

Household indebtedness, house prices and the macroeconomy: a review of the literature

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In the last 15 years, household indebtedness has increased substantially in Sweden. Since the mid-90s, debt-to-income ratios have nearly doubled. Since mortgages represent about 80% of household debt, the substantial increase in indebtedness, coupled with a rally in house prices, has raised concerns about the possibility of an unsustainable credit growth. In light of these developments, this article reviews the existing economic literature on the potential explanations for, as well as the macroeconomic consequences of, the observed substantial increase in the households' leverage. Given the strong connection between real estate markets and the households' borrowing choices, the article also discusses the driving forces behind house price developments. We conclude by discussing to what extent the results of international research on this topic can be used to shed light on the current situation in Sweden.

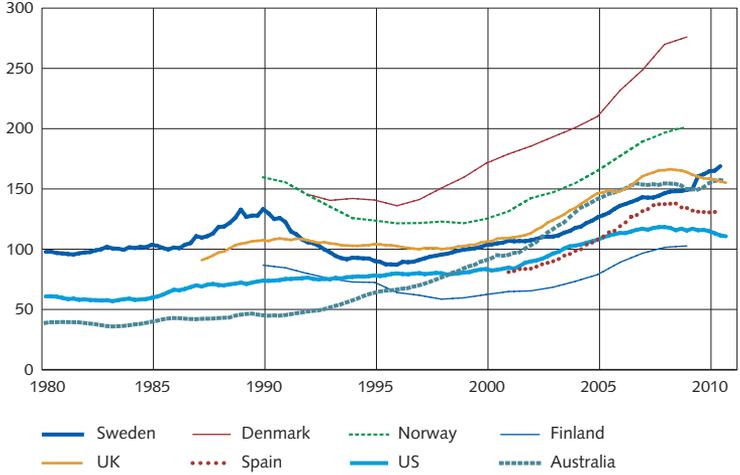
Introduction

Over the past 15 years, credit growth in Sweden has vastly exceeded the growth in the households' disposable income. As a result, Swedish households' indebtedness has increased substantially. Following the sharp decline in household debt after the banking crisis in 1992-1993, household indebtedness increased from 90% of disposable income in the mid-1990s to around 170% in 2010, see Chart 1. Other countries have experienced similar trends in the household debt-to-income ratio, some of which are shown in Chart 1.¹

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¹ The household debt/GDP ratio shows a similar pattern in Sweden (see Hansson, 2010).

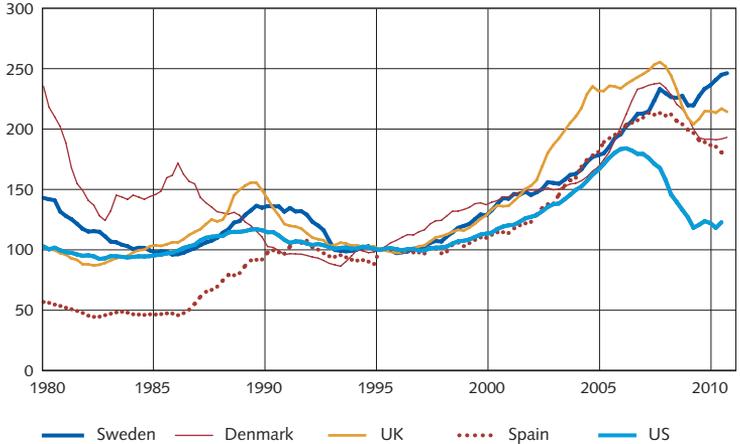
Chart 1. Household indebtedness as a percentage of disposable income



Sources: The BIS, national central banks, Reuters EcoWin and the Riksbank.

Housing credit growth is the main factor in rising household indebtedness. For most households, real estate makes up the bulk of their assets, while mortgages constitute the largest liability. House prices have been increasing in Sweden since the mid-90s. At the onset of the financial crisis, real house prices in Sweden stopped rising and even fell by about 5% in 2008-2009. Since then, real house prices in Sweden have started to increase again. Chart 2 shows the development of house prices in Sweden and some other countries.

Chart 2. Real house prices
Index 1995 Q1 = 100

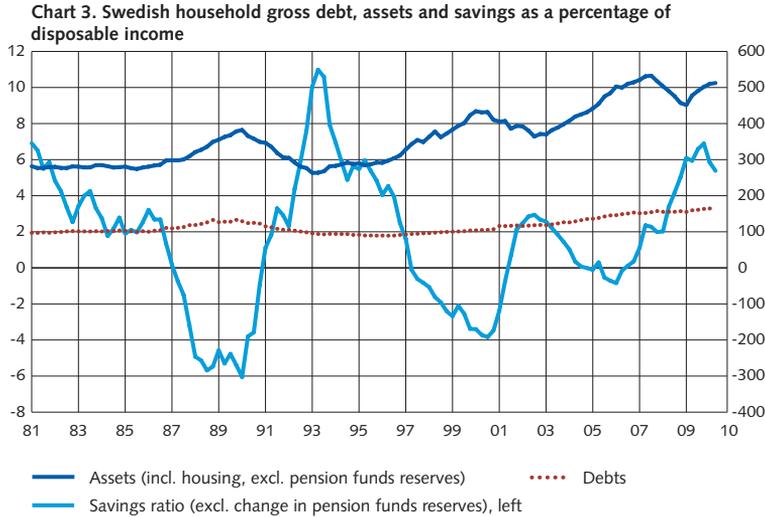


Note. Data for the US until 2010 Q2

Sources: Reuters EcoWin and Statistics Sweden.

The recent prolonged increase in house prices in Sweden and in many other advanced countries has boosted the asset side of the households' balance sheets, and in many

cases, households' net wealth has increased. Chart 3 shows the development of Swedish household debt, assets and savings. In the mid-1990s, the Swedish households held assets worth about three times their debt. In 2000, this ratio had increased to four, but 10 years later it is now back to three again.



Sources: Statistics Sweden and the Riksbank.

Although house prices in Sweden have continued to rise, they declined in several industrialized countries in the wake of the 2008-2009 financial crisis (Chart 2), illustrating that the asset side of the households' balance sheets can be substantially affected by fluctuations in house prices and interest rates.

Prior to financial deregulation in the mid-1980s, Swedish household debt was relatively stable at 100 per cent of disposable income. Following deregulation, household debt increased rapidly to around 140 per cent before declining during the 1992-1993 financial crisis. Since that crisis, household debt has again trended up. This raises the question of what constitutes a sustainable level of household debt.

A wave of recent theoretical and empirical research has focused on illustrating the basic mechanisms of household indebtedness against the backdrop of falling house prices in many countries. In this context, this article reviews:

- How do fundamental factors like expected income, interest rates, preferences and demographics affect household saving behaviour?
- What is the importance of credit market frictions and financial innovations in explaining the evolution of household debt?
- What is the interaction between household indebtedness and the development of house prices?

- To what extent can the rapid rise in household indebtedness be explained by an increase in credit supply?
- What data would be useful to analyse these issues? Aggregate data might obscure risks that stem from the fact that households differ in resources, constraints and preferences.
- What factors are relevant when evaluating the indebtedness of the Swedish households and possible risks to financial and macroeconomic stability? What policy conclusions can we draw for Sweden?

What is driving household debt? Some theory

The permanent income/life-cycle model is a useful starting point for considering household debt from an economic theory point of view.² Households save or borrow based on their expected lifetime resources, real interest rates and demographic factors. In this setting, with well-functioning financial markets, households aim to smooth out consumption even though incomes from wages and assets vary over the life cycle. This standard theory identifies a number of variables that influence the households' choice of consumption and level of borrowing:

- **Real interest rates.** Changes in real interest rates affect consumption through different channels with opposite signs. On the one hand, a decline in the real interest rate can boost borrowing because it cuts the cost of servicing the debt and decrease savings because it increases the present discounted value of future income. On the other hand, a lower return on savings also implies lower consumption in the future given the present value of lifetime resources. This last effect can boost savings. So the net effect of real interest rates on consumption and savings is ambiguous.
- **Future income.** An increase in future income expectations drives consumption up, boosting borrowing.
- **Demographics.** Individual income profiles vary substantially with age. Shifts in the age composition of the population can help explain changes in household debt.
- **Uncertainty.** The households' attitude towards risk (for example income uncertainty and time-varying interest rates) is also an important factor in the life-cycle consumption and borrowing decisions. With uncertainty, households choose to build up precautionary savings/wealth. If uncertainty is reduced, the households' rational response is to reduce precautionary saving.

With this framework in mind, historically low real and nominal interest rates, a substantial decrease in macroeconomic volatility, changes in taxation, or the ageing of the baby boom

² See Ando and Modigliani (1963) and Friedman (1957). See also Debelle (2004) for a survey of household borrowing in the life-cycle framework and macroeconomic implications.

generation,³ have all been pointed out as potential factors behind the observed increase in indebtedness.

In this standard model, borrowing is the result of households' optimal responses to economic conditions. However, recent research has considered partial departures from this simplified paradigm to explain why households do not necessarily reach their efficient consumption or borrowing levels. Imperfections in credit markets or irrational behaviour on the part of borrowers (and/or lenders) are just some examples of the numerous factors cited in the literature to potentially explain household over-indebtedness. Below we discuss the most important factors and describe how these alter the conclusions one would draw from the standard life-cycle/permanent income model.

Financial market imperfections and borrowing decisions

Financial markets are not perfect. The simple model sketched above abstracts from credit market imperfections, an important determinant in households' borrowing decisions. Liquidity-constrained households borrow *less* than they would optimally choose to do. As a result, financial deregulation and the potentially implied easier access to credit markets can boost borrowing among those households who initially were financially constrained. This last channel works not only for households who were excluded from financial markets, but also for those households who were borrowing less than they would have liked to because of binding borrowing constraints. In this sense, in a life-cycle/permanent income model augmented with a borrowing constraint, relaxing this constraint allows households to better smooth out their consumption and enhances welfare. Against this background, aggregate household debt would rise as previously constrained households reach their new optimal borrowing level.

Financial frictions and over-borrowing. Imperfections in credit markets can also induce *excessive* borrowing (see for example, Lorenzoni, 2008, and Bianchi and Mendoza, 2011). Financial constraints are usually tied to collateral values and can amplify the effects of a downturn on the economy via their feedback effects on asset prices. When making borrowing decisions, private agents might not take into account that, during a slump, fire-sales of assets will further reduce asset prices. This will shrink their ability to borrow and exacerbate the recession. As a result, they will over-borrow during a boom and their behaviour will increase macroeconomic volatility. In this environment, by taking into consideration this amplification mechanism, the government can reduce aggregate borrowing in a boom and dampen asset sales in a slump. This channel provides a justification for a macroprudential approach in financial supervision. This mechanism and the resulting interaction between asset prices and financial distress could have been at work in the recent financial crisis.

3 Dynan and Kohn (2007) explore the effects of the ageing of the baby boom generation on the evolution of US household debt since 1983.

Behavioural approaches: irrationality and over-indebtedness

Behavioural factors can also generate excessive borrowing. “Self-control” problems, “overconfidence” or a lack of “financial literacy” are some of the examples cited in the literature. All these factors can potentially generate unrealistic expectations about asset prices that can further increase borrowing above rational or optimal levels and create vicious circles.

Self-control problems. In economics, a self-control problem describes a situation where there is a conflict between short-term and long-term preferences. Households who think they should save more for retirement, but still prefer not to cut their consumption today, suffer from self-control problems. Clearly, such behaviour could importantly influence saving choices and lead to under-saving (or excess borrowing).⁴

Financial literacy, overconfidence and financial mistakes. Households might take on more debt than is rationally appropriate because they lack the knowledge required to make the right investment decisions, so-called “financial literacy”. Agents may also hold insufficient precautionary savings or too much debt because they are overconfident and underestimate the variance of future shocks.⁵ In this context, households could interpret historically low real interest rates as reflecting a permanent change in real interest rates and base their borrowing decisions on this misperception. This channel can be further strengthened if banks also change their risk attitude, for example in extended periods of low interest rates, and soften their lending standards for new loans.⁶ In theory, such a permanent change in real interest rates would be justified by a permanent decrease in growth rates, in discount factors, that is household preferences, or a permanent cut in capital income tax rates.⁷ Over time, financial markets have evolved and new, more complex, financial products have been created requiring a higher level of sophistication among investors. At the same time, economic policies that indirectly stimulate homeownership, such as interest rate deductions, or that increase the degree of individual responsibility in managing pension savings have been implemented.⁸ Thus, individual financial decisions have become more relevant at a macroeconomic level. If household over-borrowing is the result of poor financial literacy, policies such as financial education and saving programmes could be a tailor-made solution to the problem.

Credit frictions and behavioural factors. A combination of credit frictions and behavioural factors can explain excessive borrowing and credit-induced asset price fluctuations. Most of the literature on credit market inefficiencies takes leverage⁹ as a given variable and focuses on the equilibrium determination of interest rates. In Geanakoplos's

4 See Laibson (1997) and Angeletos et al. (2001).

5 See Kahneman, Slovic and Tversky (1982).

6 Ioannidou et al. (2007) find evidence of a link between short-term interest rates and banks' risk taking.

7 See Jonsson (2002).

8 In the United States, the shift from defined benefit to defined contribution pension plans has increased individuals' discretion in choosing how to allocate their retirement savings. The reform of the Swedish pension system approved in 1998 goes in the same direction. In the actual system, a share of individual contributions is deposited in capital funds chosen by the pension-saver.

9 More specifically, leverage is defined as the ratio between the asset value and the equity used to purchase it.

(2010) theory of “leverage cycles”, the interaction between “natural buyers”, that is people who value an asset more or have more optimistic beliefs, and “natural sellers” determines both asset prices and leverage in equilibrium. Natural buyers are willing to pay more and, most importantly, be more leveraged to be able to hold the asset.¹⁰ If, following bad news for the asset, they lose their ability to borrow then they will invest less in the asset. As a consequence, natural sellers will now hold the asset. Asset prices and leverage will go down and the initial bad shock to asset prices is amplified. This simple mechanism will create a “leverage cycle”: leverage will be too high in booms and too low in bad times. Geanakoplos (2010b) argues that behind the recent financial crisis in the United States there are two leverage cycles reinforcing each other: in financial and in housing markets. According to his theory, the upsurge in house prices observed in the United States just before the crisis relied mainly on a credit expansion. New, more leveraged, households entered into housing markets, thus pushing up housing prices even further. Slowly, lenders started to become more alert and house prices sharply declined following the increase in the delinquency rate. The massive fall in house prices induced by the crisis has made it more difficult for households to get new loans and to refinance old loans. This has created problems for these loans as well as for the securities they back, that is new securitizations have also become more difficult to underwrite. The author’s main conclusion is that central banks should actively monitor leverage levels in the economy.

Housing and household debt

Housing plays a key role in household indebtedness. Specifically, it is important to take into account housing-finance motives to understand household borrowing behaviour. Real estate serves two important functions: houses are investment assets but also durable goods that provide direct services for households. At a certain point in their lives, all households will need to face important decisions on whether to rent or buy, or on which kind of mortgage to subscribe. As a result, a major share of the households’ wealth is held in this form and this makes the whole economy vulnerable to house price movements. Importantly, housing can also be used as collateral and variations in house prices can facilitate or impede access to credit markets. This last mechanism is emphasized in Ortalo-Magne and Rady (2006), where the “capital gains channel”, that is the ability to move up the housing ladder when house prices are increasing, is a determinant of housing and borrowing demand for credit constrained homeowners. This can further boost house prices since more households will be able to afford more expensive homes using their capital gains.¹¹ Higher house prices may also require a larger amount to be borrowed.¹² In addition,

10 A “natural buyer” is someone who is willing to pay more than the rest of the public for a specific asset. This can reflect a higher risk tolerance, different, more optimistic beliefs or simply the fact that she/he values the asset more. Furthermore, some investors may be more expert than others at evaluating an asset because they possess more information.

11 Collateral constraints on housing play a crucial role also in Iacoviello (2005) where house price booms can amplify business cycle fluctuations by relaxing household collateral constraints.

12 In the literature, this is called the “front loading effect”. The strength of this mechanism of course depends on an individual’s asset position.

tax incentives, such as mortgage interest cost deductibility, could also boost borrowing via an induced portfolio rebalancing, that is encouraging households to invest more in housing.

Wealth effects of increasing house prices? An increase in house prices could boost consumption and reduce savings via a housing wealth effect. This channel holds for households who are planning to downsize in the future. It works in the opposite direction for households planning to buy a bigger house. In a representative agent model these two effects cancel out, that is on average there are no housing wealth effects (see Buiter, 2010). In reality, the aggregate outcome of housing wealth effects depends on the demographic structure of society. Moreover, housing wealth may affect spending indirectly, via its effect on consumers' access to credit.¹³

Renting versus owning real estate. Most of the housing literature focuses on the riskiness of housing investment. Renting, however, is also a risky activity since rents are subject to fluctuations. Sinai and Souleles (2005) explicitly take into account the fact that when deciding whether to buy a house or not, households trade off these two risky activities. The rent risk is particularly high for households that expect to stay in their houses for an extended period of time. A greater spatial correlation in house prices across different markets and a high persistency in house prices over time are both factors that reduce house price risk, that is both factors are likely to close the gap between sale and purchase prices when a household moves. According to Sinai and Souleles, the demand for homeownership should reflect the trade-off between rent and house price risk, a prediction that is consistent with U.S. data. Most importantly, they show that expected future rents and rent variance have an important effect on house prices. Clearly, a high degree of regulation in the rental market will alter this trade-off. If renting is not a real option, households will be forced to make risky housing investments even if their expected length of stay in their house is short. Therefore, rental regulation will expose households to more house price risk.

Bubbles in housing markets. Bubbles in housing markets arise when the observed price deviates from some notion of fundamental value.¹⁴ Many researchers have stressed the observed high volatility in house prices and have suggested that housing markets seem intrinsically prone to bubbles. An increase in household debt fuelled by investors' naively optimistic expectations regarding house prices could potentially constitute a serious threat to financial stability. Akerlof and Shiller (2008) argue that unmotivated confidence in housing investments, "money illusion" and more generally what they label as "animal spirits" historically have all been significant factors behind housing cycles.¹⁵ Households that do not understand the difference between nominal or real quantities suffer from "money illusion". Disagreement about real interest rates between smart and illusionary investors can stimulate borrowing and lending and drive up the price of collateral (see Piazzesi and Schneider, 2007). This channel works during periods of both high and low inflation. In a low inflation environment, illusionary investors will confuse low nominal rates

13 This last effect is not considered in Buiter (2010), since he abstracts from borrowing constraints.

14 See Dillén and Sellin (2003) for a review of the literature on financial price bubbles.

15 See Allen and Rogoff (2011) for a review of the literature on real estate bubbles that arise from asymmetric information and agency problems.

with low real rates and invest more in housing. During times of high inflation, they will be replaced in housing markets by smart investors. Smart investors correctly understand that real rates are low and want to invest in housing. Thus, the model can potentially account for the housing boom in the high-inflation 1970s as well as in the low-inflation 2000s observed in many countries.

Why has household debt increased? Empirical results

A number of empirical studies have tried to explain the observed increase in household indebtedness and disentangle the contribution of the different potential explanatory factors identified in the theoretical literature. This has proven to be a difficult task as it is not always possible to discern between causality and mere correlation. In addition, some of the potential factors behind indebtedness, such as credit, are not easily measurable or have evolved only gradually over time, such as financial innovation. Moreover, trying to explain household indebtedness by looking at aggregate data can be misleading. In this respect, it is useful to look at household level data and analyse their portfolio composition to assess the risks connected to high indebtedness. A disaggregated analysis of house-price data, both at a regional or even at a neighbourhood level, could also be fruitful. For example, an inspection of Swedish regional data reveals that the sizable upsurge in house prices is mainly a big-city phenomenon (see Englund, 2011). The sharp increase in property prices in low-income neighbourhoods observed just before the subprime crisis in the United States has been interpreted by many commentators as the result of lax credit standards. A similar analysis would also be relevant for Sweden.

Can we explain increasing household debt using “traditional channels”?

There are several papers that use traditional channels, such as interest rates, future income or demography, to explain the rise in household debt. Barnes and Young (2005) use a simple calibrated model in which housing is both a consumption good and an investment good to show that changes in interest rates, future income growth and demographic effects can explain the rise in the debts of the US households during the 1990s. However, these factors cannot account for rising indebtedness during the 1980s, a period characterized by high interest rates and lower income growth. Finocchiaro and Queijo von Heideken (2007) use a similar approach on Swedish data. They find that a combination of low real interest rates and less strict LTV (loan-to-value) requirements can account for most of the increase in Swedish household debt since the 1990s. These studies do not consider the effect of house prices on indebtedness. Dynan and Kohn (2007) explain the rise in US household indebtedness since the early 1980s by analysing the following factors:

- **Household preferences.** There is only limited evidence of a decrease in patience or increase in risk appetite among responders of the Survey of Consumer Finances (SCF) between 1983 and 2004.

- **Interest rates.** According to the econometric models used by the Federal Reserve Board, low interest rates had a very limited effect on the saving rate between 1990 and 2000.
- **Demographic shifts.** The shift of the baby-boom generation, from the youngest to the middle age group, has partially boosted aggregate debt. However, according to their data, increasing debt is an increasing trend among all age groups, hinting at the contributions of other explanatory factors.
- **House prices and financial innovation.** Dynan and Kohn estimate that rising house prices can justify one fifth of the total increase in household debt. Their study also reports some suggestive evidence on the importance of financial innovation for the uptrend in debt. On the one hand, they downplay the role of the “democratization of credit,” that is easier access to credit markets for previously constrained households, as this would explain only one seventh of the observed increase in household debt between 1983 and 2004. On the other hand, they stress the importance of mortgage securitization on interest rates and the interplay between house prices and financial innovations as being particularly important from a quantitative point of view.

Dynan and Kohn’s main conclusion is that changes in interest rates, income growth or in preferences can only partially explain the run-up of debt, while rising house prices and financial innovation were crucial.

The role of financial deregulation

Financial innovation has increased access to credit. The last thirty years have been characterized by considerable changes in financial markets. Gradually, banks have started granting housing loans with more generous loan-to-value ratios and longer amortization periods than in the past. Changes in the capital requirement introduced by Basel II and an increase in competition have further squeezed the margins on mortgage institution lending rates.¹⁶ Last but not least, the development of secondary markets for mortgages and the emergence of mortgage-backed securities have also played an important role and drastically changed credit markets.

Credit rationing has been reduced. The effects of financial deregulation on household debt have been widely explored in the empirical literature. Gerardi et al. (2010) provide evidence that the deregulation of the mortgage market in the United States in the early 1980s was followed by an increase in borrowing among households with higher expected future incomes. Thus, their analysis suggests that financial deregulation has improved market efficiency. On the other hand, Mian and Sufi (2009) argue that the substantial mortgage credit expansion observed between 2002 and 2005 in subprime neighbourhoods in the United States can mainly be explained by an upsurge in credit supply. They also show

¹⁶ Capital requirements were calculated on the basis of risk weighted assets, which implied lower risk weights for collateralized lending.

that such an increase is not motivated by improvements in the creditworthiness of subprime borrowers, while it is correlated with an expansion in the rate of securitization. Interestingly, those subprime neighbourhoods have also experienced the highest number of defaults during the crisis.

Financial literacy — Do households make investment mistakes?

Household financial literacy is lagging behind. Another branch of the literature has focused on testing the ability of households to make the right financial decisions. The empirical results in Brunnermeier and Julliard (2006) support the idea that when people decide whether to buy or rent an apartment they confuse real and nominal rates, that is they suffer from money illusion. Their mistakes make them underestimate the real cost of future mortgage payments and cause an increase in house prices when inflation is low. Using US data, Lusardi and Tufano (2009) find that a lack of debt literacy, that is the ability to make simple decisions regarding debt contracts, is widespread and correlated to over-indebtedness. In their sample, individuals with lower debt literacy tend to judge their level of indebtedness as excessive. Gerardi et al. (2010b) attribute part of the massive defaults and foreclosures observed in the US mortgage market to limited financial literacy among borrowers. Their results suggest that financial mistakes can have considerable macroeconomic consequences. Based on a representative survey of 1,300 Swedish adults, Almenberg and Widmark (2011) find that both basic and advanced financial literacy substantially vary across different demographic groups and that they are an important determinant behind stock market participation or homeownership choices. In their sample, the oldest (age > 65) and youngest (age 18-29) respondents show a particularly low level of financial literacy. Among those individuals with a low level of financial literacy, one out of seven do not know what share of their mortgages are at an adjustable rate. Reassuringly, individuals with adjustable-rate mortgages also have a higher level of financial literacy. Their main policy conclusion is that many Swedish adults are not well equipped to make complex financial decisions.

The links between house prices, consumption and household debt

Housing wealth effects remain uncertain. There are contrasting results regarding the influence of house prices on household debt and the strength of the so-called “housing wealth effect”. Mian and Sufi (2010a) show that, between 2002 and 2006, US homeowners responded to the upsurge in house prices by increasing their debt. More specifically, they find that the average household in their sample would increase its borrowing by 25 cents for every dollar gain in home equity. The extracted cash would then be used primarily for consumption or home improvement.¹⁷ A recent survey study by Chakrabarti et al. (2011) reports that in 2006, on average, US homeowners increased their

¹⁷ Since the illustrated link between house prices and consumption implies the existence of credit constraints, technically this is not a pure “housing wealth” effect.

mortgage debt by 1% for each 1% increase in home prices. Using UK micro data, Campbell and Cocco (2005) find a large degree of heterogeneity in the house price elasticity of consumption across young and old cohorts of the population. According to their estimates, old homeowners change their consumption much more strongly in response to house prices. Thus, their results suggest that the aggregate effects of house prices on consumption should be stronger as the population ages. In contrast, Calomiris et al. (2009) argue that many of the empirical studies that find large wealth effects do not take into account the possible correlation between house prices and households' long-term income expectations, that is their "permanent income". Using state-level US data, they correct for the bias that this correlation could create and find that housing wealth does not have a significant effect on US consumption. Attanasio et al. (2009) reach similar conclusions for British households. However, even though the effects of house prices on consumption generate some disagreement, there is consensus on the increasingly prominent role of housing in explaining business cycle fluctuations (see for example IMF, 2008). In this respect, Leamer (2007) observes that since World War II, eight out of ten recessions in the US were preceded by changes in residential investment.

Macroeconomic implications of rising household debt

High household indebtedness can have large macroeconomic implications for two different reasons. First, as shown by the recent financial crisis, over-indebtedness can lead to financial distress and exacerbate the effects of a crisis. In this respect different policies¹⁸ could have a preventive role in the build-up of the crisis. Second, high household indebtedness can also have important consequences in normal times by increasing households' exposure to macroeconomic fluctuations.

Debt and financial distress

High household indebtedness impacts economic downturns. The recent financial crisis led to the most severe recession since the Great Depression. A striking similarity between the two crises is that both were preceded by a dramatic increase in household leverage: household debt exceeded 100% of GDP only twice in the last century of American history: in 1929 and in 2006.¹⁹ Fisher's (1933) debt deflation theory highlights the active role of deteriorating credit market conditions during an economic downturn. In a nutshell, his theory implies that an interaction between high household leverage and negative supply or demand shocks can exacerbate a downturn.²⁰ Glick and Lansing (2010) argue there are three common patterns, observed across different countries between 1997 and 2007, that

18 We are not strictly referring to monetary policy, but to a broad range of policies that include financial regulations or fiscal policy that could have an impact on household debt.

19 See Mian and Sufi (2010b).

20 Interestingly, King (1994) draws a similar parallel between the 1930s and the crisis experienced by many industrialized countries in the 1990s. He stresses how the countries experiencing the most severe recessions were also those where private debt burdens were highest prior to the downturn.

enable us to understand the role of debt in the build-up of the crisis and the subsequent economic recovery.

- First, household debt increased considerably and at a faster rate than disposable income in many countries before 2007.
- Second, there is a positive correlation between the rapid increase in household debt and house prices.
- Third, countries experiencing the largest increase in debt have also experienced the most severe depressions.

Glick and Lansing conjecture that in many countries household deleveraging will bring more defaults or considerable cuts in spending. Recent survey-based evidence shows that indeed US households responded to their deteriorated financial situation by cutting spending. More precisely, in 2009 they increased their savings by paying down part of their mortgage debt rather than increasing their contributions to retirement or savings accounts (see Chakrabarti et al., 2011).

Are highly indebted households more vulnerable to shocks?

High household debt and volatility. Higher debt can also have large macroeconomic consequences by increasing households' vulnerability to shocks, including income, interest and asset price risk:²¹

- **Income risk.** Unemployment is probably the biggest negative income shock that a household could face. To become unemployed and have a mortgage could have adverse consequences, even though unemployment insurance may temporarily limit the drop in income.²² The big fall in income will make it difficult to maintain the mortgage payments and a large debt and negative equity could considerably reduce households' mobility in search of a new job.²³ This negative effect can be mitigated by the fact that homeowners can better absorb a negative shock by extracting equity from their houses. In this respect, British renters are more likely than homeowners to cite "unemployment" or "higher than expected interest rates" as a reason to experience debt-repayment difficulties.²⁴ Using US data, Hurst and Stafford (2004) show that households with little liquid wealth are more prone to extract equity from their homes in response to a negative income shock. Moreover, there is a vast

21 See also Debelle (2004) and Dynan and Kohn (2007) on the macroeconomic consequences of high household debt.

22 This is especially true in a country with a well-developed welfare system like Sweden.

23 For this last channel, see Sterk (2010). Empirically, both Ferreira, Gyourko and Tracy (2010) and Chan (2001) find that homeowners with negative equity are less mobile. In theory, there could be also forces that increase mobility among people with negative equity (see Schulhofer-Wohl, 2010). For example, if the loan is nonrecourse a homeowner's best choice could be to default and move. Moreover, homeowners could choose to move if they could rent out their house. However, this might be less relevant for Sweden, a country with highly regulated rental markets and full-recourse loans.

24 See Waldron and Young (2007).

literature stressing the role of financial deregulations on macroeconomic stabilization. For example, Dynan et al. (2006) argue that developments in credit markets that have enhanced households' and firms' ability to borrow played a crucial role in the stabilization of economic activity in the mid-1980s. Campbell and Hercowitz (2006) reach similar conclusions.

- **Interest rate risk.** Increases in interest rates have a direct impact on households' ability to service their debts. The immediate impact of interest increases will depend on the number of households that have floating-rate compared to fixed-rate mortgages. This channel is particularly strong in countries where adjustable-rate mortgage (ARM) contracts are more common, like Sweden, but less so in countries with predominantly fixed-rate mortgages like France, Germany and the United States (see Debelle, 2004).
- **House price risk.** Finally, changes in house prices will have an impact on highly-indebted homeowners changing the value of the asset side on their balance sheet. In principle, households planning to move in the future are more exposed to this risk (see Sinai and Souleles, 2005). A substantial fall in house prices could shrink home equity down to a level such that the mortgage debt on a property exceeds its market value. In the United States, survey-based evidence shows that in response to the recent decline in house prices the "effective homeownership rate", that is the proportion of individuals with a positive amount of home equity, has fallen by more than 7 percentage points since 2007 (see Chakrabarti et al., 2011).

To assess the relevance of these three channels it is important to look at the distribution of debt across households, quantify to what extent society as a whole is exposed to the risks of high indebtedness and take into account country-specific institutional differences that may alter these mechanisms.

What is special about Sweden?

In addition to fundamental factors, local housing demand and supply characteristics are important. Using standard fundamental explanatory factors such as growth in disposable income, the age of the working population, interest rates and rent-to-price ratios, Swedish real estate markets have frequently been identified as being out of line with fundamentals (IMF, 2004, 2008, 2009; The Economist, 2010). However, treating credit and housing markets as homogenous across countries could be misleading. In this respect, there are some important features of the Swedish economy such as (i) a highly regulated housing market; (ii) limited buy-to-let market; (iii) credit market structure and equity withdrawal; and (iv) debt distribution.

A highly regulated housing market

A striking feature of the Swedish housing market is the high level of regulation. Rent regulations were first introduced in 1940 and, despite some reforms in the 1970s and in the 2000s, the rental sector is still highly regulated today.²⁵ The largest proportion of the rental market is public and rents are set according to a cost approach. Rents in the public housing sector in practice set a cap on those in the private sector. Therefore, rents in Sweden generally do not reflect the market value of an apartment, especially in metropolitan areas. Regulations are also present in the owning segment of the housing market. The most common alternative to renting is to be member of a cooperative housing association (*bostadsrättsförening*). In practice, the most significant difference between being a member of a cooperative housing association and owning an apartment is that the former limits a homeowner's right to sublet the flat. These regulations create a number of distortions that need to be taken into account when evaluating households' borrowing decisions and the development of house prices in Sweden:

- First, rent regulations partially invalidate the use of the price-to-rent ratio to evaluate possible deviations of house prices from their fundamental values. In the empirical literature, large departures of house prices from rental prices are interpreted as a warning signal for the possible upsurge of a bubble. However, if rental prices are kept artificially low by regulations, the link between rents and prices breaks down and the rent-to-price ratio may not reflect fundamental values. As pointed out by Englund (2011), in Sweden, deviations of house prices from rents might simply reflect an increasing gap between market and regulated rents. Frisell and Yatsi (2010) criticize the use of the price-to-rent approach in Sweden and argue that behind the remarkable increase in house prices there are mainly fundamental reasons such as lower real interest rates and higher labour income. Changes in housing demand, caused for example by changes in taxation, and variation over time in the maximum LTV ratio are important factors that explain house price fluctuations in Sweden according to Walentin and Sellin (2010).²⁶
- Second, as a result of the high level of regulation in housing markets, a buy-to-let market has never fully developed in Sweden. This has reduced the scope for speculation in the housing market.²⁷
- Third, the main effect of rent control in metropolitan areas is to create a mismatch between demand and supply; as a result, queues for a rental apartment in central Stockholm can be as long as 10 years. This may force young households to buy a house earlier in life than they would have otherwise preferred and therefore to be more leveraged. Due to the regulation of the housing market, in practice there is no real trade-off for Swedish households between renting and owning.²⁸ The lack of a

²⁵ See OECD Economic Survey: Sweden (2007) and Englund (2011) for more details.

²⁶ See also Claussen et al. (2011).

²⁷ In this sense, a house in Sweden is more of a consumption good than an investment good.

²⁸ Here we mainly refer to big metropolitan areas.

well-developed rental market can force households to buy even if their investment time horizon is short and in this sense they are more exposed to house-price fluctuations.

- Fourth, housing regulation and a high cost of construction have contributed to a low level of new housing construction compared to other European countries (see OECD, 2007).

To summarize, the high level of regulation in housing markets may increase household exposure to house price fluctuations and distort household borrowing decisions and this calls for extra caution when evaluating the level of overheating in housing markets. On the upside, the resulting underdevelopment of a buy-to-let market may discourage potential speculation in housing markets.

Some important differences in credit markets

Most real estate contracts in Sweden are at floating interest rates and all mortgage debt is “full recourse”. Adjustable-rate mortgage contracts are predominant in Sweden and account for about 2/3 of all mortgage contracts.²⁹ Mortgage debt in Sweden is full recourse, which implies that the borrower is personally liable for the full amount of the loan, regardless of the market value of the underlying housing collateral. These factors could increase highly-indebted households' sensitivity to house price risks:

- Adjustable-rate mortgages can increase households' sensitivity to interest movements, as well as the sensitivity of house prices to interest rate movements, since in this case the change in interest rates will affect not only new borrowers but also a large share of outstanding loans.³⁰ This last prediction is confirmed by Assenmacher-Wesche and Gerlach (2010), who study how different housing markets affect the impact of monetary policy on property prices in different countries, including Sweden. Indeed, using a VAR analysis, they estimate a higher degree of sensitivity of house prices to monetary policy shocks in countries where ARM contracts are more common.
- Full-recourse loans may mitigate the effects of excessive borrowing on financial stability. As they are personally liable for their debts, people may be more cautious in their borrowing decisions. Moreover, in this case the issuer's/lender's recovery is not limited to the collateral. On the other hand, it implies that the cost of not being able to repay debt is particularly high for Swedish households.³¹ For example, in periods of high interest rates and declining house prices, Swedish households may have a higher propensity to cut their consumption to be able to service their debts. In this respect it

²⁹ Johansson et al. (2011) also show that this share has been increasing over time.

³⁰ In theory, households should take into account interest rate risks when making their optimal choice between ARM and FRM contracts. However, Campbell (2006) shows that households' mortgage contract decisions are sometime difficult to rationalize.

³¹ See also Andersson and Lindh (2011).

would be useful to use international data on countries with a similar legal framework as Sweden to quantify this effect.

Savings and home equity withdrawal

Home equity withdrawals appear limited in Sweden. Rising debt and decreasing savings have been a constant pattern in the United States for the last 20 years. Negative savings and rising debt can reflect home equity withdrawals. The situation looks quite different in Sweden. In recent years, savings have been positive and increasing most of the time. Looking at the Swedish savings rate, one could conclude at first glance that Swedish households do not refinance their mortgages for consumption purposes. However, the ratio between secured housing credit and dwelling investments shows a different picture. On average, home equity withdrawal amounted to about 4% of disposable income at the end of 2009 (see Sveriges Riksbank, 2010). However, aggregate data give only a very rough measure of this phenomenon. For policy purposes it would be more useful to undertake a micro data study, as in Mian and Sufi (2010a), and have more precise estimates in this respect.

Debt distribution

Debt distribution matters for debt sustainability. To properly assess the risks connected with high debt, it is important to look at debt distribution in society as a whole rather than at the average. In previous Financial Stability Reports, it has been argued that the current debt level in Sweden does not represent a serious threat to financial stability. However, even if the majority of Swedish households appear to have good margins in terms of their ability to service debt (see Jönsson et al., 2011, and Sveriges Riksbank, 2009), new borrowers seem to be more exposed to unemployment and interest rate risks (see Jönsson et al., 2011). Almost 60% of total debt belongs to households at the highest end of the income distribution; these are less likely to default on their mortgage payments in the event of a downturn, but also less likely to actually be hit by an unemployment shock. Nevertheless, comparing debt levels of households in different income categories does not give the full picture. This is especially true in a high-tax country like Sweden. In practice, contrary to the situation in the United States, income distribution in Sweden is basically flat. However, wealth distribution provides a different picture in that it is much more skewed.³² In this sense, the debt-to-asset ratio could be more informative when evaluating debt sustainability. Aggregate data show that this ratio has been stable over time. A potential drawback of using this approach is that housing wealth constitutes the largest share of household wealth. Thus, in this sense households have also become more exposed to house-price fluctuations. Moreover, disaggregated data show that a significant fraction of Swedish households has little wealth.³³ In this regard, it would be useful to use both

³² See Domeij and Floden (2010).

³³ See Domeij and Floden (2010) and Domeij and Klein (2002).

debt-to-income and debt-to-asset ratios in Sweden to estimate the probability of missing debt payments. In the United States, the second measure has a better predictive power according to Dynan and Kohn (2007).

CONCLUDING THOUGHTS

What explains the observed rise in household debt over the past two decades? Economic theory offers a rich set of potential explanatory factors such as increased expected future income, low real interest rates, diminished uncertainty, changes in demographics and financial innovation. However, empirically discerning the contribution of each of these factors has proven to be a difficult task. Many of these variables are highly endogenous or hard to measure and this has made it difficult to discern causality from mere correlation. In the United States, the easing of credit constraints and rising house prices have been pointed out as two important causes of increasing debt. A growing empirical literature suggests that there is also a link between a lack of financial literacy and over-indebtedness. In Sweden, there is some evidence to show that a combination of low real interest rates and more generous LTV ratios can explain most of the observed increase in debt.³⁴ However, we are not aware of any comprehensive study that uses micro-data to also assess the impact of increasing house prices, credit supply or changes in disposable income on household indebtedness in Sweden. Some recent survey-based evidence has documented a lack of financial literacy among Swedish households that could probably lead to an excessive build-up of debt. Moreover, even “financially educated” people could make financial mistakes and take on too much debt by judging current low levels of interest rates as permanent and the current appreciation rate in house prices as everlasting. A long period of low interest rates and increasing house prices could create and reinforce this misperception. Understanding the evolution of real-time beliefs about house price appreciation or interest rates is therefore central to understanding housing markets and household debt decisions. Collecting more data on these issues would be useful for policy purposes. Moreover, economic policies that aim to increase transparency about financial conditions, such as the decision to publish the Riksbank’s projected interest rate path,³⁵ could also help in this respect.

Judging whether the current level of household indebtedness is sustainable or whether house prices in Sweden are driven by a bubble is an even more demanding task. There is some evidence to show that house price fluctuations could mainly be explained by fundamental factors, such as real interest rates and disposable income. Nevertheless, we believe that some caution is needed in this respect. Predicting house price bubbles has proven to be very difficult and in the last US house-price cycle economic theory provided little guidance in judging what should be a reasonable level of house prices (see Foote et al., 2010). Both debt-to-income and debt-to-asset ratios are informative measures when

³⁴ See Finocchiaro and Queijo von Heideken (2007).

³⁵ Since January 2007, the Riksbank publishes its own forecast on future developments of the repo rate.

assessing household debt sustainability. We think that it would be useful to use both ratios, at a disaggregated level, to estimate the probability of missing debt payments in Sweden and to evaluate which of the two measures have a better predictive power.

Nonetheless, irrespective of whether or not we believe that households are over-borrowing and housing markets are overheated, there are indeed some special institutional settings in Sweden, such as the high degree of regulation in housing markets or the widespread use of ARM contracts, that may potentially increase indebted households' exposure to house-price and interest rate fluctuations. That said, whether monetary policy is the right instrument to constrain household debt and limit the associated risks is still an open question. An increase in the policy rate would have an impact on both households and firms. The actual borrowing cost faced by indebted households is also influenced by fiscal factors, for example interest rate deductibility, that are disconnected from monetary policy. Increasing interest costs by gradually reducing the degree of deductibility is another example of a tailor-made solution to dampen the increasing trend in indebtedness. Moreover, a change in interest rates will affect not only new borrowers but also a large share of outstanding loans and higher interest rates may induce borrowers to amortize their loans less. On the other hand, a cap on LTV ratios, like the one mandated by Finansinspektionen since October 2010, could potentially induce people to borrow less and thus slow down the rate of increase in indebtedness. Economic policies that create incentives for people to amortize could have a dampening effect on existing debt levels. Finally, heavily regulated rental markets and high construction costs have also contributed to a shortage of housing in metropolitan areas. Limited supply may have played an important role in the development of house prices and indebtedness.

Going forward, to properly assess the risks stemming from household balance sheets and housing, regulators will need to continue developing micro data on household borrowing and assets. The assessment of micro data on the households will also need to be better integrated into aggregate models for policy simulation and analysis.

Such steps could improve our understanding of household indebtedness and the risks it poses to macroeconomic and financial stability. The Riksbank's inquiry into the risks in the Swedish housing market is a first attempt in this direction.³⁶

36 See Nordberg and Sultanaeva (2011) for a description of some of the new data that will be used by the Riksbank to study housing markets.

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