. Figure C.5: Statistics Sweden (2024b,f). Figure C.6: Statistics Sweden (2024m) before 2005q1, Valueguard (2024) from 2005q1, and own calculations.

Figure C.6: Housing prices and annual growth rate.

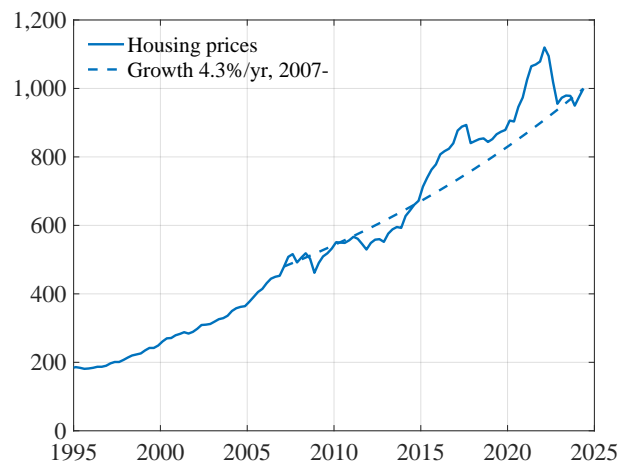
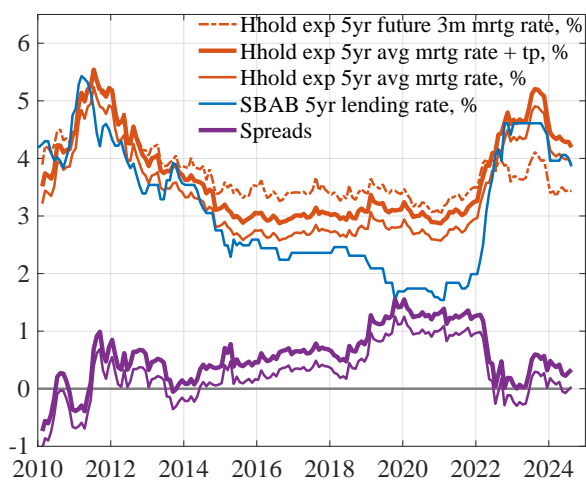


Figure C.7: Swedish households' expected 5-year average of future 3-month mortgage rates with and without term premium, the SBAB 5-year lending rate, and spreads, 2010–Augusti 2024.



Source and note: Figure C.7: NIER (2024), SBAB (2024), and own calculations. The term premium is assumed to be 0.5 basis points (bp) per month fixation period, so it is 30 bp for a 5-year fixation period.

Figure C.8: Actual and expected 5-year nominal housing-price appreciation, actual housing prices, and the average rates of nominal housing-price appreciation from 1997q1 to 2023q4 and from 2010q1 to 2023q4.

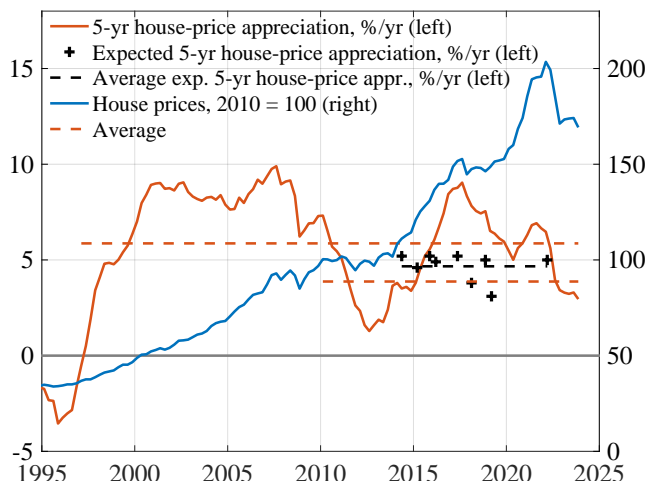
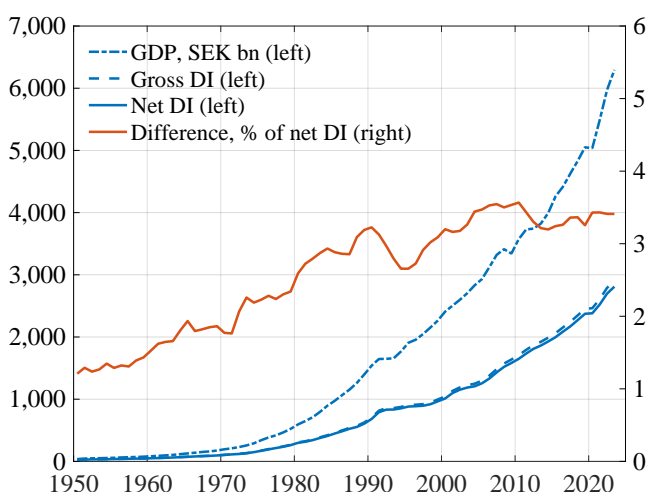


Figure C.9: GDP; disposable income, gross and net; and difference gross, net. 1950–2023.



Source and note: Figure C.9: Statistics Sweden (2024g) and own calculations. Figure C.10: Statistics Sweden (2024j), Sveriges Riksbank (2024), and own calculations.

Figure C.10: The policy rate, the average mortgage rate on new loans, and the spread, 2006–.

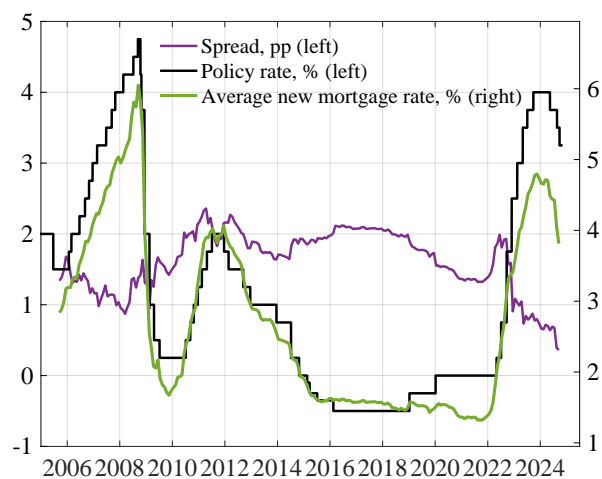
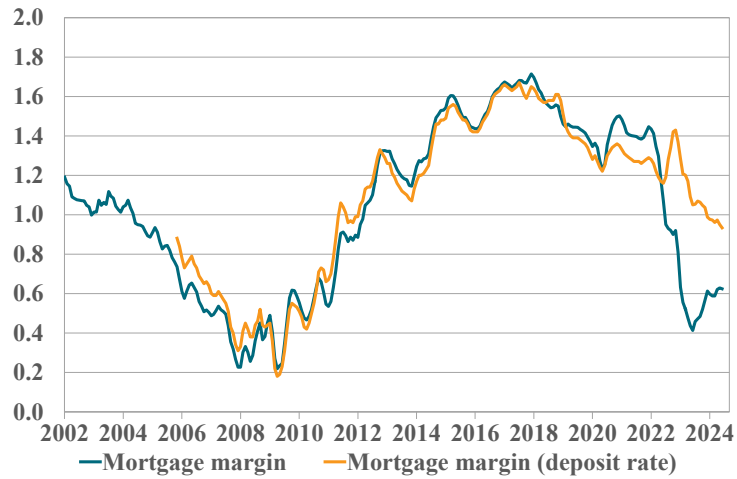
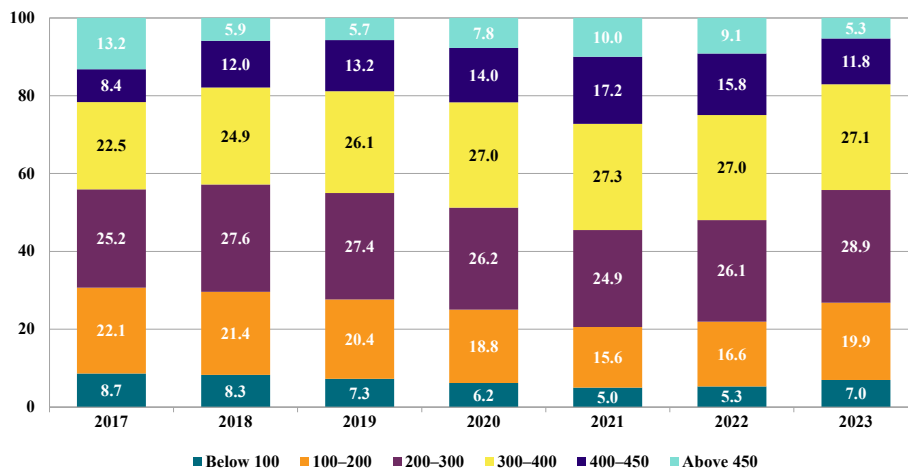


Figure C.11: Swedish bank's gross mortgage-rate margin. Percentage points.



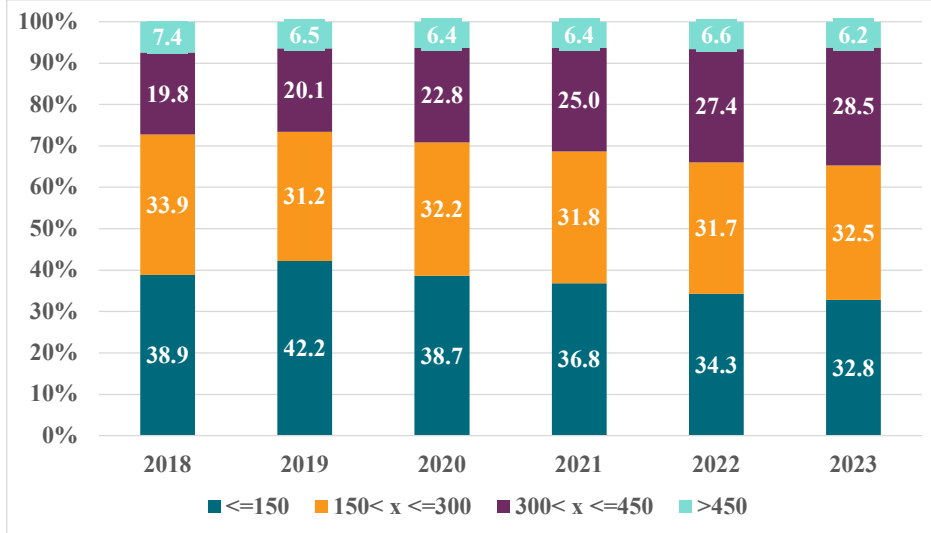
Source and note: FI (2024a).

Figure C.12: Distribution of LTGI ratios for new loans among new borrowers, 2017–2023.



Source and note: FI (2024c, diagram 18). Refers to loans for home purchases, home-equity withdrawals, and bank switches.

Figure C.13: Distribution of LTGI ratios for the total mortgage stock among borrowers, 2018–2023.



Source and note: FI (2024b). During 2018, only 5 of 8 banks reported LTI ratios, from 2019, 7 of 8 banks.

Figure C.14: Histogram of the average tax rate among new borrowers with loans intended for home purchases.

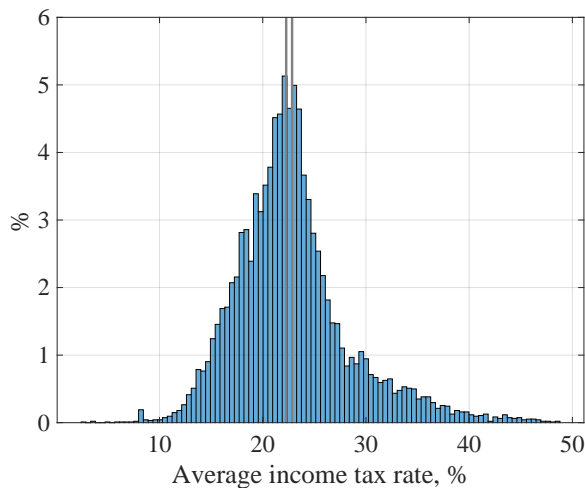
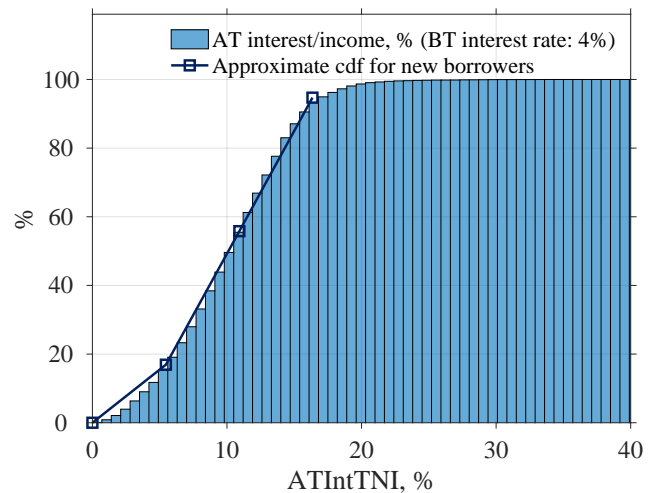


Figure C.15: Comparison of the approximate cumulative distribution for new borrowers in figure 5.17 with the actual cumulative distribution corresponding to figure 5.8.



Source and note: See note to figures 5.3 and 5.4. Figure C.14: The left and right vertical gray lines are the median and mean of the average tax rate, 22.3% and 22.8%, respectively. Figure C.15: See notes to figures 5.8 and 5.16.

Figure C.16: The ESRB's Scoreboard (ESRB, 2022, table 1, Scoreboard, part 2).

Country	Household stretch			Summary measures			
	Household debt, % of income	Household financial assets to debt, %	Debt service to income ratio for households, %	Average rating across indicators	Average rating across collateral indicators	Average rating across lending indicators	Average rating across household indicators
AT	87.7	386.3	9.5	1.5	2.75	1.0	0.7
BE	107.7	484.2	11.4	1.8	2.0	2.0	1.3
BG	38.5	585.7	6.1	0.8	1.0	1.3	0.0
CY	136.3	279.5	18.6	0.9	0.3	0.0	2.3
CZ	59.6	444.4	6.8	1.2	3.0	0.7	0.0
DE	90.4	372.2	9.3	1.5	2.8	1.0	0.7
DK	223.5	362.1	17.3	1.4	2.3	0.0	2.0
EE	68.0	358.9	7.1	1.3	2.5	1.3	0.0
ES	94.7	341.9	11.0	1.1	1.8	0.7	1.0
FI	119.7	239.7	12.0	1.4	0.5	1.0	2.7
FR	102.0	402.5	11.4	1.2	1.3	1.0	1.3
GR	78.4	298.9	15.5	0.9	1.3	0.0	1.3
HR	54.3	379.3	7.2	1.1	1.5	1.7	0.0
HU	36.1	683.9	5.5	0.9	1.8	1.0	0.0
IE	102.5	359.2	12.5	0.8	0.8	0.0	1.7
IS	139.9	347.1		1.3	1.7	0.7	1.5
IT	65.1	647.8	11.1	0.4	0.0	1.0	0.3
LI							
LT	36.9	467.3	4.4	1.0	2.3	0.7	0.0
LU	177.8	247.8	12.4	2.3	3.0	1.7	2.3
LV	33.3	523.0	3.6	0.8	1.5	1.0	0.0
MT	87.6	437.8	11.4	1.4	1.5	1.7	1.0
NL	199.8	357.5	17.8	1.8	2.8	0.7	2.0
NO	232.9	151.7	14.0	1.8	1.7	0.7	3.0
PL	55.4	325.7	9.2	0.5	1.5	0.0	0.0
PT	93.6	328.7	12.1	1.7	2.8	1.0	1.3
RO	24.5	484.4	4.8	0.5	0.8	0.7	0.0
SE	188.1	395.9	18.8	1.8	2.3	1.0	2.0
SI	43.1	488.9	5.1	1.0	2.3	0.7	0.0
SK	73.3	204.2	9.5	1.9	3.0	1.7	1.0
EEA average	98.3	392.6	10.6	1.2	1.8	0.9	1.0
EEA median	87.7	372.2	11.1	1.2	1.8	1.0	1.0
Low	75.0	240.0	10.0	1.0	1.0	1.0	1.0
Medium	85.0	260.0	12.0	1.2	1.2	1.2	1.2
High	95.0	280.0	14.0	1.7	1.7	1.7	1.7

Source: ECB, the national authorities of Iceland and Norway, the Banque centrale du Luxembourg, the Central Bank of Malta.
Notes: The latest observation is the second quarter of 2021 for the indicators in the collateral stretch, August 2021 for those in the funding stretch and the first quarter of 2021 for those in the household stretch (with some exceptions). Official data from the National Statistics Office of Malta on disposable income are only available up to the second quarter of 2017 and the quarterly values for the first quarter of 2021 are based on Central Bank of Malta projections. Official data from STATEC on disposable income are only available on an annual basis up to 2020 and quarterly values for 2021 are Banque centrale du Luxembourg projections. The overvaluation figures are estimated by the European Central Bank.

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