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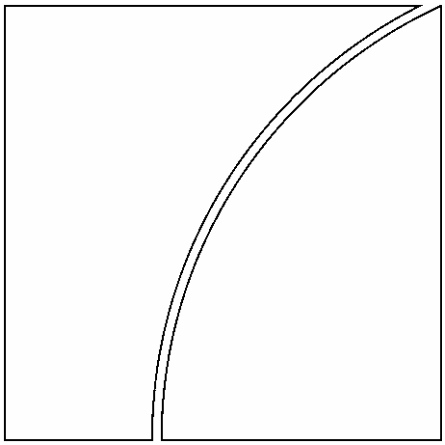

BIS Working Papers

No 153

Macroeconomic implications of rising household debt

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June 2004

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Copies of publications are available from:

Bank for International Settlements
Press & Communications
CH-4002 Basel, Switzerland

E-mail: publications@bis.org

Fax: +41 61 280 9100 and +41 61 280 8100

This publication is available on the BIS website (www.bis.org).

ISSN 1020-0959 (print)

ISSN 1682-7678 (online)

Abstract

Household borrowing has grown considerably in many countries over the past two decades, both in absolute terms and relative to household incomes. Much of the increase can be viewed as a rational response by households to the effects of easing liquidity constraints on households, and lower inflation and borrowing rates. Regardless of whether the increase in debt is sustainable, it has important macroeconomic implications. The household sector will be more sensitive to shocks to interest rates and household incomes, and consumption spending will be more sensitive to changes in expectations of future income. The increased sensitivity will depend crucially on the distribution of debt across the household sector.

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1. Introduction[1]

Household borrowing has grown considerably in many countries over the past two decades, both in absolute terms and relative to household incomes. The extent of the increase in household borrowing has raised concerns about its sustainability and the possible implications for the financial system and the macroeconomy if it is not sustainable.

This paper examines the factors that have contributed to the rise in the debt. It highlights two main influences: firstly a decrease in the prevalence of credit rationing that resulted from the deregulation of financial systems that occurred through the 1980s; and secondly the decline in interest rates, both in real and nominal terms, over the past two decades. In addition to the direct effect of a lower cost of borrowing, these factors have contributed to a sizeable easing of liquidity constraints on households. These developments have allowed households to structure their borrowing to achieve a more desirable path of consumption over their life cycle than was possible previously. In this sense the increased indebtedness can be seen as rational decisions by households. However, it is difficult to assess whether these factors can explain the full extent of the rise in indebtedness that has occurred.

Regardless of whether the increase in household debt is sustainable, which primarily may be an issue for prudential policy, the greater indebtedness of households has important macroeconomic implications. The household sector will be more sensitive to movements in interest rates, particularly if they are unexpected, and changes in household income such as that caused by unemployment. The sensitivity of the household sector to interest rate changes will depend on whether the interest rate applying to the debt is predominantly fixed or variable over the life of the loan. This feature of a loan affects the location of interest rate risk in the economy. It determines whether households, financial intermediaries or pension funds are most exposed to changes in interest rates. In turn this will influence the near-term impact of changes in interest rates on the economy.

In some countries, part of the borrowing has taken the form of a withdrawal of equity from the housing stock. This process of housing equity withdrawal has provided a boost to household spending during the recent downturn, but it may be particularly vulnerable to changes in expectations of households about future income growth, house price movements or mortgage interest rates, with consequent adverse effects on the macroeconomy if the pace of withdrawal were to slow or reverse.

To analyse the causes and implications of the increased household borrowing, the life-cycle/permanent-income model of consumption is used in Section 2 to identify the possible determinants of household borrowing. The facts about the growth in household borrowing across countries and the distribution of debt across households are presented in Section 3. In Section 4, a simple model is used to illustrate the effect of changes in inflation, taxes and liquidity constraints on aggregate household indebtedness. It suggests that much of the rise in indebtedness can be explained by an easing of liquidity constraints and the decline in inflation. The macroeconomic implications of increased household indebtedness are discussed in Section 5. Some of these implications are illustrated in Section 6 which discusses episodes in the United Kingdom, the Nordic countries, the Netherlands and the United States where household borrowing has played a significant role in macroeconomic outcomes. Section 7 concludes.

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[1] This paper was written while the author was at the Bank for International Settlements and the Massachusetts Institute of Technology, on leave from the Reserve Bank of Australia. A shorter version of this paper was published in the BIS Quarterly Review, March 2004. The author thanks Olivier Blanchard, Claudio Borio, Eleanor Debelle, Luci Ellis, Andy Filardo, Jacob Gyntelberg, Paddy Jilek, Jan Kakes, David Lebow, Andreas Lehnert, Maarten van Rooij and participants in a seminar at the BIS for helpful discussions and comments. He also thanks a number of colleagues at central banks and the BIS for assistance in providing data, particularly Philippe Hainaut and Natalie Parlett, and Sylviane Floris, Michela Scatigna and Stephan Arthur for production assistance. The views expressed in this paper are those of the author and do not necessarily reflect those of the BIS or the Reserve Bank of Australia.

2. The life cycle model of household borrowing

A starting point for examining trends in household borrowing is the life-cycle/permanent-income model of Modigliani (1986) and Friedman (1957).[2] This section discusses the model's implications for household borrowing, and examines the consequences of relaxing some of the assumptions of the framework.

In the life-cycle model, a household chooses a path of consumption to maximise utility over its lifetime subject to an intertemporal budget constraint, which requires that the household can consume no more than the sum of the present discounted value of its labour income and its current net worth (its asset holdings less its liabilities).

$$\max E\left[\sum_{t=0}^{T}(1+\theta)^{-t}u(c_t)\right]$$

subject to $A_{t+1} = (1+r)(A_t + w_t - c_t)$

where w is household labour income, A is the households net asset holdings, c is consumption, r is the rate of return on assets (assumed to be constant) and θ is the discount rate.

The solution of this problem is then given by the standard Euler equation:

$$E_t u'(c_{t+1}) = (1+\theta)/(1+r)u'(c_t)$$

The ratio of the marginal utility of consumption (appropriately discounted) is equal to the cost of intertemporal substitution, the real interest rate. The solution to the Euler equation implies that households maximise utility by smoothing the path of consumption over their life-cycle. In periods where income is low relative to average income over the life-time, households will borrow to fund current consumption (or alternatively run down their asset holdings). The loan is then repaid (assets are accumulated) in periods where income is high relative to average life-time income.

Assuming the standard upward sloping path for labour income over the working life of the household, households dis-save in the early part of their working life, and their consumption is financed by borrowing. As the household ages and labour income grows, indebtedness decreases and once it is repaid, assets are accumulated. Later in life, when the household is no longer working, households dis-save again by consuming the earnings on their accumulated assets and gradually running down their stock of wealth. The debt position of an individual household can therefore be determined by the path of future income and the interest rate (relative to the discount rate).

The model is predominantly concerned with the debt profile over the life-cycle of an individual household, whereas the primary focus of this paper is on aggregate household borrowing. To extend the life-cycle model to the aggregate economy, we assume capital mobility and a small country, such that a country can be a net borrower in aggregate without substantially affecting domestic or global interest rates. If the household sector increases its indebtedness, the current account deficit will tend to widen given an elastic supply of funds from abroad. In contrast, in a closed economy, an exogenous increase in the preference of households to borrow will drive the interest rate up to induce the necessary increased supply of funds from the part of household sector that is a net saver.

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[2] Jappelli and Pagano (1989), Muellbauer and Murphy (1997) and Barnes and Young (2003) develop the life-cycle model in a similar way. Muellbauer (1994) provides an excellent summary of the theoretical development of the framework and the associated empirical work.

In sum, in this basic version of the life-cycle model, aggregate household borrowing will depend on demographics, the expected path of future income and real interest rates. A relatively young demographic distribution will tend to be associated with larger levels of aggregate household indebtedness, assuming that the preference to hold debt does not vary across cohorts (for example, the cohorts that lived through the Depression may have a lower preference for debt). Indebtedness will also tend to be greater when the path of expected future labour income is steeply sloped, as households borrow more against their future (high) labour income in the early stages of life to ensure a stable path for consumption.

The effect of changes in real interest rates on net indebtedness is unclear, depending on the relative size of the income and substitution effects. A decline in real interest rates reduces the return on the household's asset holdings, but decreases the cost of borrowing and increases the present value of future labour income. The impact of these different channels is likely to vary across households depending on their stage in the life-cycle. Older households with large accumulated wealth and near their end of their working life are likely to be more affected by the lower returns on their wealth whereas younger households are likely to be more influenced by the lower cost of borrowing. The empirical evidence, however, is mixed on the net effect of changes in interest rates on household borrowing (Muellbauer (1994)).

The implications of the life-cycle framework for household indebtedness are accentuated when explicit account is taken of the key role that housing plays in the household's consumption decision (Miles (1992)). To consume housing services, households have the option of buying or renting. If the former decision is taken, then the household will need to borrow a larger amount than that needed to smooth other forms of consumption, as an investment element now enters the household's decision. When buying a dwelling, the household is purchasing a stream of housing services that is consumed over a long run of years. All durable goods have this aspect to them, but the purchase of a house is of considerably greater magnitude than that of any other durable consumption good, since the flow of housing services per period tends to be large and is consumed over a large number of years.

Taking account of the house purchase decision suggests higher home ownership rates may be associated with greater levels of household indebtedness.[3] This conclusion depends on the ownership of the rental housing stock. If the rental stock is owned by the domestic household sector, households who are landlords may still be incurring debt in purchasing the rental stock. The association between home ownership and indebtedness will also depend critically on the cost of housing. The higher house prices are relative to household income, the more debt new households will have to incur to purchase housing. However, there can be an issue of circularity at this point: the more households borrow to purchase housing, the more house prices rise relative to income, which in turn requires even more borrowing by new households wishing to purchase housing. The elasticity of the housing supply will also play a critical role in determining the relative cost of housing. The smaller the elasticity, the more an increase in borrowing for housing will translate into a rise in house prices rather than an increase in construction activity.

The tax system can have an important impact on household indebtedness, particularly the tax treatment of house purchase. If mortgage interest payments are tax deductible, the tax treatment of housing can affect the relative attractiveness of owner-occupation compared with renting. Differential tax treatment of the purchase of housing versus the purchase of other assets will also affect household decisions about whether to use their own house as an investment vehicle. For example, if mortgage interest payments are tax deductible, but interest payments on loans for equity purchase are not, a household may borrow against their house to fund equity investment. The influence of the tax system on household borrowing decisions often varies substantially with the rate of inflation. In particular, the interaction of high marginal tax rates, relatively high nominal interest rates and the deductibility of mortgage interest payments can significantly enhance the attractiveness of debt-financed purchase of housing. In a number of episodes, this interaction has resulted in a negative real cost of borrowing. The varying tax treatment of housing across countries is examined at the end of the next section.

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[3] No account is taken of bequests which may reduce the level of borrowing required to purchase a house. The empirical literature examining the role of bequests in house purchase suggests that they play a non-trivial, but not especially large role (see, for example, Engelhardt and Mayer (2002)).

The model described thus far focuses on demand-side determinants of household borrowing, effectively treating the supply of funds as perfectly elastic at a given interest rate. However, the institutional features of the lending side will also affect indebtedness, particularly those that give rise to constraints on the ability of households to borrow the amount that is optimal from a life-cycle perspective. Much of the rest of this section considers the implications of relaxing the assumption that households can borrow as much as they desire subject to their life-time budget constraint.

The presence of such liquidity constraints has long been recognised as a major violation of the standard life-cycle model (Hall 1978). One commonly used modification to the standard model to account for liquidity constraints is derived from Hall's (1978) development of the life-cycle framework. A proportion of households, λ, are assumed to be constrained from borrowing against future income and wealth, and instead must consume out of current labour income. Using such a specification, Hall and Mishkin (1982) and Campbell and Mankiw (1989) estimated that between 20% and 30% of US households were such "rule of thumb" consumers. While other explanations are possible for this violation of the life-cycle model, they argued that this primarily reflected liquidity constraints.[4] Japelli and Pagano (1989) provided direct evidence of the presence of liquidity constraints by linking λ to institutional features of the lending market. They found that countries with a larger spread between loan and deposit rates, a lower loan-to-valuation ratio and a lower rate of home-ownership among younger cohorts have a higher value of λ. They interpreted these features of the lending market as being indicative of credit rationing by financial institutions. Carroll (2001) argued against the validity of such tests in identifying liquidity constrained households. He provided a more formal model of liquidity constraints, and showed the close parallels between liquidity constraints and precautionary saving (see also Deaton (1991) and Zeldes (1989)).

Liquidity constraints are most binding on the purchase of housing and provide an explanation for the hump-shaped pattern of home ownership and household debt over the life-cycle that is observed in many countries. Households tend to rent in the earlier stages of their life when they are more likely to be liquidity constrained, as it allows them to consume a higher level of housing services, than that which could be obtained by purchasing a house with their low level of saving and restricted access to credit. Over time, as the household's income and savings grow and, from the lender's point of view, uncertainty about the future path of labour income declines, liquidity constraints are eased, so that the household can now borrow the large sum required to purchase a dwelling. From that point, the standard negative relationship between debt and age implied by the life-cycle model applies.

Incorporating liquidity constraints into the life-cycle model can explain why changes in the structure of the lending market have had a significant effect on the extent of household borrowing. The constraints imposed by the regulation of financial markets prior to the 1980s resulted in extensive credit rationing of households (and businesses). Through the 1980s and 1990s, financial deregulation occurred in virtually all developed economies, although the timing and extent varied considerably across countries (details are provided in the next section). The deregulation significantly eased the credit constraints on household borrowing. Hence a significant part of the growth in household borrowing may reflect a move from a sub-optimally low level of indebtedness in the period prior to financial deregulation, to a higher equilibrium level where households are less liquidity constrained. In this view of the world, the marked increase in household indebtedness over the past two decades is not necessary cause for alarm, as it simply reflects optimal decisions taken by households in response to the alleviation of constraints. With the removal of liquidity constraints, households are better able to structure the path of consumption over the life cycle and can now access the necessary borrowing to do so.[5]

Despite the financial deregulation that has occurred, there remain institutional features of the lending market, particularly related to housing, which still result in some households being liquidity constrained. Financial institutions in a number of countries set a limit on the amount of current

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[4] This model has subsequently been estimated in many countries. For example, Bayoumi (1993) estimated that around 60% of UK households were liquidity-constrained prior to the financial deregulation of the 1980s, and that this had declined to 30% by 1987.

[5] Behavioural theories of consumption such as those described in Thaler (1990) and Angeletos et al (2001) may imply an alternative conclusion. Households may have treated the equity in their house as a source of saving that was not to be accessed until retirement. The illiquidity of home equity was one way of ensuring this. With the easing of liquidity constraints and the greater access to home equity loans, households may have lost an important form of discipline on their borrowing behaviour and have subsequently overborrowed.

disposable income that a household can use to service its loan. Furthermore, in most countries, financial institutions set a maximum loan-to-valuation ratio (LVR).[6] Thus a household's current level of income and accumulated savings can still constrain the amount of borrowing it can undertake.[7]

This does not necessarily imply that a household will be consuming a sub-optimal level of housing services. First, it is possible that households will be able to borrow sufficiently to attain their desired amount of services; that is the liquidity constraint is non-binding. Secondly, housing prices and rents may endogenously adjust to the amount of finance available to households. Nevertheless, first-home buyers may well be initially consuming a sub-optimal level of housing services, and will seek the opportunity to trade-up over the life-cycle (Ortalo-Magne and Rady (1998)).[8]

These forms of financial constraints can be summarised in the following simple model. Let Y_t be the household's disposable income at time t, D_t the deposit that the household has saved to purchase the house and i_t be the current nominal interest rate. Assume that the financial institution will not permit loan repayments to exceed z% of current disposable income, and that the LVR is given by δ.[9] The maximum the household can borrow is then given by:

$$L_t = \min\left\{\frac{\delta}{1-\delta}D_t, \frac{zY_t}{i_t}\right\}$$

That is, the maximum amount a household can borrow may be constrained by the deposit that they have saved or the ability of the household to service the loan from their current income. These forms of liquidity constraints indicate that household indebtedness may vary with the institutional structure of financial markets across countries, such as the maximum LVR and debt-servicing ceilings imposed by financial institutions.

The presence of ceilings on debt service generates an additional channel for the level of borrowing costs to affect household indebtedness. It implies that the level of nominal interest rates may have an effect on household indebtedness above and beyond the effect of changes in real interest rates on the cost of borrowing for unconstrained households (Kearl (1979), Stevens (1999), Wadwhani (2001)).

This "hurdle" or "tilt" effect results from the front-loading of mortgage interest payments. With a standard mortgage (not interest only), in the early part of the loan, payments predominantly comprise interest payments with relatively little principal being repaid. Over the life of the loan, the share of interest payments in the monthly payment decreases, while the share of principal repayments increases.

When inflation is high, and nominal interest rates are high through the Fisher effect, the initial loan repayment is higher as a share of income for a loan of a given size, since the interest accrued over the life of the loan is greater. Hence with a ceiling on debt service as a share of income, households are constrained by the amount of borrowing they can undertake early in their life-cycle in a high inflation-rate environment. The latter mortgage payments decline as a share of income, as the nominal value of the repayments remains constant, but the real value declines rapidly with high inflation because of faster growth in nominal household income.

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[6] The median LVR in developed countries is 80%, although LVRs of 100% or more are observed in some countries, such as the Netherlands. To obtain a higher LVR the household is often required to take out mortgage insurance and/or pay a higher interest rate.

[7] Ludvigson (1999) presented a model that incorporates some of these features and tested it with data from the Survey of Consumer Finances in the United States, although she primarily considered credit card borrowing rather than borrowing for housing.

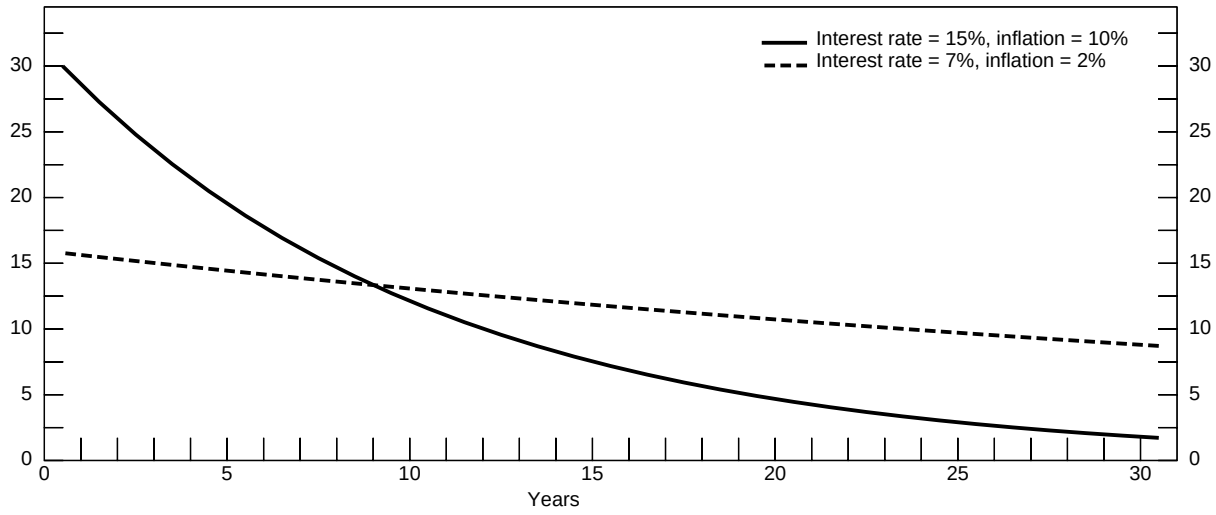
[8] The desired flow of housing services will also change over the life-cycle as the size of the household changes. But first-home buyers are likely to also have, or be close to having, children and hence are likely to desire a larger dwelling.

[9] For a discussion of how δ is determined, and its potential procyclicality, see Tsatsaronis and Zhu (2004).

As inflation rates have declined over the past two decades, the associated decline in nominal borrowing rates has allowed households to borrow larger amounts for a given debt service level, and/or allowed previously liquidity-constrained households to borrow to purchase a house.

These effects of inflation and interest rates are illustrated in Graph 1 (see Miles (1994), Bank of England (2002) and Reserve Bank of Australia (2003b)). Assume that a housing mortgage of $100,000 is taken out for 30 years and that mortgage payments are constant over the life of the mortgage in nominal terms. Real borrowing rates are assumed to remain constant but the inflation rate is assumed to change over the period from 10% to 2%.

Graph 1 **Shares of debt service in household income[1]**



[1] In per cent, over the life of the mortgage.

Source: Author's calculations.

With an inflation rate of 10%, and a concomitant higher nominal interest rate of 15%, the monthly mortgage payment is $1,264. When inflation is 2%, the monthly payment on the $100,000 loan is only half as large at $665. The payments in the early part of the mortgage are larger relative to income in the high inflation environment, but decline more rapidly over the life of the loan, as the real value of the debt is eroded more quickly.[10]

The effect of changes in borrowing costs on household borrowing can therefore arise from three different channels: movements in real interest rates; changes in the margin between borrowing rates and the funding costs of financial institutions that may be caused by increased competition in the household lending market; and changes in the inflation premium.

In terms of the household debt-to-income ratio, lower inflation has two effects. First, it can boost the ratio because of increased borrowing by households in response to the decline in nominal interest rates through the process just described. Second, lower inflation will result in lower growth of nominal household income. The nominal value of the debt over the life of the loan is eroded more slowly for each individual households, thereby boosting the aggregate household debt-to-income ratio.

Another extension to the life-cycle model with liquidity constraints allows for a feedback effect from rising house prices to increased household borrowing in the form of a financial accelerator (Aoki et al (2002)). The life-cycle model allows for an effect of the value of household assets on consumption. In most countries, the value of the housing stock is one of the largest assets owned by the household

[10] In a deflationary environment, repayments could conceivably rise over time as a share of income as the real value of the debt increases.

Box 1

Do rising house prices increase household welfare?

Rising house prices have underpinned growth in measures of household wealth in many countries over the past decade. A number of studies have found a positive relationship between increases in aggregate housing wealth and consumption (see Case et al (2001) and the references therein), although studies based on microeconomic data are less conclusive (Skinner (1994)). However, while empirically a positive relationship may be observed between rising house prices and consumption, theoretically the issue is much less clear. For example, Bajari et al (2003) present a model where house price rises have a small negative effect on consumption.

Theoretically the issue is complicated because house prices have both a wealth effect and a relative price effect (Muellbauer (1994), Kennedy and Andersen (1994)). In the standard version of the life-cycle model, the rise in the value of assets translates into an increase in consumption spending. In a world of infinitely or long-lived households who are all home-owners, a rise in house prices boosts the nominal value of household assets, but it also increases the cost of housing services both now and in the future, such that in real terms the household is no better off.

In a world where households are both renters and owners of housing, the real incomes of those households which are renters are reduced by the increased cost. Moreover, future generations, who are yet to buy a house, will also suffer a welfare loss from the rise in the price of housing. There is effectively a transfer of wealth from current renters and future home-owners to existing home-owners. To the extent that the existing home-owners take account of future generations (most obviously their children) then they may not regard the rise in the value of their house as boosting their wealth because it simply translates into an equivalent rise in the value of the bequest they will need to save for their children.

Arguably, the real income of existing home-owners is also reduced by the rise in the cost of housing services. However, the value that existing home-owners place on the flow of housing services from their home is reflected in the price they paid when they initially purchased their home. To the extent that they still place the same value on the services from their house, the rise in prices would result in them paying more than they desire for housing. To reduce their consumption of housing services, they could either move to a cheaper dwelling or, more likely, boost spending on other goods by consuming some of the rise in the value of their house, thereby reducing the net worth of the dwelling.

A large share of households who are renting are likely to be young households saving for a deposit to purchase a house. These households may reduce their consumption in order to save for the now larger deposit required to buy a house (Sheiner (1995)). (It is also possible that they simply give up entirely on home-ownership and hence reduce their saving.)

Thus, there is a decrease in consumption from renting households because of the price effect and an increase in consumption from current home-owners as a result of the wealth effect. The net effect of the rise in house prices is therefore ambiguous and will depend on the different propensities to consume of these two groups.

Given the theoretical relationship is ambiguous, why then is an empirical relationship between consumption and housing wealth observed?

First, the average propensity to consume of home-owners may exceed that of renters. This may well be the case, given the non-home-owners are likely to be saving for their home deposit, whereas home-owners who are likely to be further advanced in the life-cycle will less need to save.

Secondly, existing home-owners may be myopic or place a low value on the future consumption of housing services by their children (Skinner (1994) provides some evidence of this behaviour). As house prices rise there is an intertemporal transfer of consumption from future generations to existing home-owners, which boosts consumption in the current period.

Thirdly, the above analysis assumes that housing can be regarded entirely as a consumption good, whereas it may also have an investment element. For various reasons, such as the tax treatment of housing, households may regard housing as an efficient savings vehicle. Hence when house prices rise, households regard part of the rise in house prices as an increase in their savings. This then boosts consumption in a similar manner to rises in equity wealth, as the life-cycle model would predict. This behaviour would be associated with a decrease in the savings measure in the national accounts which does not include capital gains on asset holdings.

Fourthly, if households are liquidity-constrained, the financial accelerator channel can operate. A rise in the value of the collateral provided by the house will allow homeowners to finance greater consumption by borrowing against the increased value of the house.

Finally, if the boost to housing wealth takes the form of a transfer of ownership from the public to the private sector, as for example occurred in the United Kingdom in the late 1980s, then there is indeed a boost to households' asset values (assuming the absence of Ricardian behaviour by households).

sector. Box 1 discusses whether rises in the value of the housing stock should be considered as an improvement in household welfare. But in terms of household indebtedness, in the presence of liquidity constraints, households may well be at a corner solution in terms of consumption of both housing services and other forms of consumption. That is, households will borrow the maximum amount possible given their income, but that may not be sufficient to allow them to consume their desired amount of housing services or other goods. As house prices rise, the collateral value of the housing stock rises allowing liquidity constrained households to borrow against this to increase consumption, in a manner similar to Bernanke and Gertler's (1989) model of business investment. This implies that rises in household prices may result in increased indebtedness, although empirically this will be difficult to distinguish from the reverse causality running from borrowing to house prices (see above).

Gross or net debt?

Much of the analysis of household debt focuses on the gross level of borrowing by the household sector. However, the model discussed in this section is primarily concerned with the net financial position of households, that is, whether they are holders of debt or assets in net terms. This raises the question of which is the relevant measure from a macroeconomic point of view.

In determining the net asset position of an individual household, and their ability to adjust to particular shocks, the liquidity of the household's assets are likely to be relevant. If the assets are relatively illiquid, then the household may be effectively liquidity constrained, even if its net asset position is positive. Hence the household's marginal propensity to consume may be close to one, particularly for a negative income shock. In such circumstances, focusing on the gross debt position may be useful.

More generally, different households with different net financial positions are likely to have different marginal propensities to consume. For example, a low income household with credit card debt, may have a low debt-to-income ratio but may have a marginal propensity to consume of close to one, whereas a debt-free older household which holds interest-paying deposits may have a lower marginal propensity to consume. Given such distribution of financial debt and assets, a rise in interest rates would result in a net decline in consumption spending. Furthermore, where the household sector as a whole is net debtor, the ultimate net asset holder may be offshore. These considerations highlight the importance of examining the distribution of debt (and assets) across households rather than focusing solely on the aggregate gross measures, in assessing the consequences of greater household indebtedness.

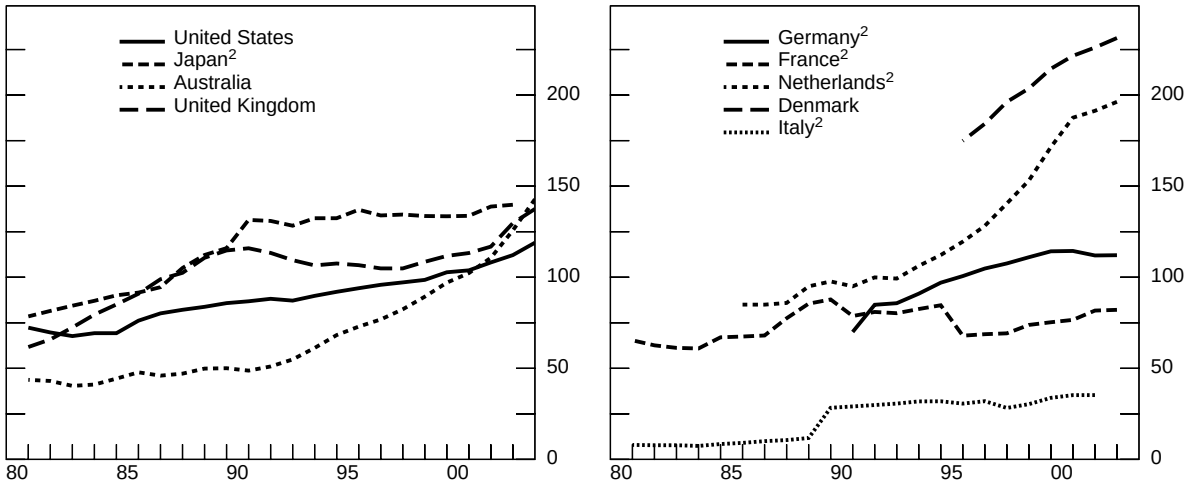
3. Facts about household borrowing

Growth in household debt has exceeded that of income in most developed countries over the past two decades. However, the timing, extent and rate of the increase has varied considerably across countries. As shown in Graph 2, household indebtedness rose substantially in France, Japan and the United Kingdom in the 1980s, and in the 1990s in Australia and the Netherlands. In the United States, household borrowing has increased steadily over both decades. Graph 2 also shows the considerable variation in household debt relative to income across countries, ranging from around 35% in Italy to over 230% in Denmark.

One explanation for the variation across countries is the different statistical definitions of the household sector. In some countries, the unincorporated business sector (generally small businesses) are included in the household sector data, whereas in other countries they are not (ECB (2004)). To the extent that the business sector tends to be more highly geared, this can affect the aggregate ratio. From a macroeconomic perspective, the precise definition of the household sector may be less important, but it should be borne in mind when comparing data across countries.

Despite the variation in the degree of household indebtedness, in every country, the bulk of the stock of household debt is in the form of borrowing for housing, consistent with the model described above and the important role of housing as collateral. For example, borrowing for housing currently accounts for around 75% of total household debt in the United States and the United Kingdom, in France and Germany it accounts for around 60% while in Australia it accounts for 85%. Growth in borrowing for

Graph 2 **Household debt/income ratio[1]**



[1] In percentages. [2] Includes unincorporated sector.

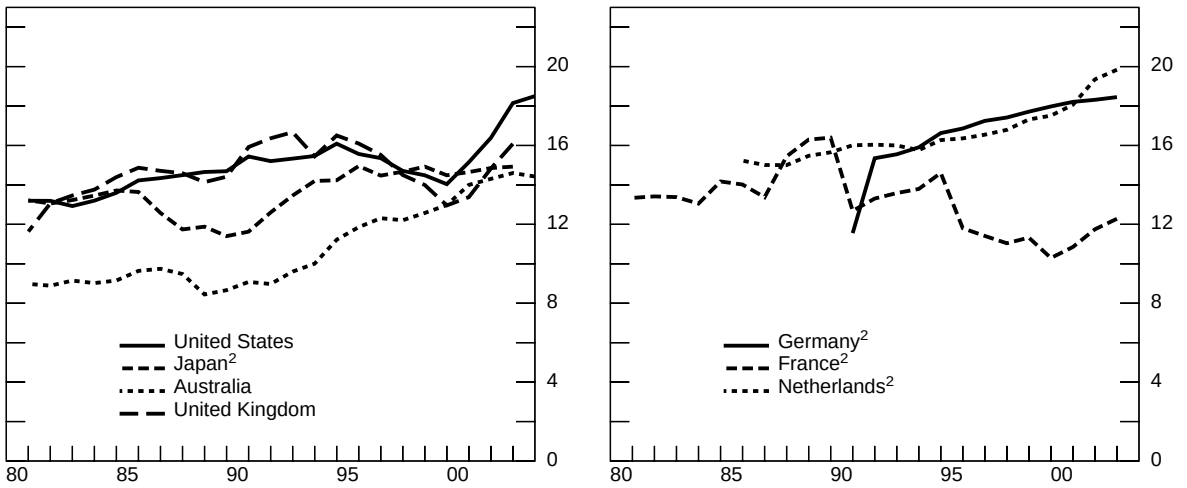
Sources: OECD; central banks.

other purposes, particularly in the form of credit card debt, has also exceeded that of income over this period, but it comprises a markedly smaller share of total household debt. The case of Korea is one notable exception, where credit card debt grew particularly rapidly in recent years before slowing sharply, in the process having a significant macroeconomic impact (see IMF (2003a)).

Scaling the amount of household borrowing by household income enables a comparison of household indebtedness across time and across countries, but it does not necessarily provide a suitable benchmark for determining whether the amount of borrowing is excessive. It is comparing a stock (household debt) against a flow (household income).

When assessing the borrowing decisions of a corporation, common benchmarks are a measure of gearing or leverage, that is, the level of debt relative to the assets of the firm, and a measure of interest cover such as debt service as a share of income. These measures are comparing a stock with a stock and a flow with a flow. Similar measures for the household sector may be more appropriate

Graph 3 **Household debt/asset ratio[1]**



[1] In percentages. [2] Includes unincorporated sector.

Sources: OECD; central banks.

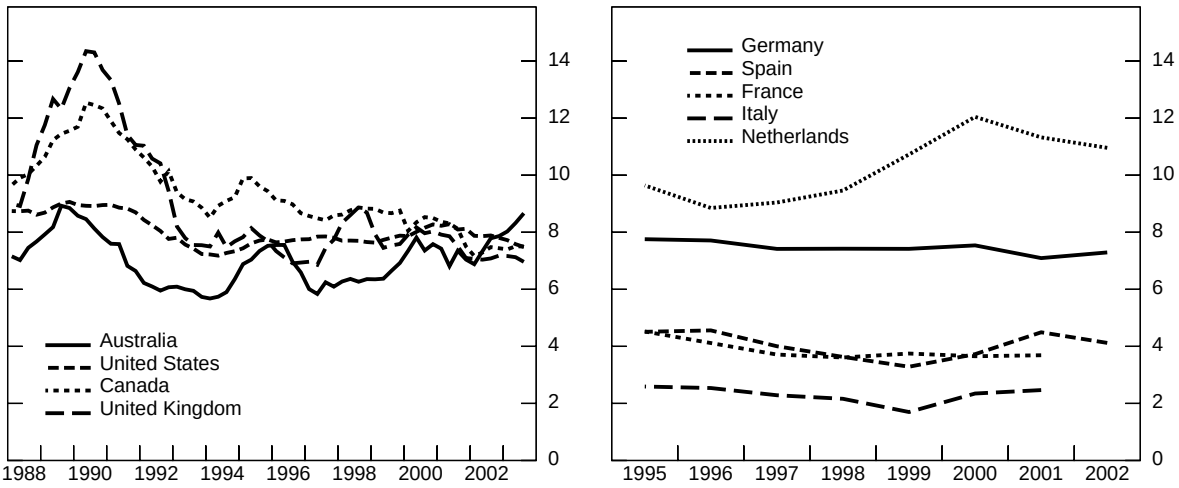
when assessing debt sustainability. The leverage of households can be calculated by scaling household debt by the value of household assets. The interest cover of households can be measured by dividing household loan repayments (which include both interest payments and required principal repayments) by a measure of household disposable income.

Using the assets of the household sector as the scaling factor, leverage has not increased nearly as dramatically over the past two decades (Graph 3). Leverage ratios have generally risen by no more than 5 percentage points, and in the case of France, the ratio has actually decreased. In large part, this reflects the concomitant increase in house prices, and in some countries it also reflects an increase in the value of households' equity holdings. The variation across countries is also much less when this measure of indebtedness is used than when the debt to income measure is used, reflecting the strong correlation between house prices and household borrowing.

The household gearing ratio suffers from the problem that it would deteriorate rapidly were house prices to fall. The value of the debt would remain fixed in nominal terms whereas the price of the asset against which it is secured would decline. Moreover, if in such circumstances, households tried to sell their homes to repay the debt, a debt-deflation spiral may ensue leading to a further deterioration in household gearing. Hence care must be taken in using this measure to assess the sustainability of household debt.

While household debt has increased relative to both income and household assets in most countries, the interest cover or debt service ratio of households does not show a clear upward trend (Graph 4). The increase in household indebtedness has been offset by the decline in borrowing rates, so that on average, households are not devoting any greater share of their income to debt service than in the past. However, debt service is close to historical highs in some countries. With interest rates in some countries at historically low levels, debt service would rise further as mortgage rates increase as the interest rate cycle turns. Again, these series are not directly comparable across countries. In some cases, debt service refers only to interest payments, in others it includes required loan payments which include both interest *and* principal repayments.

Graph 4 **Debt service[1]**



[1] Share of household disposable income, in per cent.

Sources: OECD; Eurostat; central banks.

This measure has the potential to misrepresent the effect of mortgage interest repayments on household cash flows because of changes in home ownership (Dynan et al (2003)). When home ownership rates rise, households who were previously renting substitute mortgage payments for rental payments, with considerably less effect on their disposable income net of housing costs than that suggested by the rise in their debt service. Indeed, their disposable income net of housing costs may even increase. Thus in those countries where home ownership has increased, the rise in the average debt service of those households with debt may be lower. However, rents are not likely to be directly affected by changes in interest rates whereas debt service will be affected if the household has a loan

with a variable (floating) interest rate. In addition, a greater degree of home ownership implies wealth will be more affected by fluctuations in house prices.

The variation in home ownership rates across countries is shown in Table 1. The substantial differences reflect a number of influences including the tax treatment of housing, the provision of public housing and different lending criteria in the financial sector. Financial deregulation and the decline in nominal interest rates has been associated with an increase in home-ownership rates in some, but not all, countries in the sample, consistent with an easing of liquidity constraints.[11] In France and Germany, home ownership rates have been relatively stable for the past 20 years (ECB (2003)), whereas in the Netherlands, Spain and the United Kingdom, ownership rates have increased by around 10 percentage points over the same period.

Table 1

Housing tenure

As a percentage of all households

Country	Owner-occupied	Private rental	Public rental	Other rental
Australia	70	20	10	0
Austria	56	21	20	3
Belgium	72	17	6	3
Canada	64	28	8	0
Denmark	59	26	19	4
Finland	64	15	16	11
France	58	21	17	8
Germany	39	47	10	0
Greece	80	20	0	6
Ireland	78	8	8	6
Italy	69	20	6	6
Japan	60	…	…	…
Netherlands	53	12	35	0
Norway	78	17	4	3
Portugal	64	25	3	8
Spain	85	9	2	6
Sweden	53	22	22	0
Switzerland	30	…	…	…
United Kingdom	70	10	21	0
United States	69	…	…	…

Sources: Barker (2003) Table A.1; ECB (2003); Federal Reserve Board Survey of Consumer Finances; national central banks; statistical agencies.

[11] Hamilton (2003) finds that a large share of the increase in aggregate household indebtedness in the United Kingdom can be explained by an increase in home ownership.

As noted above, the ownership of the rental sector may also have implications for household indebtedness. Table 1 shows that the ownership of the rental sector varies considerably in terms of public ownership and the split of private ownership between households and corporations. In most countries the data are not available to allow one to separate the share of housing debt which is used to purchase owner-occupied housing from that used to purchase rental housing as an investment vehicle. One exception is Australia where nearly one-third of the stock of total borrowing for housing is for the purchase of an investment property.

Distribution of household debt

The aggregate data on the indebtedness of the household sector conceal substantial variation in the distribution of the debt across individual households. For example, according to the 2001 *Survey of Consumer Finances* in the United States, around 45% of households have mortgage debt, while around one quarter of households hold no debt at all (Table 2). In Australia, less than a third of households have a mortgage for owner-occupation, while in Norway, one fifth of households have no debt at all (Table 3). Thus for indebted households, debt to income ratios and measures of debt service are considerably larger than the aggregate measures for the economy.

Table 2

The distribution of household debt in the United States

	Percentage of families holding debt		**Median debt holding of indebted households (thousands of 2001 or 1989 dollars)**	
	Home-secured	**Total**	**Home-secured**	**Total**
	2001 survey			
All families	44.6	75.1	70.0	38.8
Percentile of income				
Less than 20	13.8	49.3	28.0	5.2
20–39.9	27.0	70.2	40.0	11.5
40–59.9	44.4	82.1	56.1	29.1
60–79.9	61.8	85.6	75.6	62.3
80–89.9	76.9	91.4	91.0	96.8
90–100	75.4	85.3	134.0	146.4
	1989 survey			
All families	38.7	72.7	32.0	15.2
Family income[1]				
Less than $10,000 (1989 dollars)	8.8	47.2	7.5	1.9
$10,000–19,999	21.3	58.7	13.0	5.0
$20,000–29,999	36.8	79.5	21.0	12.5
$30,000–49,999	53.1	86.5	33.0	26.2
Over $50,000	72.4	91.8	48.0	55.5

[1] Approximately 20% of families are located in each of the income distribution brackets in the 1989 survey.

Sources: Federal Reserve Board Surveys of Consumer Finances (1989, 2001); Aizcorbe et al (2003).

Table 3

The distribution of household debt in Norway

Share of households	1990	1995	2001
No debt	28	24	21
Debt/income less than 100%	36	39	39
Debt/income between 100% and 200%	20	22	22
Debt/income between 200% and 300%	9	8	10
Debt/income greater than 300%	6	6	7

Source: Statistics Norway.

The distribution of debt across households has important implications for the sensitivity of the economy to the shocks to income, interest rates and house prices discussed in Section 5 below. The characteristics of indebted households may differ from those of the population as a whole. If indebted households tend to have higher incomes, they may be less exposed to rises in unemployment or interest rates than the aggregate numbers would suggest, although they may be more exposed to fluctuations in wealth, for example caused by share price movements. Similarly, if the increase in aggregate household debt reflects an increase in borrowing by higher income households or increased borrowing by households with higher asset values, it may be less of a cause for concern. If it instead reflects greater borrowing by households with lower incomes or less collateral, which may take the form of credit card debt, the increase in the macroeconomic sensitivity of the household sector is likely to be greater. Alternatively the effects will also depend on whether the increase in debt has been concentrated in a small number of households or distributed evenly across the population.

Detailed data on the distribution of household debt are available in a number of countries (although not all) including Australia, Netherlands, Norway, Sweden and the United States. These data show a hump-shaped pattern of debt relative to age, consistent with the life-cycle model with liquidity constraints. Young households carry relatively little debt relative to income, although young households which have debt have very high levels of debt relative to income. This hump-shaped pattern follows that of home ownership, again reflecting the fact that housing debt accounts for the bulk of household debt.

Households with higher incomes tend to have the greatest share of the stock of the debt. In Sweden, 40% of the stock of debt is held by households in the top income quintile (Riksbank *Financial Stability Report* 1 (2003)). In the United States, three quarters of households in the highest income quintile have a mortgage, compared to 14% in the lowest income quintile. Moreover, the median outstanding mortgage debt is nearly five times larger for the richer households. In terms of other forms of debt, around half of all households in the United States in the lowest income quintile borrow in some form, compared to 85% in the upper quintile. These numbers reflect the prevalence of credit card debt amongst low-income households.

Amongst the population of indebted households, the highest debt-to-income ratios are found at the lower end of the income distribution (even though the absolute amounts of borrowing by these households may be relatively small). These households are generally recent home-buyers with younger household heads (Table 4). They have not yet started to pay down the principal on their mortgage and have a low income relative to the expected path of income over the rest of their working life. Data from the Netherlands show that debt relative to the value of assets held also tends to be highest amongst indebted households at the lower end of the income distribution (Van Rooij (2003)), again reflecting the fact that they have recently purchased a dwelling with a high loan-to-valuation ratio (which has not yet experienced much appreciation in value since its purchase).

Table 4

The distribution of household mortgage debt in the Netherlands in 2002

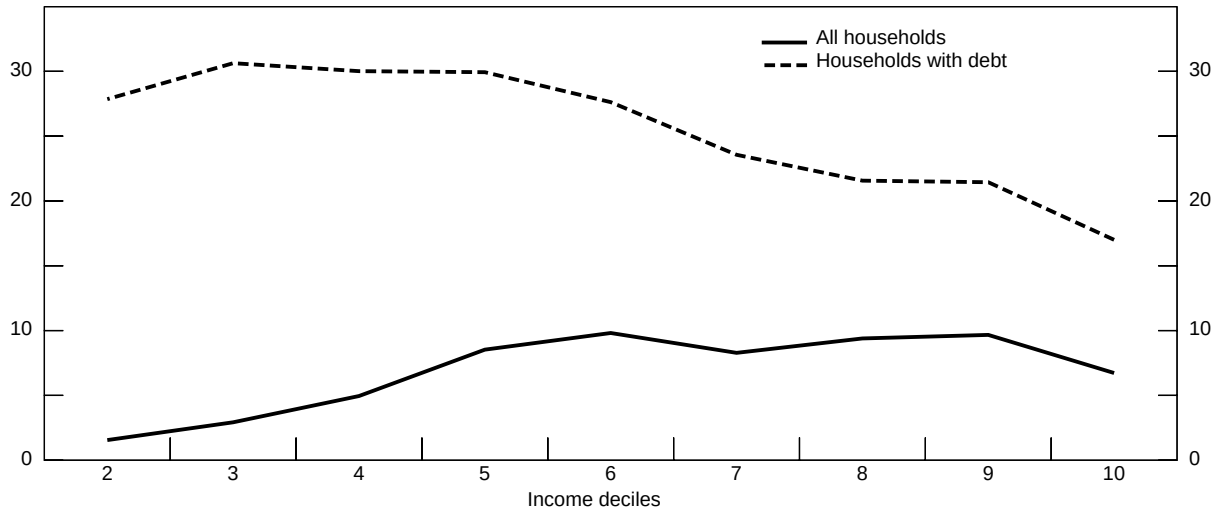
	Mortgage debt/household income					
	0–1	**1–1.5**	**1.5–2**	**2–2.5**	**2.5–4**	**>4**
Share of households (per cent)	16	12	19	17	20	16
Mortgage debt/home value	39	32	38	47	71	65
Value of house (€ thousands)	199	246	189	266	208	281
Year of purchase	1985	1988	1985	1994	1996	1994
Age of household head	51	51	53	44	39	42
Gross household income (€ thousands)	60.7	53.0	38.3	50.3	43.5	32.8

Source: van Rooij (2002), Table 2.

The distribution of debt service across households broadly corresponds to the distribution of debt. In countries with variable rate mortgages, the two distributions are naturally almost identical, as the interest rates on all outstanding mortgages and credit card debt will be basically the same across indebted households. In countries where fixed rate mortgages are more relevant there can be more of a difference depending on the age of the mortgage stock, the interest rate prevailing when the mortgage was initiated and the ease with which a mortgage can be refinanced to take advantage of lower interest rates.

Mortgage repayments as a share of income tend to increase with household income, reflecting the greater tendency to borrow of higher income households (Graph 5). Again, the debt service ratio of indebted households is highest for lower-income households. In the United States, the share of households with debt service greater than 40% of income is highest for low-income households at around one quarter, but is negligible amongst households in the highest income decile (Table 5).

Graph 5 **Total mortgage repayments[1]**



[1] As a percentage of household disposable imcome.

Sources: Reserve Bank of Australia; Australian Bureau of Statistics.

Norwegian data suggest that households with a high debt service ratio are accounting for a growing proportion of the debt stock (consistent with the rapid growth in credit that has occurred), but that much of this growth is amongst higher income households (Norges Bank *Financial Stability Report* 2 (2003)).

Table 5

The distribution of debt service across households in the United States

In per cent

	Ratio of debt payments to income		Share of debtors with debt service ratio above 40%	
	1992	**2001**	**1992**	**2001**
All families	14.0	12.5	10.8	11.0
Percentile of income				
Less than 20	15.8	15.3	26.4	27.0
20–39.9	15.2	15.1	15.1	16.0
40–59.9	15.5	16.5	10.1	11.7
60–79.9	16.3	16.3	7.6	5.6
80–89.9	15.2	16.5	2.9	3.5
90–100	11.2	8.0	2.5	2.0
Housing status				
Owner	16.0	13.5	13.6	13.9
Renter or other	6.9	6.8	4.7	3.5

Source: Federal Reserve Board Survey of Consumer Finances (2001); Aizcorbe et al (2003).

There is less data available on the change across time in the distribution of household debt, which complicates the assessment of the rise in household indebtedness that has occurred over the past two decades. The *Survey of Consumer Finances* in the United States is one exception, providing detailed data on the distribution of debt at regular intervals over the past 30 years (Table 2). Comparing the 2001 survey with that of 1989, a notable development is that the share of households with a mortgage has increased across all parts of the income distribution. Amongst households at the lower end of the distribution, the share has increased from 8% to 14%. Debt service as a share of income declined from 1992 to 2001, in aggregate, despite the increase in indebtedness. However, this was almost completely explained by a decline in debt service by households in the highest decile, probably reflecting the very high rates of income growth in that decile.

Financial deregulation and taxation

The deregulation of financial markets occurred in the first part of the 1980s in many countries (Table 6). Prior to that, lending to households was tightly controlled. These controls took the form of direct constraints on the amount and allocation of lending by financial institutions, either directly or implicitly in the form of moral suasion. The proceeds of mortgages were generally restricted to funding house purchase, not consumption spending. Moreover, in most cases, only certain institutions were allowed to participate in the lending market. Controls on interest rates on both loans and deposits restricted the ability of financial institutions to lend. By the end of the 1980s, most of these constraints had been eliminated in nearly every developed country. Group of Ten (2003) and Girouard and Blondal (2001) provide further details of the deregulation that occurred.

Table 6

Deregulation of the mortgage market

Country	Year	
Australia	1982	Quantitative lending guidance eliminated
	1986	Removal of ceiling on mortgage interest rate
Canada	1967	Ceiling on interest rates on bank loans eliminated
	1967	Restrictions on banks' participation in mortgage financing abolished
	1980	Banks allowed to have mortgage loan subsidiaries
Denmark	1982	Liberalisation of mortgage contract terms
	1982	Interest rate deregulation
	1989	Elimination of restrictions on mortgage bond issuance
Finland	1984	Funding quotas from the Central Bank to commercial banks eliminated
	1986	Interest rate deregulation
	1987	Guidelines on mortgage lending removed
France	1984	Bank specialisation requirements reduced
	1987	Elimination of credit controls
Germany	1967	Interest rate deregulation
Italy	1983	Interest rate deregulation
	1983	Credit ceilings eliminated (temporarily reimposed 1986-87)
Japan	1993	Bank specialisation requirements reduced
	1994	Interest rate deregulation completed
Netherlands	1980	Interest rate deregulation
New Zealand	1984	Credit allocations guidelines removed
	1984	Interest rate deregulation
Norway	1984	Lending controls abolished
	1985	Interest rate deregulation
Sweden	1985	Interest rate deregulation
	1985	Lending controls for banks abolished
United Kingdom	1980	Credit controls (corset) eliminated
	1981	Banks allowed to compete with building societies for housing finance
	1986	Building societies allowed to expand lending activities
	1986	Guidelines on mortgage lending removed
United States	1980	Interest rate deregulation, phasing out of Regulation Q (deposit interest rate ceilings) over four years
	1980	Elimination of portfolio restrictions for thrifts

Source: Girouard and Blondal (2001), Table 3.

At the same time as these constraints were being eliminated, in many countries entry restrictions on foreign financial institutions and restrictions on the nature of the business that domestic financial institutions could undertake were abolished. This boosted competition in the lending market as financial institutions sought to establish or protect their market share.

The tax treatment of household borrowing is summarised in Table 7 (see Group of Ten (2003) for more discussion). The substantive differences across countries in the tax treatment are whether mortgage interest payments are tax deductible and whether housing is subject to a wealth tax. The deductibility of mortgage interest rate payments varies considerably across countries, ranging from full to zero deductibility. In some countries such as Australia and the United Kingdom, deductibility is not allowed for owner-occupation but is allowed for investment in the rental housing stock. The attractiveness of this tax deduction also depends on the structure of marginal tax rates. The higher the marginal tax rate, the greater the benefit of interest deductibility.

Table 7

Tax treatment of owner-occupied housing

Country	Interest cost deductible	Capital gain taxable/ exempt	Imputed rent taxable/ exempt	Wealth tax on housing	Inheritance tax on housing
Australia	No	E	E	No	No
Austria	….	T (if turnover < 10 years)	E	No	Yes
Belgium	Partly	E	T	No	Yes
Canada	No	E	E	No	No
Denmark	Partly	E	E	Yes	Yes
Finland	Partly	E	E (after 2 years)	No (in most cases)	Yes
France	No	E	E	Yes	Yes
Germany	No	E	E	No	Yes
Greece	Yes	E	T	No	Yes
Ireland	Partly	E	E	No	Yes
Italy	Yes	E	E	No	Yes
Japan	Yes	E	E	No	Yes
Netherlands	Yes	E	T	No	Yes
Portugal	Yes	E	E	No	Yes
Spain	Partly	E	E	Yes	Yes
Sweden	Partly	T	T	Yes	No/Yes
Switzerland	Yes	T/E[1]	T	Yes	Yes/No[1]
United Kingdom	No	E	E	No	Yes
United States	Yes	E	E	No	Yes

[1] Depends on canton.

Sources: ECB (2003); G10 (2002).

The tax treatment of housing has changed in a number of countries over the past 20 years. Mortgage interest deductibility has been reduced substantially in the Nordic countries and was phased out completely in the United Kingdom, in part responding to developments in those housing markets in the 1980s (see Section 6). In the United States, tax reform in 1986 eliminated interest deductibility on all borrowing except that secured against the home, which significantly increased the relative attractiveness of mortgage financing for other purposes such as consumption.

These features of the tax regime have affected the type of mortgage product that is offered. For example, in the Netherlands, to maximise the tax advantage of borrowing, the majority of mortgages do not involve the payment of principal over the life of the mortgage, thereby maximising the interest

deduction. Instead, the mortgagee builds up wealth in a savings account or an account which is invested in the equity market, the proceeds of which are used to pay off the principal at the expiration of the mortgage. Such products boost the recorded level of gross household indebtedness, and in doing so may lead to a misinterpretation of the overall position of the household's balance sheet, again highlighting the value of measures of the net financial position of households.

4. The effects of inflation, taxes and debt-service constraints on household borrowing

In this section, a simple simulation is conducted to illustrate the influence of inflation, taxes and debt-service constraints on aggregate household debt levels.[12] It compares debt to income levels across steady states that vary in terms of the rate of inflation, the tax deductibility of mortgage interest, assuming a binding debt-service constraint on household borrowing.

A synthetic economy is constructed where the age of households varies from 20 to 75. Households are evenly spread across the age distribution, so demographics do not have any influence on indebtedness. Households rent in the early period of their working life between ages 20 and 30, during which time they do not borrow. At age 30, households buy a house by borrowing, subject to a debt-service constraint set by the financial institution. The mortgage is assumed to have a duration of 30 years, so that at age 60, it has been paid off in full. The household remains debt-free for the remaining 15 years of life. Households do not "trade-up" over the course of their life, so borrowing only occurs at age 30.

The mortgage is a standard credit foncier mortgage, where annual payments are kept constant in nominal terms. Initial payments primarily comprise interest payments with only a small amount of principal being repaid. Over time, the share of principal in each payment increases, while the share of interest decreases. Thus this is the same type of mortgage that underpins the analysis in Graph 1.

The debt-service constraint takes the form of a ceiling on debt service payments as a share of disposable (after-tax) income. The constraint is assumed to be always binding on the household at age 30. Therefore the size of the mortgage is determined by the income of the household at age 30. That is, households borrow so that debt service payments are x% of their income. Variations in debt-service constraints can be examined by changing the value of x.

Household income is assumed to increase with age until age 65. At age 65, the household retires and their income in retirement is a proportion of their final wage.[13] Household income grows steadily at 3% per annum in real terms. Nominal growth in household income varies one-for-one with the rate of inflation, π.

The nominal policy interest rate in the economy is assumed to be equal to the rate of growth of nominal income. Thus the interest rate is constant in real terms but the Fisher effect is complete so that nominal interest rates change one-for-one with inflation. The mortgage interest rate is set at a fixed margin, m, above the nominal policy interest rate.

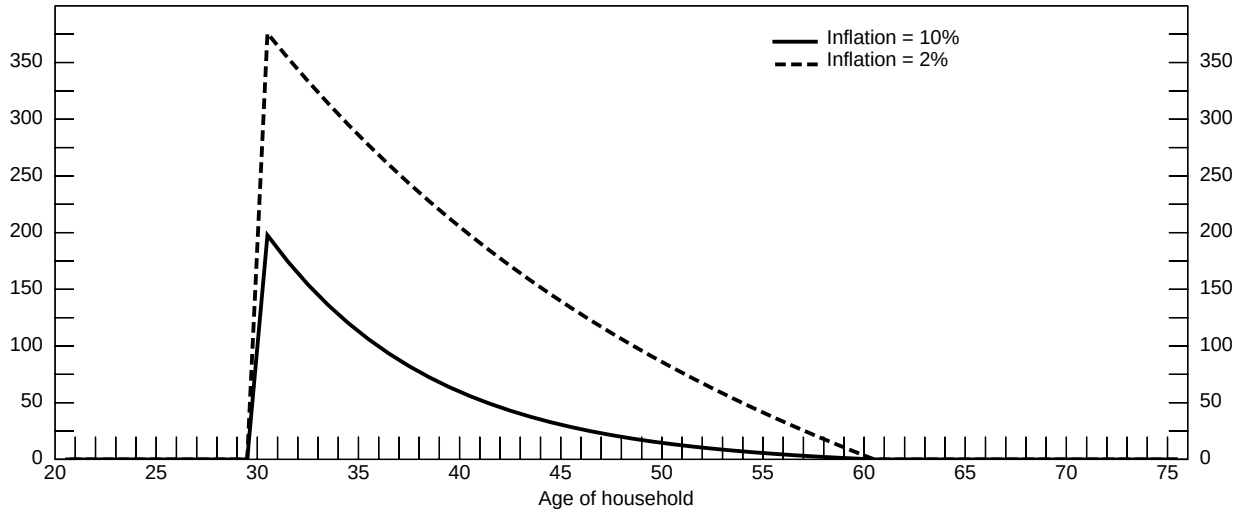
Two different tax regimes are considered: one where mortgage interest payments are not tax deductible, the other where they are completely tax deductible. As the debt-service constraint is assumed to be related to after-tax income, when interest is tax deductible, households are able to borrow more.

Graph 6 illustrates the path of the debt to income ratio for an individual household over the life-cycle, assuming a borrowing limit of 30% and no interest deductibility, and for an inflation rate of 2% and 10%. The lower inflation rate (and nominal interest rate) allows the household to borrow more, and the debt is eroded more slowly because of lower income growth. The debt to income ratio for the economy

[12] Ellis (2004) and Hamilton (2003) conduct similar exercises.

[13] This assumption is somewhat arbitrary but does not have a large impact on the results. All that is required is that income in retirement is small compared to income during the working life.

Graph 6 **Debt to income ratio over the life cycle[1]**



[1] In per cent.

Source: Author's calculations.

as a whole can be calculated for different inflation rates, debt-service constraints, borrowing margins and tax regimes, by aggregating the total income and indebtedness for each household.

The aggregate debt to income ratios for various combinations of the parameter values are shown in Table 8. The various columns are comparing steady state outcomes, once the full adjustment has taken place. Ellis (2004) provides some indication of the possible path of the aggregate ratio between steady states. The first two columns show the effect of changes in inflation on the aggregate debt-to-income ratio. A decline in inflation from 10% to 2%, similar to the disinflation experienced in many countries over the past two decades, results in the debt-to-income ratio rising by around a factor of eight. While these simulations are only indicative, they illustrate the large influence that changes in inflation and nominal interest rates can have on the debt-to-income ratio. However, it should be noted that the assumption that the debt-service constraint is binding on every household magnifies the influence of changes in inflation.

Table 8

Effects of inflation, taxation and debt-service constraints on indebtedness

Aggregate debt to disposable income ratio (in per cent)

Liquidity constraint	**30%**		**40%**		**30%**	
Margin	**2**		**2**		**4**	
Tax deductibility	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**
Inflation						
2%	67	90	90	130	59	80
5%	31	43	41	64	27	38
10%	8	11	10	16	7	10

Source: Author's calculations.

As described in Section 2, two influences are contributing to the rise in aggregate indebtedness when inflation declines. First, the interaction of the debt-service constraint with lower nominal interest rates allows the household to borrow more upfront. The decline in inflation eases the liquidity constraint on households. Secondly, the slower growth in nominal income as a result of lower inflation erodes the nominal value of the debt more slowly.

The effect of tax deductibility of mortgage payments can be seen by comparing the two columns. The deductibility of interest payments increases the household's disposable income after borrowing. Given the liquidity constraint is assumed to be binding and depend on the level of disposable income, this results in the household being able to borrow more upfront. The tax system again eases the liquidity constraint on household. However, this model does not capture the full role that deductibility played in the Nordic countries in the late 1980s, as in those countries, at least initially, nominal mortgage rates did not rise in line with inflation as is assumed here.

The effect of an easing in the debt-service constraint from 30% to 40% is also illustrated. This change again results in a relatively large increase in aggregate household indebtedness, and provides some indication of the possible effects of financial deregulation on the level of borrowing. The final pair of columns indicate the influence of changing the margin between the borrowing rate and the policy rate. It is indicative of the effect of permanent changes in the real interest rate. The effect is relatively small compared to the influence of changes in inflation and liquidity constraints.

This simple model gives an indication that changes in inflation and liquidity constraints can induce a large rise in the debt-to-income ratio. It suggests that these factors may explain much of the rise in household indebtedness that has been observed. However, it is difficult to use this framework to accurately gauge whether the rises in indebtedness that have been observed in many countries can be fully explained by these two influences, because of the simplifying assumptions made in the model. First, as mentioned earlier, the assumption that the debt service constraint is binding on all households greatly enhances the influence of any factor, such as a decline in inflation, that eases this constraint. Secondly, no account has been taken of demographic effects: the greater the share of older households, the smaller the debt-to-income ratio is likely to be. Thirdly, income distribution will also have an important influence, although the net impact is unclear: if the distribution is highly skewed, households in the upper end of the distribution are unlikely to be liquidity-constrained, and while their borrowing may be large in absolute terms, it may be small relative to income. Fourthly, the tendency of households to "trade-up" over the life-cycle is not modelled. This would boost the debt-to-income ratio of every household (and hence the aggregate ratio). That is, rather than the debt-to-income ratio declining smoothly over the life-cycle as in Graph 6, it may periodically spike up again as the household increases their mortgage. Accessing the equity in the house would have a similar impact. Finally, the debt-service constraint assumed here is too simple to capture the full effect of the easing of financial constraints on the household sector over the past 20 years. Moreover, it is assumed to be exogenous in the model. Instead, it is quite possible that, in reality, the debt-service constraint may vary pro-cyclically with economic conditions. If household income growth were to slow, financial institutions may tighten borrowing conditions, reducing the ability of households to consumption smooth.

5. Macroeconomic implications of increased household indebtedness[14]

The previous sections have discussed the causes of the large rise in household debt observed in a number of countries over the past two decades. A large part of the rise may be a rational response of households to an easing of liquidity constraints resulting from financial deregulation and the decline in both nominal and real borrowing rates. This has allowed households to structure their borrowing so as to achieve a more desirable path for consumption over the life-cycle. However, as explained in the previous section, it is difficult to determine whether the large increases in household borrowing can be explained by the changes in interest rates and inflation, or whether the growth has been excessive (or

[14] Similar discussions of these issues have occurred in a number of countries: for Australia, see Macfarlane (2003); for Ireland, Kearns (2003); for Norway, Gjedrem (2003); for the United Kingdom, HM Treasury (2003), Nickell (2003) and Tucker (2003); as well as recent Financial Stability Reports, inter alia, for Finland and Sweden.

indeed whether there might be further increases still to come). Regardless of whether households have "over-borrowed" or not, the larger stock of household debt has important macroeconomic implications which are discussed in this section.

As illustrated in the previous section, the decline in interest rates and inflation has had two effects on household borrowing. First, the reduction in borrowing costs has allowed a greater number of households to borrow and/or increased the average level of debt per borrowing households. Thus in a number of countries, aggregate debt-servicing ratios are currently close to the highest levels of the past few decades, despite the fall in interest rates. Secondly, with lower inflation, the real value of the debt (which is fixed in nominal terms) is not eroded as fast as in the past. As a result, for a given household, the debt-to-income ratio and debt service as share of income will not decline as rapidly over the life of the mortgage in a low-inflation environment. Households may be surprised in later years by the amount of income still required to service their debt, and hence have lower than desired consumption.

Taking these two effects together, the higher debt-to-income ratio means that the household sector is more exposed to shocks. Not only are they more exposed than previously, they will also be more exposed for a longer period of time than in the past. The increased indebtedness means that the household sector is more exposed to interest rate risk, particularly where variable rate mortgages are prevalent, and to shocks to household income and house prices. Furthermore, the easing of liquidity constraints and the increased indebtedness imply that household consumption and hence the economy is likely to be more sensitive to changes in households expectations about the future path of income, house prices and interest rates. The distribution of debt across households will have an important influence on how much more sensitive the economy will be as a result of the higher level of debt.

Changes in household income

The largest and most significant negative shock to household income is unemployment. Unemployment causes household income to decline substantially both now and, in many cases, also in the future. Greater household indebtedness and higher debt service will heighten the sensitivity of households to a rise in unemployment, amplifying the effect of whatever negative shock to the economy induced the rise in unemployment.

Households with debt will find it more difficult to maintain their mortgage payments through a period of unemployment, and hence will be more likely to default. This has the potential to increase the incidence of distressed selling, and hence the likelihood of a downward spiral in house prices and negative equity. Such developments would be particularly unwelcome if the shock that caused the rise in unemployment was already placing downward pressure on house prices. Financing difficulties would be even more acute if the rise in unemployment was associated with higher interest rates, as for example occurred in the Nordic countries and the United Kingdom in the early 1990s (discussed in Section 6).

Greater household indebtedness may also reduce the ability of households to move locations in search of employment during a downturn. Blanchard and Katz (1992) and Decressin and Fatas (1995) highlight the importance of labour mobility in the United States and Europe. In the United States, labour mobility is a significant channel of adjustment in response to aggregate shocks, whereas it is of lesser significance in Europe. The need to sell to the house to repay the mortgage may substantially increase the cost of searching for employment in distant labour markets and inhibit this channel of adjustment. This channel is likely to be most impeded when the household has negative equity in their property. Gardner et al (2001) and ECB (2003) examine the relationship between home ownership and labour mobility, and find that home ownership tends to be associated with lower labour mobility. Increased indebtedness will thereby amplify the impact of a rise in unemployment indirectly through this reduction in mobility as well as through the direct effect of the decline in income on the ability to service the debt.

The distribution of the debt across households will affect the potency of this channel. Unemployment generally affects only a relatively small section of the population. The critical factor is the degree of overlap between those households with a higher risk of unemployment and those with high debt levels. In general, the incidence of unemployment tends to be greatest amongst newer entrants to the labour force and amongst those on lower incomes. These households tend to have significantly less debt, primarily reflecting their low level of home ownership, so the degree of overlap between those

households with a higher risk of unemployment and those with high debt levels has historically been low. New home-buyers are likely to be most exposed. This group generally has very high debt-to-income and debt service ratios relative to the aggregate, although they generally only account for a small share of total borrowing. Nevertheless, because households now have higher debt service levels for a longer period of their working life, they are more likely to experience a spell of unemployment while debt service is still a significant share of household income.

Working in the other direction, the easing of liquidity constraints may mean that households are now better able to smooth consumption during periods when income is temporarily low, thus reducing the impact of a negative shock. The ability to smooth is generally only available to households with free (or excess) collateral in the form of their house, who also have an existing line of home equity credit. The availability of such products is increasing in a number of countries but is still not widespread. In general, many households who experience unemployment are still unlikely to be able to borrow to smooth consumption during their period of unemployment.

The easing of liquidity constraints also means that households are better able to borrow to fund higher consumption when expectations of the future path of labour income are raised. In particular, an increase in expected future income may boost house prices, and allow existing homeowners to borrow against the increase in home equity to fund consumption (see below). King (1990) argues that much of the boom in consumption in the United Kingdom in the late 1980s could be attributed to expectations that future income would be higher. He argues that the subsequent downturn was exacerbated by the realisation that the expectations of future income were overly optimistic. Consequently, household consumption and household borrowing are likely to be considerably more sensitive to changes in households' expectations about future income (Pagano (1990)).

In summary, the increased indebtedness means that the economy as a whole, and particularly consumption spending, will be more sensitive to changes in current labour income (such as those induced by unemployment) as well as changes in expectations about future income. The higher levels of debt are likely to amplify the impact of the initial shock that causes these changes in income.

Changes in interest rates

Changes in interest rates will generally affect a much greater number of households than a rise in unemployment. The sensitivity of the household sector to changes in interest rates will depend critically on whether households tend to have fixed or variable (floating) rate loans and mortgages. Most credit card borrowing is at a variable interest rate, but the nature of the interest rate applying to a mortgage varies considerably across countries (Table 9).[15] The increased indebtedness means that households are more exposed to interest rate risk in countries with variable rate mortgages, although financial institutions may have a greater exposure to credit risk as a result. In countries with fixed rate mortgages, financial institutions or the end-holders of securitised mortgages are more exposed to interest rate risk.

The effect of the increased interest rate exposure will also depend on the degree to which the change in interest rates was anticipated by households at the time they initiated their loan. That is, is the change in interest rates perceived to be consistent with the normal variation over the business cycle, or has there been a change in the interest rate regime involving a complete shift in the nominal term structure (for example, from a high to a low interest rate environment)?

In those countries where mortgages predominantly have fixed rates, including France, Germany and the United States, movements in policy interest rates over the business cycle should, in theory, have only a small effect on mortgages. The borrowing rate is most closely related to longer-term interest rates and thereby the average policy interest rate expected to prevail over the life of the mortgage. With the interest rate being fixed for a long period of time, households are sheltered from the direct risk of interest rate movements, although in some countries, households have a call option embedded

[15] See also Miles (1994, 2003) and FSA (2001). The definitions of fixed and variable are somewhat imprecise. Some fixed rate loans allow for the interest rate to be periodically reviewed. The primary distinction is between mortgages where the household sector bears the interest rate risk in the short term (ie less than one or two years) and mortgages where the household is protected from movements in interest rates in the short to medium term.

Table 9

Household mortgages

Predominant type of interest rate

Country	Mortgage interest rate	Country	Mortgage interest rate
Australia	Variable	Italy	Mixed
Austria	Fixed	Japan	Mixed
Belgium	Fixed	Netherlands	Fixed
Canada	Fixed	Norway	Variable
Denmark	Fixed	Portugal	Variable
Finland	Variable	Spain	Variable
France	Fixed	Sweden	Variable
Germany	Fixed	Switzerland	Variable
Greece	Variable	United Kingdom	Variable
Ireland	Variable	United States	Fixed

Source: ECB (2003); Borio (1995), based on majority of the stock of mortgages.

in the mortgage, which allows the household to refinance their loan and take advantage of a decline in borrowing rates.[16]

A change in the interest rate regime will have an asymmetric effect on households with fixed rate mortgages. If there is a downward shift in the interest rate regime, there is an incentive for existing borrowers to exercise their call option (where it is available) and refinance their mortgages at the lower interest rate. This will boost the amount of household income available for other purposes, most notably consumption, as monthly mortgage payments are reduced. The extent to which this occurs will depend on the cost of refinancing, which is relatively low in Denmark and the United States, but relatively high in other countries with fixed mortgage rates (Frankel et al (2004)). If there is an upward shift in the interest rate regime, existing fixed-rate borrowers will be shielded from the effects of the rising interest rates; only prospective new borrowers will be affected and the magnitude of this latter effect will be little influenced by the level of aggregate household debt.

While there may be no change in the effect of unexpected interest rate rises on households with fixed-rate mortgages, the effect on lending institutions may be larger, particularly if it comes after a period where households have refinanced at lower interest rates. The interest rate risk is borne by the financial institution rather than by the household sector.[17] The greater securitisation of housing mortgages means that financial institutions may also be shielded from the increase. The end holders of the securitised product, which are generally pension funds, may thus be most exposed to the risk (IMF (2003b)). Alternatively, these institutions may also hedge their interest rate risk, in which case the exposure lies with the writer of the interest rate option.

Even if the exposure to interest rate fluctuations is transferred from households to financial institutions or pension funds, the household sector still ultimately bears the risk, either through its shareholdings in the financial institution or through the value of pension funds. But because the effect is less direct, being transmitted through changes in the value of pensions or share-holdings, there is likely to be a

[16] This call option comes at a price. The cost is reported to range from around 50 to 120 basis points in the United States (Greenspan (2004)).

[17] Having the financial institution intermediate the risk is arguably a more efficient distribution of the risk exposure. Campbell and Cocco (2003) discuss the conditions under which a variable or a fixed-rate mortgage is more suitable for a household. They also argue that an inflation-indexed fixed-rate mortgage may be the most suitable type of mortgage for a household.

much more gradual adjustment in consumption than if the household were bearing the interest rate risk directly.

In countries where mortgages are predominantly variable (floating) rate, such as Australia, Ireland, Spain and the United Kingdom, the implications of increased household indebtedness are potentially much greater. Variable interest rates are more directly related to the policy interest rate, often changing one-for-one with it. In these cases households with mortgages, rather than financial institutions, are directly exposed to the risk of interest rate fluctuations. Although the household sector more directly bears the interest rate risk, financial institutions may have a greater credit risk as a consequence.

The size of the impact will depend on the extent to which the movement in interest rates is within the range of normal cyclical variation or is rather a shift in the interest rate regime. The impact of policy interest rate changes will be reduced to the extent that households treat the variable rate as effectively fixed over the life of the loan, and interest rates do vary over the cycle within the range that has been anticipated by households. For example, if the interest rate is at a cyclical low, households may (rationally) save the temporary decline in required repayments, with consumption being relatively unaffected.[18] Effectively, the households are insuring themselves against interest rate risk by building a precautionary savings buffer. Where it is contractually possible, a simple way for households to save in such situations is to maintain the monthly repayments at a constant level, thereby paying off the loan principal faster than necessary.[19] This prepayment buffer, which is built up when interest rates are low, will allow the household to also maintain constant mortgage payments as interest rates rise, again diluting the impact of these increases on consumption.

If there is a downward shift in interest rates that is perceived to be permanent, households may opt to increase their borrowing and/or their spending on housing or other forms of consumption. When there is a permanent upward shift in the interest rate regime, only those borrowers whose repayments are at the minimum required will be affected initially. With no prepayment buffer, interest rate rises will directly feed into higher mortgage payments and hence reduce consumption approximately one-for-one. As interest rates continue to climb, the prepayment buffers of more and more households are eroded, increasing the impact on consumption.[20]

With the downward shift in interest rates over the past decade or so, it is possible that many indebted households with variable rate mortgages have built up a sizeable prepayment buffer (are “ahead” on their mortgage payments), so that the duration of the mortgage is reduced. Hence, were interest rates to rise substantially, the effect on consumption might be smaller than would be suggested by the larger size of aggregate household debt. Offsetting this possibility, some households have taken advantage of the lower rates to increase the size of their mortgage, most notably to trade up to a larger dwelling.

Thus, in countries where mortgages are predominantly variable rate, the increase in household indebtedness is likely to have increased the potency of monetary policy because of a large rise in the exposure of households to interest rate risk. The effect is likely to be broadly symmetrical, in that households will be more sensitive to both rises and falls in interest rates. However, the extent of the increase in potency will be diminished by the degree to which households regard variable-rate mortgages as effectively fixed, and the extent to which interest rates remain within a range anticipated by households when they initiated the mortgage.

There are a large number of mortgage products which lie between the two extremes of a completely variable-rate mortgage and one where the borrowing rate is fixed for a substantial period of time. Where mortgage rates are fixed for a shorter period of time (in particular, less than the length of the interest rate cycle), many of the considerations that apply to variable-rate mortgages become

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[18] Miles (2003) discusses some evidence that households expect the variable interest rate at which they initiated the mortgage to prevail over the whole life of the mortgage. Thus, even if the borrowing rate was likely to be at a cyclical low, households expected it to stay at the low level.

[19] The ability to do this will depend on the cost of early prepayment of principal. For some mortgage contracts this cost is zero, but other mortgages impose constraints on the ability to prepay.

[20] A shift upward in interest rates does not necessarily imply that default rates will automatically increase as households become unable to service their loans. When determining the maximum size of the loan they are prepared to grant to households, financial institutions will often assess the household’s ability to service the loan at an interest rate some margin above the rates currently prevailing.

important. The timing of the impact of interest rate changes will depend on the frequency with which the fixed rates roll-over to variable rates, and the difference between the fixed rate and the variable rate prevailing at the roll-over date.

The discussion thus far has only considered the effect of interest rate changes on the consumption of those households with debt. The effect on other households who are net lenders will be the opposite, with rises in interest rates boosting the returns on their wealth. The aggregate impact will again depend critically on the distribution of debt and assets across the household sector, and the degree to which marginal propensities to consume vary across households with different net financial positions. Nevertheless, in most countries the household sector has become a smaller net lender than in the past, and in some cases is now a net borrower. Thus changes in monetary policy are likely to be more potent than in the past.

Finally, this increased sensitivity of the household sector to interest rate changes is not necessarily a major concern if central banks factor the increased potency of monetary policy into their interest rate decisions. If this occurs, it implies that interest rate cycles may have a smaller amplitude than in the past (for a given set of shocks), particularly in those countries with predominantly variable-rate mortgages.

Declines in house prices

Increased indebtedness (and increased home ownership) means that the household sector is potentially more exposed to falls in house prices. The effect of house price falls are difficult to examine in isolation, as it will, in large part, depend on the environment in which house prices are falling. The higher level of household indebtedness may be a significant macroeconomic and financial problem to the extent that it increases the likelihood that house price falls result in negative equity. The probability of negative equity will depend on, inter alia, the loan-to-valuation ratio applied by the lending institution, the age of the mortgage (the older the mortgage, the more principal that has been repaid) and the extent of the house price fall. Borio and McGuire (2004), Case and Shiller (1990) and Hendry (1984) document the strong autocorrelation in house price movements, although this auto-correlation was estimated over a sample where indebtedness was considerably lower than current levels.

Notwithstanding this, household financial distress need not increase when house prices fall, as it is primarily a function of the household's ability to service the mortgage. This is determined by the interest rate on the mortgage and the household's income rather than by the value of the house itself.

In the current environment of lower interest rates, the primary impact of a fall in house prices might be lower consumer confidence and reduced household spending, exacerbated by a turnaround in housing equity withdrawal. Again this may depend more on the net, rather than the gross, financial position of households. An impact of this sort has been observed in the Netherlands (discussed in more detail in Section 6), where only a slowdown (not a fall) in house prices was associated with declining consumption.

Housing equity withdrawal

One aspect of the increase in household indebtedness which has had a marked impact on the macroeconomy has been the growing tendency of households to extract equity from the value of their houses to finance consumption or the purchase of other assets. This process of housing equity withdrawal has played a role in boosting consumption in a number of countries in recent years, most notably the United States, the United Kingdom, Netherlands, Australia and Ireland. In the Netherlands, after providing a substantial boost for some time, this effect has recently been experienced in reverse. A significant decline in equity withdrawal has acted as a major drag on the economy over the past two years (Netherlands Bank (2003)).

Housing equity withdrawal can be measured as the difference between net borrowing by households secured against housing and spending by households on housing assets. The latter can take the form of either spending on new housing or upgrades to the existing housing stock (ie renovations). Households are extracting equity from the value of the housing stock when borrowing exceeds the spending on the housing stock, and are injecting equity when spending on the housing stock exceeds borrowing. Some definitions of equity withdrawal exclude spending on home improvement from the calculation, thus treating it as a use of equity withdrawal, even though it is increasing the value of the housing stock equiproportionately.

The ability of households to extract equity has been considerably enhanced by the greater availability of products such as home equity loans, and the lower transactions costs of using those products. Some products effectively provide a revolving credit line for households, secured against the house. This is particularly the case with flexible-rate mortgages. With fixed-rate mortgages, the decline in transactions costs associated with refinancing, most notably in Denmark and the United States, the decline in mortgage rates in recent years, and rising house prices have provided households with the incentive to access home equity at the time of refinancing.

In addition to extracting equity by increasing the mortgage against a household's existing property, households (most notably retirees) can also extract equity when trading down. That is, a homeowner moves to a cheaper residence but reduces the mortgage by less. For example, a retiree may sell their existing property on which there is no mortgage, and use some of the proceeds to finance current consumption.

Housing equity withdrawal need not occur only when house prices are rising. All that is required is that homeowners have a positive equity share in their homes greater than the minimum amount of collateral the financial institution requires for the loan. However, housing equity withdrawal may be more likely to occur in an environment of rising house prices for at least two reasons. First, households are less concerned about the possibility of negative equity when prices are rising than when prices are falling. Second, as discussed above, rising house prices may be associated with expectations of higher labour income in the future. Hence, housing equity withdrawal is one of the transmission channels for the effect on consumption of rising housing wealth (although see Box 1). This wealth channel allows households to use the collateral in the home to smooth the path of consumption over the life-cycle.

The effect of an increase in expected future income may be relatively quickly reflected in higher house prices, to the extent that spending on housing has an income elasticity greater than one. If income is expected to be higher in the future than previously anticipated, then the greater demand for housing services will translate into a higher discounted value of housing services and hence higher housing prices today. The impact on house prices may be quite large given the relatively long life of housing assets.

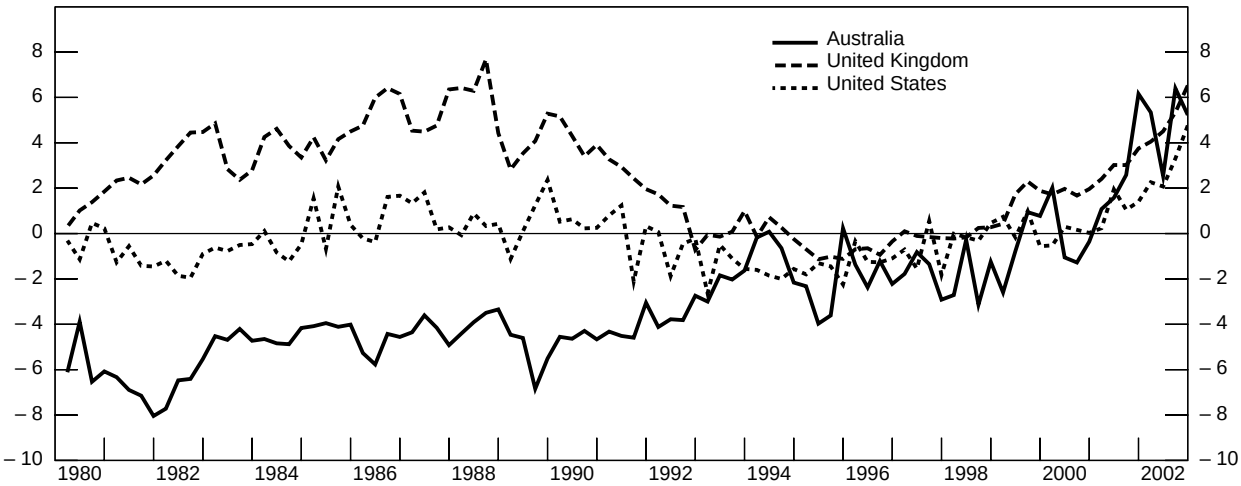
The equity extracted from the housing stock can be used for a number of purposes: increasing consumption spending on durables or non-durable goods and services; repaying or substituting for other forms of debt; purchasing other assets such as shares or bank deposits. As interest rates on debt secured against housing are generally lower than interest rates on all other forms of household borrowing, there is a large incentive for households to consolidate other forms of borrowing into their mortgage. In particular, equity withdrawal may be used to finance durable goods consumption such as the purchase of motor vehicles, which would otherwise be financed by borrowing at interest rates markedly higher than mortgage rates.

Canner et al (2002) estimated that in 2001 and 2002, around one quarter of funds extracted from the value of the US housing stock through mortgage refinancing were used to repay other debts (although this happened in over half of the refinancing transactions), 16% was spent on consumption including on durables such as automobiles, 10% was invested in the stock market or in other financial instruments, 10% in businesses or other real estate, while one third was spent on home improvement. As noted above, spending on home improvements is not strictly withdrawing equity from the housing stock as it should increase the value of the housing stock one for one. Nonetheless, in terms of the effect on economic activity, spending on home renovation financed by equity withdrawal will boost the level of dwelling investment in an economy. The incentive to spend on home renovations is likely to be higher when house prices are rising both because the return to housing investment is higher and because households may be unable to afford to trade up and hence decide to take the cheaper option of upgrading their existing dwelling.

Housing equity withdrawal has boosted both consumption and dwelling investment in those countries where it has been prevalent. In Australia, it is estimated to have increased household disposable income and thereby consumption growth by around 1 percentage point in each of the past four years (Reserve Bank of Australia (2003a)), while in the United Kingdom and the United States, equity withdrawal boosted household incomes by over 2% in 2000 (Davey (2001) and Deep and Domanski (2002)). Estimates of equity withdrawal for Australia, the United Kingdom and the United States are provided in Graph 7. In the opposite direction, the reversal of this process is estimated to have reduced growth in household consumption in the Netherlands by around 0.5 percentage points in both

2001 and 2002, having raised it by 1 percentage point in 2000 (Netherlands Bank (2003)). The role of equity withdrawal in the Netherlands and the United States is discussed in more detail in Section 6.

Graph 7 **Housing equity withdrawal[1]**



[1] As a percentage of household disposable income.

Sources: Bank of England; Federal Reserve Board; Reserve Bank of Australia.

It is important to note that to continue to boost consumption, the amount of equity extracted each period needs to continue to rise at the same rate. That is, the level of equity withdrawal must keep increasing to maintain the pace of household income growth and hence consumption growth. Simply maintaining the level of housing equity withdrawn constant will reduce consumption growth as the boost to household income declines.[21] Such a slowdown in equity withdrawal could occur even with stable interest rates.

Despite the equity withdrawal that has taken place in these countries in recent years, the ratio of debt to assets remains low. But while there is still a considerable amount of equity that could potentially be extracted, it is also possible that, if house prices were to flatten out or fall, households would reduce the amount of equity being extracted or even revert to injecting housing equity. Hence the boost to household income and consumption provided by equity withdrawal could diminish or conceivably reverse were households to reassess the outlook for house prices, household income or interest rates. The Netherlands experience described below illustrates that house prices need only slow, not fall, to reduce the boost to the economy from this source.

6. Country experiences

This section reviews three episodes where household borrowing has had a marked effect on macroeconomic outcomes, illustrating some of the arguments made in Section 5. The first is the experience of the Nordic countries and the United Kingdom, where a rapid increase in household borrowing boosted economic growth and contributed to a house price boom in the late 1980s, but then increased household indebtedness exacerbated the economic slowdown of the early 1990s. The second episode is the experience of the Netherlands where equity withdrawal provided a significant boost to consumption for a number of years but subsequently exerted a contractionary force on the

[21] More precisely, one can think of equity withdrawal each period providing a supplement to household income obtained from other sources such as wages. Hence growth in total disposable income will depend on the growth rates in the two components. If growth in equity withdrawal slows, then disposable income growth will slow ceteris paribus.

economy when the pace of withdrawal slowed. Finally, the experience of the United States economy in the 2001 recession is discussed where household borrowing helped sustain spending on consumption and housing investment despite the deterioration in the overall macroeconomic environment.

The Nordics and the United Kingdom in the early 1990s

Finland, Norway, Sweden and the United Kingdom all experienced large and rapid growth in household borrowing together with a rapid rise in house prices in the mid to latter part of the 1980s (Table 10, Graph 8).[22] This contributed to strong consumption growth and a marked decline in the household savings rate. In the early 1990s each economy suffered a recession with varying degrees of severity (the decline in Norway was a little earlier). House prices fell significantly, loan default rates rose and the financial sector was significantly distressed (although in most countries, the latter was at least as much a result of excessive lending to the corporate sector and for commercial property). The magnitude of the macroeconomic impact was significantly influenced by the changes in the indebtedness of the household sector.

Table 10

Boom and bust in the Nordic countries and the United Kingdom

Annualised change over the period, in per cent

Boom	**Finland**	**Norway**	**Sweden**	**United Kingdom**
	March 1986–March 1990	**March 1984–March 1988**	**March 1986–March 1990**	**June 1985–June 1990**
Credit growth	17.9	16.3	21.0	18.9
House price growth	15.4	n.a.	15.7	14.9
GDP growth	4.5	3.6	2.7	3.4
Consumption growth	3.8	3.6	2.8	5.1
Change in unemployment rate[1]	–2.8	–1.6	–1.3	–5.1
Bust	**June 1990–March 1994**	**June 1988–June 1990**	**June 1990–Dec 1993**	**Sep 1990–March 1993**
Credit growth	–1.5	–8.0	–8.7	6.5
House price growth	–9.3	n.a.	–3.2	–2.9
GDP growth	–3.1	0.7	–1.2	–0.3
Consumption growth	–2.4	–1.5	–1.0	0.0
Change in the unemployment rate[1]	14.9	2.6	7.2	4.7

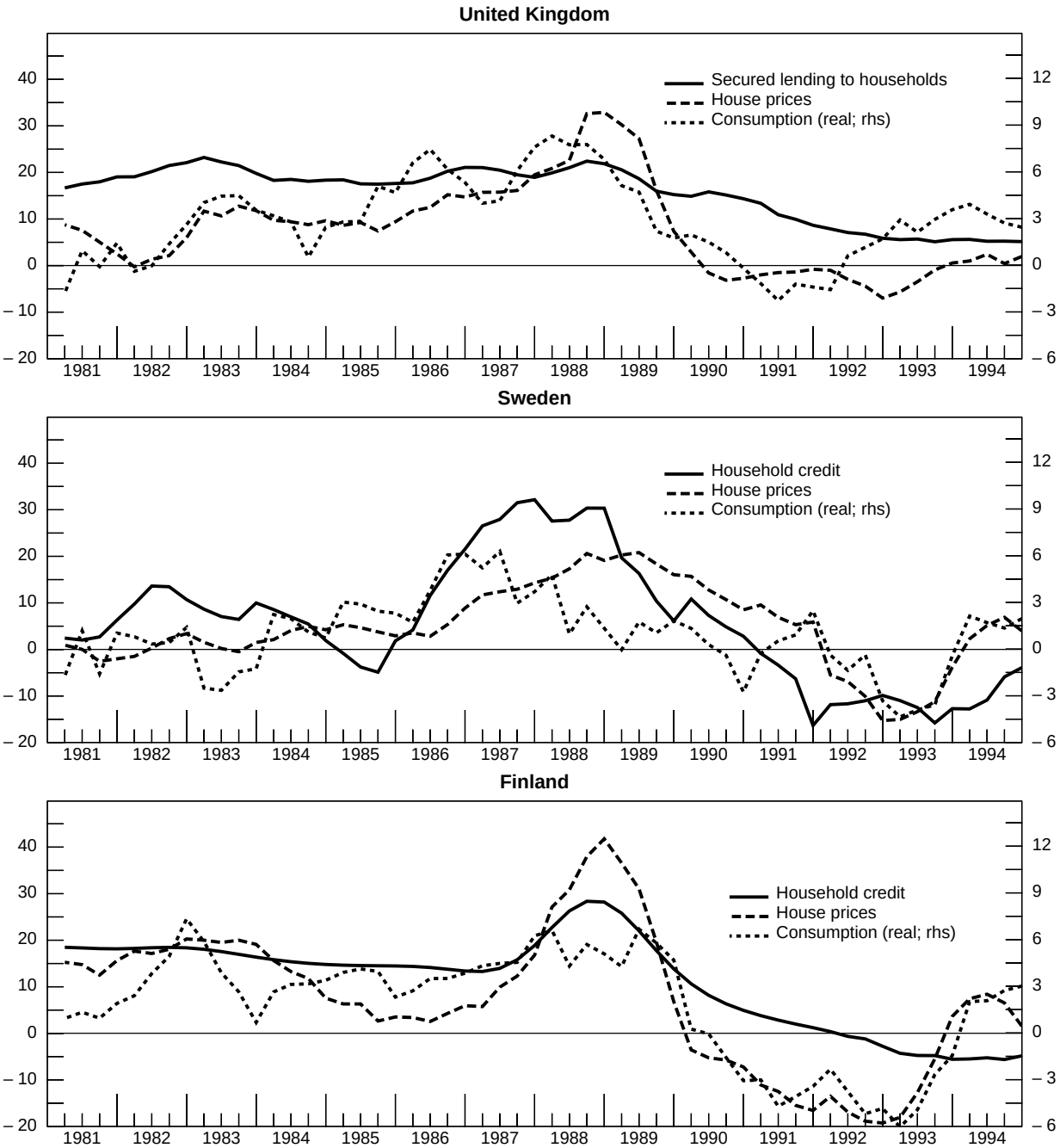
Note: The peak in real GDP is used to identify the transition from boom to bust. The end of the bust is dated by a peak in the unemployment rate.

[1] In percentage points.

Sources: national central banks; BIS; author's calculations.

[22] Denmark experienced a less dramatic version of this set of events around the same time.

Graph 8 **House prices, credit and consumption in the United Kingdom and the Nordic countries[1]**



[1] 4-Quarter-ended change, in percentages.

Source: National data.

The increase in household borrowing that occurred in each country in the 1980s can be attributed to the combination of a number of factors. First, prior to the 1980s, the financial system was heavily regulated. There was significant rationing of credit to households, resulting from either direct limits imposed by the authorities on financial institutions in terms of the amount of lending to households or indirect limits caused by ceilings on lending and deposit rates. Financial liberalisation during the first half of the 1980s substantially reduced the extent of credit rationing.[23] In addition to the removal of interest rate ceilings and quantitative lending restrictions, ceilings on loan to valuation ratios were removed in some countries. These actions boosted competition in the lending market. Moreover, at the same time, competition in the financial system increased due to the relaxation of entry restrictions for foreign financial institutions and/or the removal of restrictions on lines of business that existing financial institutions could undertake. As a result, new financial institutions aggressively sought business to which the incumbent institutions responded – in many cases with laxer internal prudential standards (Drees and Pazarbasioglu (1998)).

In the Nordic countries, domestic financial institutions were also allowed direct access to global capital markets. These institutions were then able to finance the expansion in their balance sheets without increasing their funding costs as much as would have been the case had they access only to the pool of domestic savings.

As an indication of the reduction in credit rationing that occurred following financial deregulation, the proportion of British households with mortgages rose from 33% in 1980 to 42% in 1992.[24] As mentioned above, Bayoumi (1993) estimated that the share of households that were liquidity constrained in the United Kingdom fell from 60% to 30%.

A second factor contributing to the increase in borrowing was the interaction of inflation with the tax system. The relatively high inflation rate in each country was associated with high nominal lending rates. However, the tax deductibility of mortgage interest payments significantly reduced the real after-tax cost of borrowing, to such an extent that it was negative for much of the second half of the 1980s. In Finland, Norway and Sweden, mortgage interest payments were fully tax deductible and marginal tax rates were at a high level – for example 80% in Sweden[25] – while in the United Kingdom, the first £30,000 of a mortgage was tax deductible. Thus, as an example, the nominal mortgage rate in Sweden in 1983 was 14%, inflation was 11% and the top marginal tax rate was 80%, implying a real after-tax borrowing rate of around *minus* 8%.

Thirdly, while the rapid growth in lending to both households and businesses imparted significant stimulus to the economy, there was initially little substantive macroeconomic response. In some cases, the ability of monetary policy to adjust was constrained by the presence of a fixed exchange rate regime. However, generally, policymakers and other observers appear to have been surprised by the expansionary impulse. Smith et al (1994) and Church et al (1994) provide evidence that econometric models in use at the time in the United Kingdom substantially under-predicted consumption in the boom period, and also failed to predict the extent and length of the decline that occurred during the recession (see also King (1994)). In the case of prudential policy, ex post, it also appears there was insufficient recognition of the impact of financial deregulation on the behaviour of lending institutions (Koshenkyla (1994)).

Fourthly, the favourable macroeconomic environment that existed in the second half of the 1980s encouraged households to revise their expectations of future income growth upwards. This increased the incentive of households to borrow against their higher lifetime wealth and, given the deregulated financial environment, they were now better able to do so. Moreover, it appears that financial institutions shared this more optimistic assessment of the economic outlook and hence were willing to supply the finance on that basis.

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[23] Drees and Pazarbasioglu (1998) summarise the changes in financial system the Nordic countries; see also Berg (1994), Brunila and Takila (1993), Englund (1990), Nyberg and Vihriala (1994). Muellbauer and Murphy (1990) discuss the changes in the United Kingdom.

[24] Some part of this rise was also attributable to the program of privatisation of the rental housing stock owned by local councils that occurred in the second half of the 1980s.

[25] Around the middle of the 1980s, the tax deductibility of interest payments was reduced in Sweden to 50%.

Finally, the rapid expansion in credit, combined with a very slow adjustment of the supply of housing, resulted in large increases in house prices of around 15% per annum in the second half of the 1980s (Table 9). This allowed the household financial accelerator to operate (see Section 2), as rising house prices encouraged households to borrow against their increased equity in their homes to fund current consumption (Brunila and Takala (1993), Muellbauer and Murphy (1990)). Again, financial institutions were willing to provide finance against this seemingly valuable and safe collateral.

There has been some debate, particularly in the United Kingdom, about how much of the increase in borrowing in these countries was caused by financial liberalisation interacting with the boom in house prices, and how much can be attributed to an increase in expectations of future income. Muellbauer and Murphy (1990) argue that much of the borrowing and the associated decline in household saving in the United Kingdom resulted from financial liberalisation and lax macroeconomic policy, fuelling a self-perpetuating asset price boom. In discussing this paper, King (1990) and Pagano (1990) both put much greater weight on the role of changes in household expectations of future income growth. In a similar vein, while acknowledging that financial liberalisation and the favourable tax treatment of borrowing for house purchase played the prominent role in Finland, Nyberg and Vihriala (1994) argue that the large rise in Finland's terms of trade from 1986–89 caused Finnish households to raise their expectations of future income growth (see also Brunila and Takala (1993)).

To test these two competing hypotheses, Attanasio and Weber (1994) use disaggregated data on consumption and saving behaviour of British households. They find that the combination of financial liberalisation with higher income expectations played the major role in the consumption boom, as younger households, who would tend to be most affected by this change, increased their consumption the most. They find some evidence that rising house prices boosted consumption but argue this channel was significantly smaller.

In summary, the experience in each country in the boom period can be characterised in the following manner. The liberalisation of financial markets led to a rapid expansion in household (and corporate) borrowing, as liquidity constraints were eased. The expansion in borrowing was encouraged by the favourable tax treatment of borrowing for housing, interacting with high inflation. The willingness of households to borrow and financial institutions to lend was further enhanced by the favourable macroeconomic environment, which helped to generate optimistic expectations about future income. Macroeconomic policies were initially loose, in part, because of an underestimation of the boost to demand from financial liberalisation. The surge in borrowing contributed to rapid rises in house prices and boosted the wealth of existing home-owners. All of these influences interacted with each other to further boost consumption and domestic demand. The associated reduction in household savings resulted in an appreciable widening of the current account deficit in each country.

Reflecting the brisk pace of domestic demand, inflation started to rise in each country, and house prices continued to rise at a rapid pace. In response to the increasing signs of overheating in the domestic economy, monetary policy was eventually tightened in every country through the latter part of the decade. Nominal lending rates increased in line with the rise in the policy interest rate. As the economies began to slow, inflation started to decline leading to further rises in the real cost of borrowing.

At the same time, tax reforms further boosted the real after-tax cost of borrowing. In Sweden, Norway and Finland there were large reductions in marginal tax rates in the late 1980s. In part as a direct response to concerns arising from the developments in the housing market, the tax deductibility of interest payments was reduced to 30% in Sweden, 28% in Norway and 25% in Finland. In the United Kingdom, it was announced that interest deductibility was to be phased out over 10 years from 1991. To reuse the example from above, the mortgage rate in Sweden in 1992 was 12.5%, inflation was 2% and tax deductibility was capped at 30% implying a real after-tax rate of *plus* 7%. The deductibility of interest payments had probably been capitalised in house prices in each country, so in addition to increasing the effective cost of borrowing, the reduction of the tax deductibility added to the downward pressure on house prices.

In the second half of the 1980s, each country had also experienced a commercial property bubble, and more generally excessive lending to the corporate sector, which began to collapse around 1990. This provided an additional contractionary force not only through its direct influence on business investment spending and hiring decisions but also indirectly through its effect on the stability of the financial system. Loan losses in the banking system peaked at 6% of total loans in Norway in 1991, 4.7% in Finland in 1992 and 7% in Sweden in 1992 (Drees and Pazarbasioglu (1998)), with the largest

part of these bad loans located in the corporate sector. For example, Brunila and Takala (1993) report that loan losses to households were around one quarter of total defaults in Finland.

Finally, a number of other exogenous macroeconomic shocks hit the economies. All the economies were affected to varying degrees by the downturn in the global economic cycle. The Finnish economy was hit by two negative external shocks: a large decline in export demand following the break-up of the Soviet Union and a decrease in its terms of trade from 1990. Similarly, the decline in oil prices in 1986 had a large contractionary effect on the Norwegian economy. These shocks together with the downturn in the domestic economy probably caused households to reassess their optimistic expectations of future income growth and to substantially revise their expectations downward.

Thus each economy was hit by a number of contractionary influences simultaneously from three sources: external, internal and financial. A recession resulted in each country and unemployment rates rose sharply. GDP declined in Finland by 14¼% from peak to trough, by 6¼% in Sweden and by 2½ in the United Kingdom. In response to the increased cost of borrowing and the downgrade of future income prospects, growth in household borrowing slowed considerably in the United Kingdom to near zero, while in Finland, Norway and Sweden, the level of household debt declined, with the fall in Finland reaching well over 10%. House prices also fell, with the measured decline ranging from 12% in the United Kingdom to 40% in Finland. Reflecting the reduction in borrowing, as well as the rise in unemployment and the consolidation of the household balance sheet, consumption spending slowed markedly in each country, and generally contracted.

What role did the large rise in household indebtedness play in the subsequent bust?

First, the surge in borrowing certainly boosted house prices. Some part of the rise in asset prices was warranted, given the removal of financial constraints on households, but it appears probable that house prices overshot their fundamental value while adjusting from one equilibrium level to another. In the absence of financial deregulation, it is arguably the case that households would not have been able to borrow as much, which would have limited the degree of overshooting in house prices that occurred and therefore also the size of the subsequent decline.

The fall in house prices also exacerbated the extent of the downturn. It is possible that the decline in house prices may not have had as large an economic impact if it had occurred in isolation. However, whether such a fall could in fact occur in isolation from other developments is difficult to determine. The large increase in the incidence of negative equity combined with rising unemployment and markedly higher service costs contributed to a debt-deflation spiral. Some households who decided it was prudent to reduce their indebtedness did not have the option of trading down or renting, because the value of their mortgage exceeded the value of their property (Smith et al (1994)). This had the effect of constraining consumption expenditure, as a large share of income was required for debt service payments, as well as substantially reducing the ability of households to move from depressed labour markets in search of more favourable employment prospects. The increased indebtedness of households increased the potency of this channel and the likelihood of negative equity.

Secondly, the rapid increase in borrowing also provided an unexpectedly large boost to domestic demand, through both consumption and housing investment spending, which led to inflationary pressures and necessitated a macroeconomic response which was delayed in coming. Thus it could be argued that it was the *speed* of the increase in household borrowing rather than the *level* of indebtedness itself which contributed most to the macroeconomic fallout.

Thirdly, the primary role of the higher level of household indebtedness was arguably in amplifying the transmission of other shocks.[26] With a higher level of indebtedness, the household sector was more vulnerable to a rise in unemployment, a rise in interest rates, and a revision of expectations of future income. As it turned out, all three of these developments materialised in each country, both as a result of exogenous shocks and the endogenous policy response to the overheating domestic economy.

[26] In this regard, mortgages in some of these countries were denominated in foreign currency. As the exchange rate depreciated, this further exacerbated household balance sheet problems.

The Netherlands, 1994–2003

Housing equity withdrawal has had a significant impact, both positive and negative, on the Dutch economy over the past five years or so (Table 11), and hence serves as a useful case study of the role of the effect of housing equity withdrawal on the macroeconomy. The Dutch experience is also interesting to examine as the Dutch household sector is amongst the most indebted in developed countries.

Table 11

Housing equity withdrawal in the Dutch economy

Country	1998	1999	2000	2001	2002	2003
Contribution to domestic expenditure (in bns of euro)	3.1	6.8	9.9	4.5	4.7	5.0
Contribution to GDP growth (in percentage points)	0.5	1.0	1.1	–0.5	–0.5	–0.3

For 2003, based on the first six months of the year.

Source: Netherlands Bank (2003), Table 2, p 45.

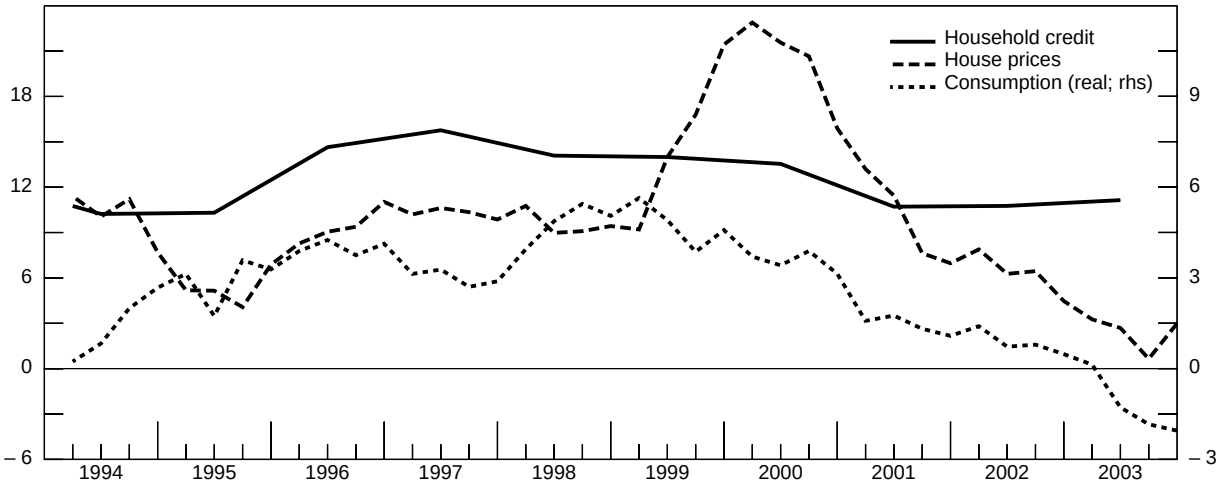
Household credit grew at an annual rate of around 14% over the period 1994–99. The bulk of the borrowing was for the purchase of housing. The causes of the fast pace of credit growth was similar to that in the Nordic countries and the United Kingdom. The macroeconomic environment was favourable: GDP growth averaged just under 4%, the unemployment rate declined and mortgage interest rates were relatively low. Home-ownership rates rose significantly. In addition there was financial innovation in the form of new mortgage products and a relaxation of lending criteria by banks (Netherlands Bank (2000a)).

The financial innovations were designed to take advantage of the tax deductibility of mortgage interest payments by maximising the principal on which interest is paid. These new mortgage products included savings-linked or investment-based mortgages where the principal is not paid down over the life of the mortgage. Instead, the mortgage-holder makes payments into a separate savings account which earns interest or an investment account where the funds are invested in the stock market. The mortgage-holder uses this investment to accumulate funds to repay the principal and retains any excess earnings on the investment above that required to pay the principal. Thus the payments are effectively principal but are not treated as such for tax purposes. This means that the financial situation of Dutch households is somewhat misrepresented relative to other countries if one focuses only on the gross level of household debt. A more comparable measure would net out the balances accumulated in the savings account. These products have been particularly popular. Recent estimates suggest that 90% of mortgages do not involve the direct repayment of principal during the life of the loan (van Els et al (2003)). Over 40% of mortgages are interest only, while savings-based or investment mortgages account for another 49% (Netherlands Bank (2002)).

The relaxation of lending criteria took a number of forms. The maximum debt-service ratio was increased, and other forms of household income were included in the assessment by the financial institution of the household's ability to repay. Financial institutions also eased constraints on the maximum LVR, such that in 2001–02, 75% of loans issued had LVRs in excess of 100% – so-called "top-up" mortgages – compared with less than 40% prior to 1995 (van Els et al (2003)). The ceiling on debt service rather than the size of the loan became the binding constraint on household borrowing.

The rapid growth in credit combined with a very low elasticity of supply of housing and demographic factors generated strong growth in Dutch house prices over the same period (Graph 9). House price growth peaked at over 20% (in year-end terms) in 1999. The rise in house prices, strong growth in household income and favourable prospects for future income growth together with the relaxation of lending criteria, encouraged home-owners to borrow against their increased housing equity: in 1999,

Graph 9 House prices, credit and consumption in the Netherlands[1]



[1] 4-Quarter-ended change, in percentages.

Source: National data.

56% of new mortgages were not associated with a housing transactions (Netherlands Bank (2000b)). Table 11 provides an estimate of the extent of equity withdrawal that took place and the boost to the economy that it provided in 1998, 1999 and 2000.

Given the significant impact that equity withdrawal has had on the macroeconomy, the Netherlands Bank commissioned a regular survey of Dutch households on the factors affecting their decision to withdraw equity and the uses to which they have put it.[27] 70% of the funds extracted were re-injected into the housing stock in the form of home renovations (thus this is not exactly the same definition of equity withdrawal used in Section 5). The desire for home renovation is likely to be a function of the rise in house prices, as higher house prices increase the return to spending on renovation but also reduce the ability of home-owners to trade-up to better dwellings. Of the remaining funds, only around 6% was used to reduce other more expensive forms of borrowing. 10% was used to finance investment in financial assets, as the favourable tax treatment of mortgage interest payments implies that housing equity is a cheap source of investment funding (although, since 2001, deductions of interest are not allowed for any use of funds obtained from a new mortgage not spent on the house itself). Finally, around 8% was spent on consumption.

Unlike the experience in the Nordic countries and the United Kingdom described above, Dutch households continued to increase their borrowing during the economic slowdown that occurred in 2001–03. The rate of credit growth slowed a little, while house price growth slowed more sharply but remained positive. One critical difference between the two episodes is that interest rates in the Netherlands only rose by a relatively small amount in both real and nominal terms. Households were able to partially smooth consumption spending through the economic downturn by borrowing because servicing costs remained at relatively low levels. The effect on debt service of rising interest rates was also reduced because of the prevalence of fixed-rate mortgages in the Netherlands. However, the decline in interest rates in 2001–03 has encouraged greater use of variable rate mortgages, which have risen from 8% to 15% as a share of new mortgages issued. It has also resulted in a reduction in the standard fixed period of a mortgage from 10 years to five years or less. As a result, Dutch households are now more sensitive to future increases in the interest rates from their current historically low levels.

While household borrowing continued to increase over the past three years, the gradual slowdown in credit growth that occurred in 2001–03 reduced the boost to income arising from equity withdrawal, and imparted a substantial negative impulse to the economy. This illustrates the important point that to

[27] The results of this survey are reported in van Els et al (2003) and Netherlands Bank (2000b, 2002).

continue to provide a net stimulus to the economy, the amount of equity extracted each period must continue to grow. Even though households continued to withdraw equity in 2001, the fact that the equity withdrawn was less than that which occurred in 2000 reduced household spending. Partly because of this effect, growth of aggregate consumption spending declined considerably in 2001 despite income tax cuts.

The slowdown in equity withdrawal may have been related to a change in sentiment about the housing market. Other possible explanations include a small rise in mortgage interest rates, and the possibility that Dutch households had mostly exhausted the need to upgrade their homes or purchase a new car. The rate of house price increase slowed from over 20% per annum to single digit rates of increase. This cooling, rather than collapse, in the housing market was still sufficient to have a sizeable macroeconomic impact, illustrating the point that asset prices do not need to fall to cause households to reassess the structure of their balance sheets.

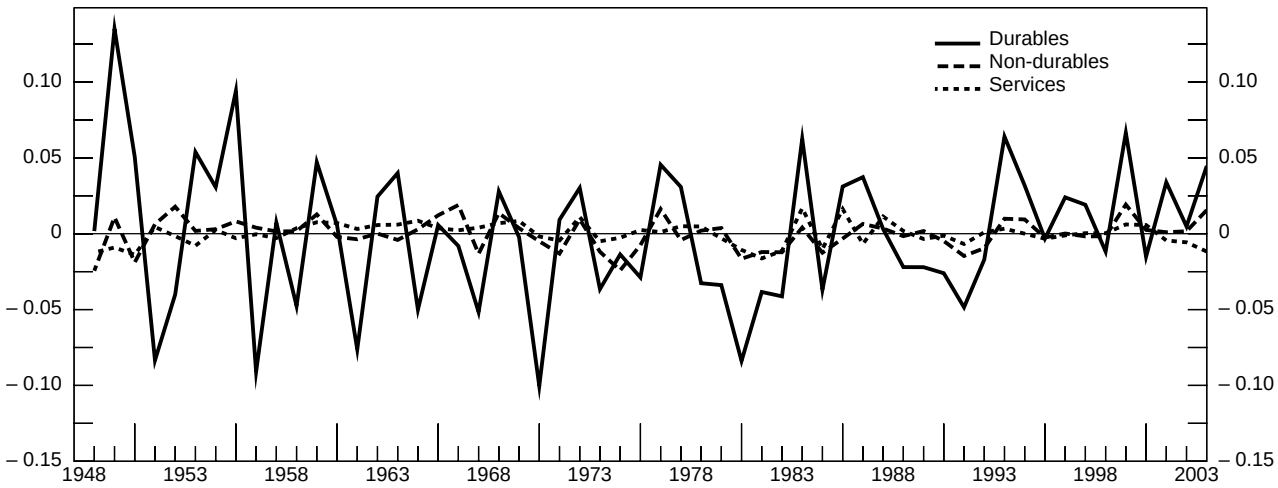
In summary, the increased indebtedness of Dutch households per se did not significantly exacerbate the downturn in the economy that occurred (at least thus far). However, the fact that much of the borrowing had taken the form of equity withdrawal had a marked influence on the macroeconomy as the pace of withdrawal slowed. The nature of the borrowing increased the sensitivity of the economy to any reassessment by households of the outlook for household income and house prices.

US households in the 2001 recession

A notable feature of the 2001 recession in the United States has been the resilience of consumer spending, particularly in comparison to the 1990–91 recession where sub-par growth in consumption spending was a prominent feature. One factor behind this outcome appears to have been the willingness of households to borrow to smooth consumption spending during a period of low income growth. In particular, US households have taken advantage of the low cost of borrowing to refinance their mortgages and, in the process, extract housing equity to fund consumption. The level of indebtedness of US households has not amplified the negative shock to the economy; instead debt has been used to help smooth the effect of the shock.

Evidence confirming the resilience of consumption spending in the recent episode can be obtained by updating the analysis of the 1990–91 recession by Hall (1993). Hall estimated a version of his Euler equation model of consumption described above, regressing consumption on disposable income. He showed that the residuals in this equation were positive in the late 1980s but negative in 1991, and

Graph 10 **Hall regression for the United States[1]**



[1] Consumption residuals.

Source: Author's calculations.

that this sharp turnaround in consumption accounted for a sizeable part of the downturn in growth. Blanchard (1993) reached a similar conclusion using a VAR estimate. Graph 10 shows the outcome of updating Hall's exercise for the various forms of consumption spending.[28] It shows the large negative residuals in each of the regressions during the recession of the early 1990s (as well as the early 1980s recession). For the recent recession, the residuals are positive for durables and non-durables consumption but negative for services consumption spending. That is, spending on durables and non-durables is stronger than would be expected given the growth in household disposable income, but spending on services is weaker.

What have been the major differences between the two episodes which can explain this difference in consumption behaviour? Why have households opted to borrow to smooth consumption in the current episode but not in the early 1990s?

A possible explanation for the difference is the large tax cuts that were instituted in 2001, but the effect of these should be captured in the measure of disposable income used in the regression. Another possibility is the role of the incentives, such as zero-cost financing, that were offered to households on the purchase of durable goods, particularly automobiles. Consumer confidence also collapsed sharply early in the 1990s episode, associated with the first Gulf war and the rise in petrol prices.

One important difference between the two episodes is the path of interest rates. Interest rates rose by significantly less prior to the 2001 recession than they did prior to the early 1990s recession, and have remained at very low levels subsequently. Hence debt service levels have remained low despite the increase in borrowing that has occurred. The cost of mortgage refinancing is also much lower now than it was in the early 1990s. Together these two factors have encouraged households to exercise the call option on their fixed rate mortgages and refinance at lower rates, further reducing debt service levels. In the process of refinancing, many households have taken the opportunity to withdraw equity from their houses to smooth consumption (Canner et al (2002)). In a similar vein, McConnell et al (2003) argue that the cheaper cost of housing equity withdrawal has encouraged households to substitute towards this source of finance away from more expensive personal loans. The equity withdrawal has not necessarily boosted consumption much above what would be expected given the path of income, but, unlike in previous recessions, it has helped prevent a marked slowdown in consumption.

The willingness of households to withdraw equity has been further boosted by the strength of house prices through the recent downturn. While there have been declines in house prices in some cities, particularly those that had experienced the most rapid rises, aggregate measures of house prices have continued to rise by over 5% per annum. In contrast, in the 1990–91 recession, aggregate house price growth was flat with some particularly large declines in some markets.

One possible explanation for both the resilience of house prices and the prevalence of equity withdrawal in the recent episode is that households have not significantly changed their optimistic assessment of future income growth (Case and Shiller (2003)). The strong growth rates of the economy in the late 1990s and the marked pick-up in productivity growth may have prompted households to upgrade their outlook for income growth. As productivity growth has continued at a fast pace through the recession, households may not have substantively downgraded their longer-term outlook, despite the recession and the rise in the unemployment rate. While the movements in consumer sentiment provide some contrary evidence, the willingness of households to borrow to fund consumption provides support for this conjecture.

The experience in the United States illustrates the role that household borrowing can play in allowing households to maintain their consumption spending in the face of adverse shocks to the economy. However, as the experience in the Netherlands shows, consumption spending supported by housing equity withdrawal is vulnerable to any reassessment by households of either the future paths of house prices or household incomes. Any desire by households to consolidate their balance sheets would result in at least a levelling off in the level of equity withdrawal, if not a decline, thereby subtracting from consumption growth. If this were to occur at a time when the recovery in the rest of the economy was well-established then the macroeconomic impact may be more easily absorbed. But if it were to

[28] The log of consumption spending is regressed on its lag and the contemporaneous and lagged value of household disposable income, using annual data since 1948.

occur in response to a shock which hindered the economic recovery, the turnaround in consumption spending could significantly magnify the initial negative impulse.

The household sector in the United States is not particularly vulnerable to an increase in mortgage rates from their current low levels because of the predominance of fixed-rate mortgages, but a rise in rates may prompt a marked decline in refinancing and, as a consequence, a slowdown in equity withdrawal. The pace of refinancing has proven to be sensitive to movements in longer-term Treasury yields and after the rapid pace of refinancing seen in recent years, most mortgagees may already have exercised their call option. That said, the ratio of debt to the value of the housing stock still remains at a low level, suggesting there remains plenty of scope for households to extract further equity should they so desire.

Fixed-rate mortgages and the prevalence of mortgage securitisation have transferred the interest rate exposure away from households and lending institutions to the end-holders of the securitised product. To the extent that these end-holders are pension funds, households are still ultimately bearing the risk. However, as discussed in Section 5, changes in the value of pensions through this channel are likely to have a considerably more diluted impact on consumption than the immediate changes in debt-service associated with a variable rate mortgage. Households in the United States have increased their take-up of variable rate mortgages or hybrid mortgages,[29] but in aggregate are still much less exposed to rises in mortgage interest rates than countries such as the United Kingdom.

7. Conclusion

The rise in household debt that has occurred over the past two decades reflects the response of households to lower interest rates and an easing of liquidity constraints. This is likely to have allowed households to achieve a more desirable path for lifetime consumption. However, the increased indebtedness has heightened the sensitivity of the household sector to changes in interest rates, income and asset prices. This is particularly the case in countries with mainly variable-rate mortgages, where the household sector bears the risk of fluctuations in policy interest rates. In countries with more fixed-rate mortgages, the household sector is shielded from the direct effects of policy interest rate changes, with this risk being borne instead by the end-holder of the securitised mortgage. Hence the macroeconomic effects of greater indebtedness in these countries will be somewhat muted. If central banks factor these larger effects into their interest rate decisions, it is possible that the amplitude of policy interest rate cycles will be lower than in the past (ceteris paribus).

A related phenomenon has been increased borrowing by existing mortgage holders against their housing equity to finance consumption. This has helped to maintain consumption through the recent global slowdown. However, the experience of the Netherlands illustrates that any slowing or reversal of this process, which may result from a deceleration in house price growth, can also have a substantial negative impact on the macroeconomy.

Increased household indebtedness, in and of itself, is not likely to be the source of a negative shock to the economy. Rather the primary macroeconomic implication of higher debt levels will be to amplify shocks to the economy coming from other sources, particularly those that affect household incomes, most notably rises in unemployment. Similarly, the easing of liquidity constraints and greater indebtedness has heightened the sensitivity of consumption spending to changes in income expectations, thereby potentially increasing the volatility of consumption spending.

The macroeconomic effects of greater indebtedness will depend crucially on the distribution of the debt (and assets) across the household sector and the nature of the shock to the economy. The effects will depend on whether or not the increase in aggregate indebtedness reflects increased borrowing by those households who are best able to bear the risk of changes in interest rates or who are less exposed to the risk of unemployment (for example). Unfortunately, less is known about the distribution of debt, debt service and asset holdings in many countries.

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[29] These mortgages are generally shorter than the standard 30-year mortgage, often with a life of around five to seven years. They involve a combination of a fixed mortgage rate for an initial period of four to five years and then floating rate thereafter. They may be a more attractive product than the standard 30-year mortgage, given the tendency of households in the United States to change residence within 10 years.

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