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Household debt and the macroeconomy[1]

Lower interest rates and an easing of liquidity constraints have led to a substantial rise in household debt over the past two decades. The greater indebtedness has made the household sector more sensitive to changes in interest rates, income and asset prices. This enhanced sensitivity is higher where more households have variable instead of fixed rate mortgages.

JEL classification: E210, E520.

Household borrowing has increased considerably in a number of developed countries over the past two decades, both in absolute terms and relative to household incomes. This has raised concerns about the sustainability of household debt, and the implications for the stability of the financial system if it is not sustainable.

Much of the increase in household borrowing can be attributed to two factors: the decrease in the prevalence of credit rationing that followed from the financial deregulation of the early 1980s; and the reduction in interest rates, both in real and nominal terms, as inflation declined over the past two decades. These factors have contributed to a significant easing of liquidity constraints on households.

Regardless of whether the increase in household debt is sustainable, the greater indebtedness has important macroeconomic implications. The household sector will be more sensitive to movements in interest rates, particularly if they are unexpected, and to changes in income, most notably arising from unemployment. This enhanced sensitivity depends critically on the share of fixed versus variable rate mortgages held by households, with the sensitivity increasing more in those countries with predominantly variable rate mortgages. Moreover, in some countries part of the recent expansion in household borrowing has taken the form of a withdrawal of equity from the housing stock, which has provided a substantial boost to consumption spending. If this process of housing equity withdrawal were to slow or reverse,

[1] This article was written while the author was at the BIS and the Massachusetts Institute of Technology, on leave from the Reserve Bank of Australia. The views expressed in this article are those of the author and do not necessarily reflect those of the BIS or the Reserve Bank of Australia. The author thanks Olivier Blanchard and Claudio Borio for helpful discussions and comments.

as might occur were house price growth to slow or mortgage rates to rise, there could be a sizeable negative effect on the macroeconomy.

This special feature first discusses the increase in household borrowing that has occurred. It then briefly presents some factors that are likely to have contributed to this situation. Finally, it examines the macroeconomic implications of increased household indebtedness.[2]

Facts

Household debt has risen substantially

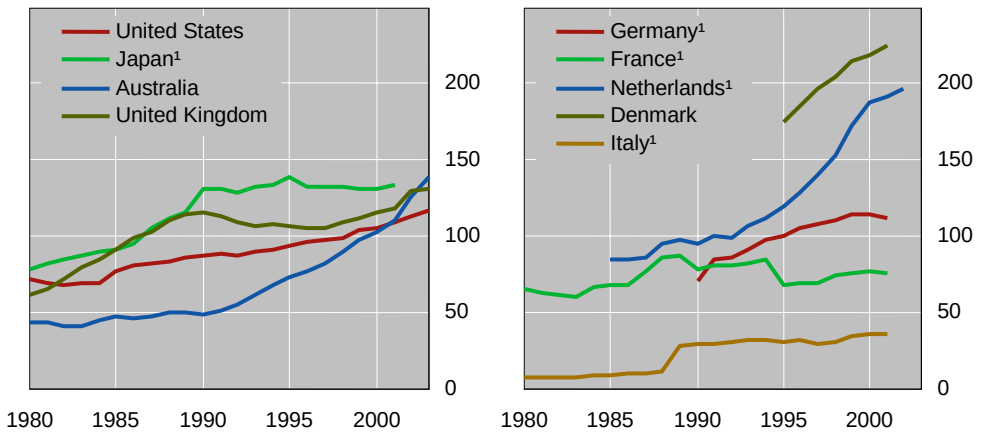
In most developed countries, the growth in household debt over the past two decades has exceeded that of income. However, the timing, extent and rate of the increase have varied considerably across countries. As shown in Graph 1, household indebtedness rose substantially in the 1980s in France, Japan and the United Kingdom, and in the 1990s in Australia and the Netherlands. The graph also shows considerable variation across countries.

Much of the borrowing has been for housing

In every country, the bulk of the increase in household debt has been in the form of borrowing for housing. For example, such borrowing currently accounts for around 75% of total household debt in the United States and the United Kingdom and around 60% in France and Germany, while in Australia it accounts for 85%. Although growth in borrowing for other purposes, particularly in the form of credit card debt, has also exceeded that of income over this period, it comprises a markedly smaller share of total household debt.

Household debt/income ratio

In percentages



¹ Includes unincorporated sector.

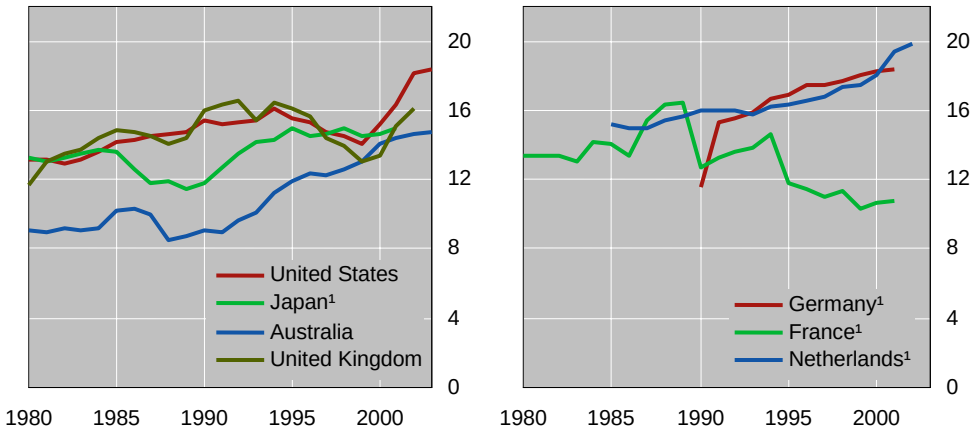
Sources: OECD; central banks.

Graph 1

[2] For a discussion of similar issues see: for Australia, 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 for Finland and Sweden inter alia.

Household debt/asset ratio

In percentages



[1] Includes unincorporated sector.

Sources: OECD; central banks. Graph 2

Scaling the amount of household borrowing by household income enables a comparison across time and across countries, but it does not necessarily provide a suitable benchmark for determining whether the amount of borrowing is excessive. When assessing the borrowing decisions of a corporation, a measure of gearing – the level of debt relative to the assets of the firm – is generally used, or a measure of interest cover such as debt service as a share of income. Similar measures for the household sector may be more appropriate when considering debt sustainability. The leverage of households can be calculated by scaling household debt by the value of household assets. The interest cover can be measured by dividing household loan repayments (which include both interest payments and required principal repayments) by a measure of household disposable income.

Leverage has not increased greatly …

Using the assets of the household sector as the scaling factor, the leverage of the sector does not increase nearly as dramatically. Graph 2 shows that leverage ratios have generally risen by no more than 5 percentage points; in the case of France, the ratio has actually decreased. In large part, this reflects the concomitant increase in house prices that has occurred in most countries, although in some instances it also reflects an increase in the value of equity wealth.[3] Were house prices to fall, this measure of household gearing would deteriorate rapidly, as the value of household assets declined but the associated debt did not. Hence care must be taken in using this measure to assess the sustainability of household debt.

… nor has debt service

The interest cover of households does not show a clear upward trend in most countries. The effect of the increase in household indebtedness has been offset by the decline in borrowing rates so that, on average, households are not

[3] The articles by Borio and McGuire, and Tsatsaronis and Zhu in this issue of the *BIS Quarterly Review* examine possible causes of the growth in house prices.

devoting any greater share of their income to debt service than in the past.[4] However, in some countries, debt service is already close to historical highs, and would rise further were mortgage rates to increase.

Indebtedness varies considerably across households

The aggregate numbers 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, only around 45% of households have mortgage debt, while around one quarter of households hold no debt at all. In addition, cross-sectional data from Australia, Sweden and the United States show a hump-shaped pattern of debt relative to age. In aggregate, young households carry comparatively little debt relative to income (although young households that have debt have very high levels of debt relative to income). This hump-shaped pattern follows that of home ownership, reflecting the fact that housing debt accounts for the bulk of household debt.

These distributional issues have important implications for the sustainability of the increase in debt, and for the macroeconomic consequences of the increase. Unfortunately, there is little data available on the change over time in the distribution of debt across households.

Why has debt increased?

Borrowing helps smooth consumption over the life cycle

A useful framework for examining trends in household borrowing is the life cycle model of Ando and Modigliani (1963). In periods during which income is low relative to the average lifetime income of the household, the household will borrow to fund current consumption, and repay the loan in periods during which income is high. As most households experience a rising income through their (working) life, debt will tend to be high relative to income early in life, and then gradually decline with age.

The presence of liquidity constraints complicates this story. Early in their working life, when income is relatively low, households may not be able to borrow as much as they desire. This particularly applies to the decision to purchase housing, which is the largest single expenditure a household undertakes. In most countries, financial institutions will not lend the full value of the dwelling being purchased, requiring the household to contribute to the cost of the purchase. Hence younger households are required to rent while saving for a down payment. As their incomes and savings grow, liquidity constraints are eased, so that households can borrow the large sum required to purchase a dwelling. This contributes to the hump-shaped pattern of household debt and home ownership over the life cycle that is observed in many countries.

Liquidity constraints have eased …

Liquidity constraints explain why changes in the structure of the lending market seem to have had such a significant effect on the extent of household borrowing. Financial deregulation occurred in nearly all developed economies

[4] 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). If home ownership rates rise, households which were previously renting are substituting 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 ratio.

through the 1980s and 1990s, although the timing and extent of the deregulation varied considerably across countries. Thus a significant part of the growth in household borrowing may reflect a move from a suboptimally low (from the household's point of view) level of indebtedness in the period prior to financial deregulation to a higher level now that households are no longer liquidity constrained. This is likely to have allowed households to better structure their path of consumption spending over the life cycle.

… but still remain

Despite the deregulation that has occurred, there remain institutional features, particularly related to lending for housing, which still result in some households being liquidity constrained. Financial institutions generally set a limit on the amount of disposable income that a household can use to service its loan, thereby restricting the maximum amount it can borrow. This means the level of borrowing costs can affect household indebtedness beyond the direct effect of a reduction in the real cost of borrowing caused by a fall in real interest rates. Given a household's income, a decline in nominal interest rates will allow an increase in the maximum amount a financial institution will lend to the household (Stevens (1997) and Wadhwani (2002)).

Lower inflation can boost debt relative to income …

The effects of inflation and interest rates are illustrated in Graph 3 (see also Miles (1994), Bank of England (2002) and Reserve Bank of Australia (2003b)). Assume that a housing mortgage is taken out for 30 years and that payments are constant over the life of the mortgage. With a standard mortgage, 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.

… as interest rates are lower and income growth is slower

With higher rates of inflation, and concomitant higher nominal interest rates, the upfront payments are larger relative to income, while later payments decline considerably as a share of income. The nominal value of the repayments remains constant, but the real value drops rapidly because of higher growth in nominal household income. With lower inflation, the upfront payments on a mortgage of the same size are smaller relative to income, but decline less rapidly over the life of the loan, as the real value of the debt is eroded more slowly.[5] As inflation rates have fallen, the associated decline in nominal borrowing rates has allowed households to borrow larger amounts for a given limit on debt service.

The tax system also affects borrowing

The tax system also has an effect on household indebtedness, which varies with the rate of inflation. In a number of countries, mortgage interest payments on owner-occupied housing are tax-deductible and, in some cases, part of the principal may also be deducted.[6] In countries such as Finland, Norway and Sweden, negative after-tax real interest rates contributed to rapid growth in borrowing for housing in the second half of the 1980s.

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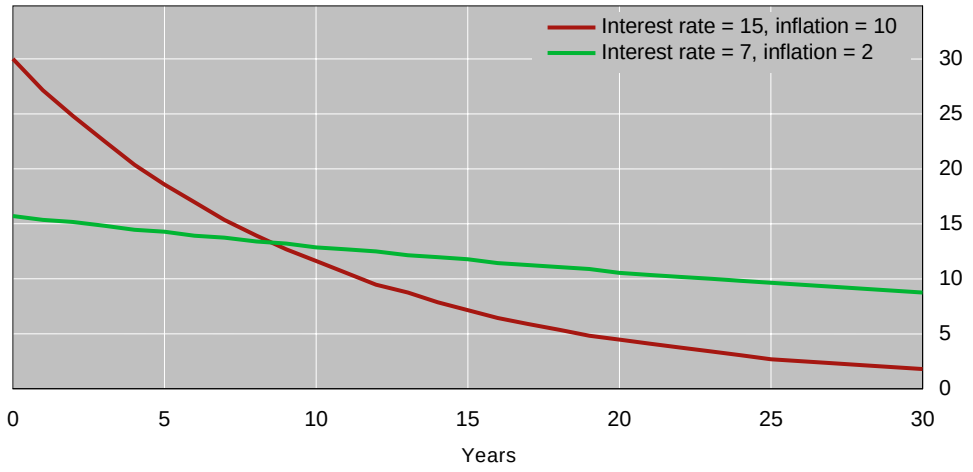
[5] Indeed, in a deflationary environment, repayments could conceivably rise as a share of income as the real value of the debt increases.

[6] Group of Ten (2003) describes the different tax treatment of housing across countries and the effect this has had on house prices and household borrowing.

Shares of debt service in household income

In percentages, over the life of the mortgage



Source: Author's calculations. Graph 3

In terms of the debt/income ratio, lower inflation has two effects. First, it boosts the numerator because of increased borrowing by households in response to the decline in nominal interest rates. Second, it will result in lower growth of nominal household income, so the nominal value of the debt is eroded more slowly for each individual household, thereby also boosting the aggregate household debt/income ratio.

Thus, much of the increase in household borrowing that has been observed can be explained by the combination of declining interest rates, in both real and nominal terms, and financial deregulation. For example, assume that interest rates fall from 15% to 7%, nominal income growth declines from 9% to 4% (a situation similar to the experience of some countries over the past two decades), and households borrow in such a way that their initial repayment is 30% of income. This could lead to a more than doubling of the aggregate household debt/income ratio (Reserve Bank of Australia (2003b)). Barnes and Young (2003) conduct a similar exercise for the United States and show that much of the growth in household debt in the 1990s can be explained by these factors (although not the increase observed in the 1980s).

Macroeconomic implications

Regardless of whether households have "over-borrowed", the larger stock of household debt has important macroeconomic implications. These include the increased sensitivity of the household sector to fluctuations in income, interest rates and house prices. In some countries, there may also be a reversal in the process of housing equity withdrawal, which has provided a boost to consumption in recent years.

Households will be more sensitive to …

As mentioned above, the decline in 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 household. Thus, in a number of countries, aggregate debt

service ratios are currently close to the highest levels of the past few decades, despite the fall in interest rates. Second, with lower inflation, the real value of the debt (which is fixed in nominal terms) is not eroded as fast as in the past. Households may be surprised in later years by the proportion of income still required to service their debt, and hence have lower than desired consumption. The higher aggregate debt/income ratio means that households will be more exposed to shocks, and will also remain exposed for a longer period of time than in the past.

Declines in household income

… declines in income, in particular via unemployment …

The largest and most significant negative shock to household income is unemployment. Greater household indebtedness and higher debt service levels will heighten the sensitivity of households to a rise in unemployment, amplifying the effect of a negative shock to the economy. 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, the likelihood of a downward spiral in house prices and the incidence of negative equity (where the value of the house falls below the outstanding mortgage). Such developments would be particularly unwelcome if the source of the unemployment shock were already placing downward pressure on house prices. Financing difficulties would be even more acute if the rise in unemployment were associated with higher interest rates, as for example occurred in Scandinavia and the United Kingdom in the early 1990s. For related reasons, greater household indebtedness might also reduce the ability of households to relocate in search of employment in a downturn.[7]

Admittedly, unemployment generally affects only a relatively small section of the population, and the degree of overlap between those households with a higher risk of unemployment and those with high debt levels has historically been low. Nevertheless, because households now have higher debt service levels for longer, they are more likely to experience a spell of unemployment while debt service is still a significant share of household income.

Declines in house prices

… declines in house prices …

Even in the absence of a downturn, increased indebtedness means that the household sector is more exposed to falls in house prices that result in negative equity. The primary impact of such a fall might be lower consumer confidence and reduced household spending, exacerbated by a turnaround in housing equity withdrawal (see below). Household financial distress need not increase, however, as it is primarily a function of the household's ability to

[7] That is, the need to sell the house to repay the mortgage may substantially increase the cost of searching for employment in distant labour markets. Blanchard and Katz (1992) and Decressin and Fatas (1995) highlight the importance of labour mobility in the United States and Europe. Gardner et al (2001) and ECB (2003) examine the relationship between home ownership and labour mobility.

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.

Changes in interest rates

… and 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 interest rate changes will depend critically on whether households mainly have fixed or variable (floating) rate mortgages, which varies considerably across countries (see Table 1).[8] It will also depend on the degree to which the change in interest rates was anticipated by households at the time they initiated their mortgage; that is, whether changes in interest rates are perceived to be consistent with the normal variation over the business cycle, or whether there has 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).

With fixed rate mortgages, the impact may be smaller

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.

A change in the interest rate regime will have an asymmetric effect on households. If there is a downward shift in the interest rate regime, there is an incentive for existing borrowers to refinance their mortgages at the lower interest rate, thereby boosting 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 (see the article by Frankel et al in this issue of the *BIS Quarterly Review*). If there is an upward shift in the interest rate regime, existing fixed rate borrowers will be shielded from the effects of

Predominant type of household 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

Sources: Borio (1995), based on majority of the stock of mortgages; ECB (2003). Table 1

[8] For a similar discussion of this issue, see Miles (1994, 2003) and FSA (2001).

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.

The risk is borne by financial institutions and pension funds

While there may be no change in the impact on households of an upward shift in interest rates, the effect on lending institutions may be more pronounced, particularly if it comes after a period during which a large number of households have refinanced at lower interest rates. Financial institutions will be faced with higher funding costs but, with the bulk of their assets earning fixed rates, will not experience a rise in the return on these assets as interest rates rise. However, 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 (2003)). The household sector still ultimately bears the risk, but as it is transmitted through changes in the value of pensions, there is likely to be a much more gradual adjustment in consumption. Hence the macroeconomic effect is likely to be smaller and/or more protracted than if the household is bearing the interest rate risk directly.

With variable mortgages, the household bears the risk

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, directly bear the risk of interest rate fluctuations.

Households may be able to smooth the impact …

The size of the impact will again depend on whether 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.[9] For example, if the interest rate is at a cyclical low, households may save the temporary decline in required repayments, with consumption being relatively unaffected. A simple way to save in such situations is to maintain the monthly repayments at a constant level, thereby paying off the loan principal faster than necessary. 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

[9] 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, even if it is only at a cyclical low.

interest rates continue to climb, the prepayment buffers of more and more households will be eroded, increasing the impact on consumption.

With the downward shift in interest rates over the past decade or so, it is possible that many indebted households 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, many households have re-borrowed at the lower rates of recent years and in some cases have taken advantage of the lower rates to increase the size of their mortgage, most notably to trade up to a larger dwelling.

... but sensitivity to interest rate changes is greater

Thus, in countries where mortgages are predominantly variable rate, the rise in household indebtedness is likely to have increased the potency of monetary policy. The effect may well be broadly symmetrical. However, the extent of the increase in potency will be diminished by the degree to which households regard variable rate mortgages as effectively fixed over the interest rate cycle.

Housing equity withdrawal

Greater tendency for withdrawal of housing equity

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 significant role in boosting consumption in a number of countries in recent years, most notably the United States, the United Kingdom, the 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 injecting equity when spending on the housing stock exceeds borrowing.

Housing equity is easier to access

The ability of households to extract equity has been considerably strengthened by the greater availability of products such as home equity loans, and the lower transaction costs of using those products. Some products effectively provide a revolving credit line for households, secured against the house. This has enhanced the ability of households to smooth temporary declines in income, and also allowed them to borrow better against increases in expected future income by using their house as collateral, significantly easing liquidity constraints.[10]

[10] Whether a rise in house prices increases the net worth of the household sector is debatable. While house price rises boost the wealth of existing homeowners, they also reflect an

The equity extracted can be used for a number of purposes: increasing consumption spending on durable or non-durable goods and services; repaying other forms of debt; purchasing other assets such as shares or bank deposits, etc. As interest rates on debt secured against housing are generally lower than those 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, which would otherwise be financed by borrowing at interest rates markedly higher than mortgage rates.[11]

Equity withdrawal boosts disposable income and consumption ...

Housing equity withdrawal has boosted both consumption and residential 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)).[12] 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 2001 and 2002 respectively, having raised it by 1 percentage point in 2000 (Netherlands Bank (2003)).

However, to continue to boost consumption, the amount of equity extracted needs to continue to rise each period. That is, equity withdrawal needs to keep growing to maintain consumption growth; simply maintaining the level of housing equity withdrawn constant will reduce consumption growth as the proportionate boost to income declines.

... but may be vulnerable to a slowdown in house price growth

Recently, equity withdrawal has occurred in a period of rising house prices. 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.

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offsetting increase in the implicit rental cost of housing. There is a transfer of wealth within the household sector between current homeowners on the one hand and renters and future homeowners on the other. The fact that housing can also be used as collateral for borrowing for liquidity constrained households may explain the common finding of a positive effect of rising housing wealth on consumption.

[11] Using a slightly different concept of equity withdrawal, 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 was 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, and one third was spent on home improvement.

[12] See McConnell et al (2003) for a discussion of the recent US experience.

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 the risk being borne instead by the end holder of the securitised mortgage. Hence the macroeconomic effects of greater indebtedness 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).

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 will be to amplify shocks to the economy coming from other sources, particularly those that affect household incomes, most notably rises in unemployment. The macroeconomic effects of greater indebtedness will also depend on the distribution of the debt across the household sector. Unfortunately, less is known about this issue.

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.

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