The role of household debt and balance sheets in the monetary transmission mechanism

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There is considerable uncertainty about the effect of household debt on the macroeconomy and its role in the monetary transmission mechanism. This article summarises conclusions from recent Bank of England research aimed at shedding light on this issue. It argues that the extent to which levels of household debt affect the outlook for the economy and the way in which the economy responds to unexpected developments, depends on the circumstances of individual borrowers and lenders, as well as wider economic conditions. Recent evidence suggests that there has been little difference in the amount by which the spending of high and low debt households has responded to changes in those households’ financial position. This is likely to be because the benign economic environment and favourable lending conditions have made it easier for households to smooth over adverse shocks. Nevertheless, adverse interactions between debt, house prices and consumption could arise in other circumstances. As such, there is a need to keep this situation under review by continued monitoring of household and lender balance sheets.

Introduction

The stock of outstanding household debt in the United Kingdom has roughly doubled since 2000. Higher debt levels can have a range of implications. For some households, debt repayments may turn out to be difficult to meet. This can result in them having to restrain their spending and, in extreme circumstances, seek bankruptcy or other forms of debt relief. This is a serious issue for the households concerned. But currently households seeking bankruptcy protection or debt rescheduling account for only a small share of overall spending. As such, these extreme cases have only limited relevance for the setting of monetary policy. (1)

More generally, however, there is no clear consensus on whether higher debt levels necessarily affect the outlook for aggregate consumer spending or the size and speed of the response of spending to changes in the economic environment, including interest rates. Conventional economic analysis suggests that consumption choices depend on debt only to the extent that debt affects household net wealth. But there is also a long history, going back at least to Irving Fisher in the 1930s, of mainstream economists who have dissented from this view. (2) They would argue that, in some circumstances, debtors might respond differently to shocks than creditors, so that, for a given level of net wealth, aggregate outcomes are affected by the amount of debt outstanding and its distribution. Moreover, the interaction between household spending, market prices and the actions of lenders could accentuate these effects.

Recent research at the Bank has aimed to clarify the circumstances under which debt has an ‘active’ role in the transmission mechanism and whether the potency of monetary policy depends on the state of the household sector’s aggregate balance sheet. This article sets out the main conclusions from that research.

Major developments in the household sector balance sheet

Although debt has grown very quickly in recent years, in aggregate it has mainly been used to finance asset accumulation rather than spending on goods and services. That is apparent from Chart 1, which shows that the increase
in household debt since the early 1990s has not coincided with a decline in household net wealth, as would be expected if the household sector as a whole were drawing down its wealth to pay for higher consumption.\(^{(1)}\) In fact, the overall net financial position of the UK household sector in 2006 was little different from that in the early 1990s.\(^{(2)}\) So the view that the United Kingdom has experienced a long-lived consumption boom ‘funded by a tidal wave of debt’ is misleading (Nickell (2004)).\(^{(3)}\) Instead, the evidence suggests that the growth in household debt (about 80% of which is in the form of mortgages) has been associated in large part with higher house prices (Chart 2).

Some indication of how the distribution of balance sheets has changed can be gained from household-level surveys.\(^{(6)}\) Here information is taken from the 1995 and 2000 waves of the British Household Panel Survey and the 2005 NMG Research survey carried out for the Bank (Barwell, May and Pezzini (2006)). Chart 3 shows that older households (aged 55 and over) experienced the largest gains in net financial wealth and the value of their housing assets between 2000 and 2005. By contrast, Chart 4 shows that middle-aged households (35–54 year olds) increased their indebtedness the most over that period. That likely reflects the high homeownership rates among these age groups. Similarly, a decline in homeownership rates among 25–34 year olds likely explains why that group’s median net financial wealth plus housing assets and median indebtedness fell between 2000 and 2005. The fact that median indebtedness tended to fall between 2000 and 2005, while mean indebtedness tended to rise suggests that the distribution of debt has become more skewed with fewer households borrowing larger amounts (Waldron and Young (2006)). Thus the growth in debt in recent years has been associated with a substantial change in the distribution of debt as middle-aged households (35–54 year olds) have tended to borrow more, possibly to keep up with rising house prices, while younger households (18–34) have borrowed less possibly because they have not entered the housing market.

Higher house prices have meant that new entrants to the housing market have needed to borrow more to finance their purchase (Hamilton (2003)). The effect of this on the aggregate balance sheet depends on what the ultimate sellers of houses do with the proceeds.\(^{(4)}\) If the increased debt of the new entrants is exactly matched by the reduced debt of the sellers, then there need be no effect of housing transactions on aggregate debt. But in many cases the ultimate sellers are people with small or no mortgages. As such, they are more likely to add the proceeds of the house sale to their financial assets. In this way, higher house prices might be associated with higher financial assets as well as higher debt.\(^{(5)}\) So, increased indebtedness has not been associated with a deterioration of the aggregate household sector balance sheet, but instead has been associated with higher house prices and a change in the distribution of financial assets and debts across households.

\(^{(1)}\) A similar pattern is also apparent in other countries (OECD (2006)). See also Debelle (2004).

\(^{(2)}\) The increase in the value of housing assets does not necessarily imply that the household sector as a whole is better off. Not only do people own houses, they also live in them, and so, in aggregate, increases in the value of people’s homes are broadly offset by increases in the future cost of housing. See Benito, Thompson, Waldron and Wood (2006).

\(^{(3)}\) This is not to say that a minority of households have not financed spending by unsustainable borrowing.

\(^{(4)}\) Most sellers of houses also simultaneously purchase another property. For those new purchasers without a property to sell, there is also an ultimate seller not intending to buy another property. These include sellers moving into rented accommodation or moving abroad and those selling properties they have inherited.

\(^{(5)}\) The relationship between house prices and the household sector balance sheet depends on the reason for the change in house prices. Over the past ten years, it is likely that the rise in house prices has been associated, among other things, with lower real interest rates, higher household incomes, and higher population growth.

\(^{(6)}\) It is well known that households tend to underreport the value of their financial assets and unsecured debt in such surveys. As Campbell (2006) notes, ‘it may be more unusual today for people to reveal intimate details of their financial affairs than to reveal details of their intimate affairs’. Redwood and Tudela (2004) examine the extent of underreporting in the British Household Panel Survey.
How the debt distribution affects the responsiveness of the economy to shocks

While the build-up of household debt has not been associated with a deterioration in the household sector’s aggregate balance sheet, it may be that the changed distribution affects the responsiveness of overall spending to shocks. One way of assessing this is to use a standard model of household behaviour such as the life-cycle/permanent income model (Modigliani and Brumberg (1979)). This model assumes that households are forward looking and that it is optimal and feasible for them to smooth their consumption over time. In this model, what matters to households in determining their current consumption is their lifetime net wealth (including expected future labour income), not their gross balance sheet positions. In particular, more indebted (but otherwise identical) households do not respond more to income shocks than other households, although they might respond more to interest rate and asset price shocks to the extent that these are exacerbated by leverage.\(^{(1)}\)

In this model, higher debt levels therefore have only limited relevance for aggregate household sector behaviour. But many of the assumptions underpinning the basic life-cycle/permanent income model may not hold in practice. For example, all households are assumed to be able to foresee the future perfectly and to behave in a perfectly rational way. That affords no role for the possibility that some households might be ineffective at making saving plans and so might be prone to take on more debt than they can afford to repay, given their circumstances. If such a tendency were widespread, then the basic model could be misleading. However, recent evidence suggests that the proportion of households having debt repayment difficulties has been quite low in recent years (Waldron and Young (2006)).

Another assumption underpinning the basic model is that households are able to borrow against their future income. But theory and evidence has confirmed that there are limits to this. One reason is that capital market imperfections can arise because of frictions such as the inability of lenders to enforce financial contracts (Hart and Moore (1994)), asymmetric information between borrowers and lenders (Stiglitz and Weiss (1981)), moral hazard (Holmstrom and Tirole (1997)) and costly state verification (Bernanke, Gertler and Gilchrist (1999)).\(^{(2)}\) In essence, these models imply that lenders are less willing to lend unless they can access collateral in the event that the borrower defaults.

One implication of this is that there are differences between the cost of secured and unsecured debt. Secured debt is generally available to households with a verifiable income stream up to some proportion of the value of their collateral, at interest rates only a little higher than the rates they can earn on deposits.\(^{(3)}\) But borrowing more than can be secured on collateral is usually only possible at higher unsecured rates. Del-Rio and Young (2006) use a life-cycle model to show that a collateral constraint affects the response of household consumption to different types of shock and so modifies the relationship between spending and the balance sheet. In particular, income shocks are likely to be smoothed over the life cycle by unconstrained households, as in the benchmark

\(^{(1)}\) To see that consider two households; one with a mortgage of £100,000 on a £200,000 house and one with a £100,000 house owned outright. Both households have a net asset position of £100,000. Now suppose that house prices fall by 10%. The first household now has a house worth £180,000 and net assets of £80,000, while the second household has a house and net assets worth £90,000. Leverage or gearing has made the first household more exposed to asset price changes. An analogous argument can be made with respect to changes in interest rates. Of course, a fall in house prices would not necessarily reduce a household’s lifetime wealth because it would also imply lower future housing costs. See Benito et al (2006).

\(^{(2)}\) These imperfections are discussed in more detail in Haldane et al (2004).

case, but less so by households close to the collateral constraint. Because households without collateral face a higher cost of intertemporal consumption smoothing, they will do less of it, and when they receive a shock to current income, they will react more to it in the current period. Lower spreads on unsecured debt affect the extent to which households without collateral respond to shocks. The lower are the spreads, the more their behaviour will mimic that of those who are unconstrained.

So, to the extent that higher debt levels are a reflection of a mature financial system with fewer restrictions on borrowing, higher levels of debt might be associated with households finding it easier to smooth their consumption in the face of shocks. That would tend to reduce the responsiveness of the economy to shocks.\(^{(1)}\)

**Evidence**

There is substantial evidence that households do not smooth their consumption to the full extent implied by the life-cycle/permanent income model. For example, Johnson, Parker and Souleles (2006) find evidence that many US households did not adjust their spending in response to the 2001 tax rebate until that rebate had been received, even though it was announced some time in advance. Stephens (2006) finds similar behaviour among UK households, whose consumption tends to be excessively sensitive to the timing of pay cheque receipts. Benito and Mumtaz (2006) find, using evidence from 1992 to 2002, that 20%–40% of UK households behaved as if they were constrained – either because of credit constraints or precautionary saving. This is somewhat higher than the 16% of British households who said they were credit constrained in the 2006 NMG Research survey (Waldron and Young (2006)).

All of this would suggest that income, interest rate or asset price shocks could have larger effects on spending than indicated by the basic life-cycle model. But is there evidence that those with more debt respond more?

One way of assessing that possibility is to examine the response of household-level spending to unexpected changes in financial circumstances. In particular, using the BHPS it is possible to compare a household’s view of how its financial situation changed over the past year with what, one year previously, it said it expected for that year. This indicator provides a measure of whether a household had a positive or negative shock over that year. It is then possible to test how this affected the household’s spending and whether the effect is larger for those with more debt.\(^{(2)}\)

**Table A** shows the percentage of households in the sample reporting a worse, similar, or better financial situation than expected summed across each year between 1997 and 2004.\(^{(3)}\)

The rows indicate how a household expected their financial situation to change and the columns indicate how their financial situation actually did change. For example, the cell in the second column and first row shows that 3.2% of households reported their financial situation as ‘about the same’ as the previous year, having expected their situation to worsen.

<table>
<thead>
<tr>
<th>How situation turned out</th>
<th>Frequency</th>
<th>Worse off</th>
<th>About the same</th>
<th>Better off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worse off</td>
<td>4.8</td>
<td>3.2</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>About the same</td>
<td>11.6</td>
<td>39.6</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>Better off</td>
<td>4.6</td>
<td>9.3</td>
<td>12.8</td>
<td></td>
</tr>
</tbody>
</table>

Sources: BHPS (1997–2004) and Bank calculations. 32,102 observations.

Questions: ‘Looking ahead, how do you think you will be financially a year from now? Will you be: better off, worse off, or about the same?’ “Would you say that you yourself are better off or worse off financially than you were a year ago?”

A household’s perception of how its financial situation has changed is a subjective, qualitative indicator. It is important to check that this is consistent with quantitative information provided by households. **Chart 5** plots the income growth averaged over each year between 1997 and 2004 of those who had expected their financial situation to get worse in that year. On average, income fell by around 9% for those whose financial situation actually got worse, as expected. Income grew by just over 2% for those who reported their financial situation to have been unchanged. And, income grew on average by just under 4% for those whose financial situation unexpectedly improved. This suggests that the financial shock indicator contains information as it is likely to encompass income shocks.

By splitting the sample according to whether a household is in the top quartile of mortgage debt or not, it is possible to investigate how debt levels affect households’ durable spending in response to shocks to their financial situations.\(^{(4)}\) According to the life-cycle/permanent income model, the size of the response is likely to be affected by whether these shocks are perceived to be temporary or more persistent. But even temporary shocks can be expected to have some effect on durables spending. **Chart 6** shows, as might be expected, that

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\(^{(1)}\) See Campbell and Hercowitz (2005) and Dynan, Elmendorf and Sichel (2005) for discussions on the contribution of financial innovation to the improvement in macroeconomic performance in the United States in recent years.

\(^{(2)}\) This is a valid test provided that the shock indicator is not correlated with the debt position.

\(^{(3)}\) This is the longest sample period available for an analysis of spending on consumer durables: the first BHPS survey was conducted in 1991, but questions on the amount spent on consumer durables were not asked before 1997.

\(^{(4)}\) The set of durable goods covered by the BHPS is restricted to televisions, video recorders, freezers, washing machines, tumble dryers, dishwashers, microwave ovens, home computers and cd players.
of those who expected their financial situation to get worse, those who experienced positive shocks spent more on durables than those who did not. That is true for both the high and low debt groups. But the percentage amount by which spending is higher is hardly different for the low and high debt groups. Spending on durables is about 15% higher when they had a small positive shock (financial circumstances turned out the same when they had been expected to get worse) and about 90% higher when they had a large positive shock (financial circumstances improved when they had been expected to get worse).

A similar conclusion emerges from an investigation of the spending of those experiencing negative shocks. Of those who expected their financial situation to get worse, those who experienced negative shocks spent less on durables than those who did not. But there appears to be no material difference in the reaction of those with high or low debt. Those experiencing large negative shocks (their financial circumstances worsened when they were expected to improve) spent around 20% less whether they had high or low debt. Among those experiencing small negative shocks (financial circumstances unchanged when they had been expected to improve), those that had relatively low levels of debt actually reduced their durables spending (19%) by a little more than those with higher levels of debt (11%).

Overall, this analysis of household-level data over 1997–2004 suggests that higher debt levels did not, in general, raise the sensitivity of spending to shocks: the response of those with more debt was similar to that of those with less debt. This implies that having a high level of debt over this period did not make it more difficult to adjust to shocks. This conclusion is consistent with evidence suggesting that households could reduce the extent to which they cut spending by responding to shocks in other ways. Benito (2007) finds that adverse shocks raise the likelihood of households withdrawing equity from their home. The evidence in Bridges, Disney and Gathergood (2006) and Del-Río and Young (2006) is consistent with households using unsecured borrowing to smooth over shocks. Also, in contrast to the basic life-cycle model that assumes that income is perfectly predictable, and to the extent that labour market conditions allow, households may have responded to shocks by increasing labour supply, either by additional members of the household going out to work (Attanasio et al. (2005)) or by taking on a second job (Boheim and Taylor (2004)).

The 1997 to 2004 period may be unusual in that households might have had multiple channels available by which they could smooth out shocks. In addition, the UK economy was historically very stable over this period (Benati (2005)). This meant that the shocks experienced were mainly idiosyncratic, affecting individual households in isolation, rather than the economy as a whole as in the early 1990s. There is evidence from other periods and other countries that responses to shocks have been larger when indebtedness was higher (Balke (2000)). An implication of this is that the response of the economy to shocks varies over time depending on the circumstances. Moreover the effect depends on the types of shocks that occur. For example, the years from 1997 to 2004 contained smaller interest rate movements and lower variation in unemployment than at other times. Had larger interest rate movements or more incidences of unemployment

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(1) Further analysis using more formal econometric techniques that control for other influences on spending confirm the lack of any significant difference between the durables spending of high and low debt households.

(2) It seems that this is how Winston Churchill responded to debt problems: ‘Churchill evolved two firm rules which he followed faithfully for the rest of his life. The first was that expenditure should be determined by needs (generously interpreted) rather than by resources. He stood the famous maxim of Dickens’s Mr Micawber on its head. Second, he decided that when the gap between income and expenditure became uncomfortably wide the spirited solution must always be to increase income rather than to reduce expenditure’. Jenkins (2001, page 28).
occurred, it is possible that larger changes in spending would have been seen among those with more debt.

**The response of households to interest rate shocks**

Is it likely that the overall response of household spending to interest rate changes would be larger than in the past because of higher debt levels? This section outlines the various channels by which an unexpected increase in real interest rates would affect households.

The most obvious direct effect of higher real interest rates is that interest payments rise for those households who have flexible rate mortgages and other debts. This effect is equivalent to a fall in real income for these households and they would be expected to reduce their spending in response. For a household with debts of three times its income, for example, an increase in real interest rates of 1 percentage point sustained for a year would reduce its real income in that year by 3%. But the effect on spending would be less than this for those households who are able to spread the loss in real income over their lives.

For every borrower there is also a lender, so adverse income effects on borrowers will be at least partly offset by beneficial income effects on lenders. But Bean (2004) notes that the impact of interest rate changes on demand may be affected by higher debt levels if indebted individuals respond more strongly to a rise in their interest payments than do savers to a corresponding rise in their interest receipts. It is often believed that the propensity to cut spending by borrowers is larger than the propensity to increase spending by lenders. But this belief may reflect the prevalence of borrowing restrictions in the past that prevented borrowers, but not lenders, from smoothing the effects of interest rate shocks. In the current conjunction, where many households have greater capacity than before to increase borrowing through housing equity withdrawal, the spending responses of borrowers and lenders may be more similar, consistent with the empirical evidence reported earlier.

Other direct channels by which changes in real interest rates affect spending reflect substitution effects. First, through intertemporal substitution: higher rates increase the return to saving today to finance future spending. Second, through intratemporal substitution: higher rates increase the opportunity cost of durable goods and housing and so discourage spending on them. There is no obvious reason to expect the intensity of these effects, which depend on household preferences, to have changed markedly over time, except that households might now have more flexibility to vary their spending by borrowing.

There are a number of indirect channels by which higher real interest rates affect household spending. One of the more important is likely to be the effect through house prices. Other things being equal, higher interest rates would reduce the demand for housing and hence house prices. A lower value of housing assets would tend to reduce the spending of older households, but lower prices would be beneficial to younger households who are intending to buy a house for the first time or trade up (Benito et al. 2006). The net effect of this on aggregate spending would depend on the initial distribution of housing and variation in propensities to consume.

Putting all of these channels together and determining how consumer spending might respond to changes in real interest rates is not straightforward. One way of doing that is to use an overlapping generations (OLG) model of household behaviour similar to the life-cycle/permanent income model described above. In order to capture some of the important channels through which changes in interest rates can affect spending, the model incorporates collateral constraints on household borrowing and allows for endogenous changes in house prices. The model is calibrated to UK data. By calibrating the age distribution of balance sheets to be the same as distributions from different waves of the BHPS and NMG survey data (see Chart 3 and Chart 4), it is possible to examine how the initial distribution of debt and balance sheets affects the response of spending to changes in real interest rates.

Chart 7 plots simulated responses from the OLG model of consumption to an exogenous, unexpected 1 percentage point increase in real interest rates. It is assumed that the increase persists for around five periods (each period is of five years) but eventually wears out. Because the model periods are so long, the simulations are not designed to quantify the impact of monetary policy changes. For example, they do not provide a read as to how consumer spending might have responded to the three increases in Bank Rate since August 2006. Instead, they are designed to give an indication of how changes in the distribution of balance sheets and debt might have affected the response of spending to changes in policy. In both cases, the simulations show the percentage change in consumption after the increase in real interest rates relative to what it would have been had interest rates remained unchanged. In the first case, the initial distribution of balance sheets (debt and financial wealth) and housing assets is set equal to that from

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(1) Some of the direct beneficiaries of higher interest receipts may be outside the household sector. While the household sector’s stock of financial assets is worth considerably more than its stock of debts (Chart 5), much of this is held indirectly in pension funds. Direct interest receipts of the household sector as a whole (£31.4 billion in 2005) are much smaller than interest payments (£71.0 billion).

(2) More formally, changes in real interest rates have substitution, income, and human capital or wealth revaluation effects. See, for example, Deaton (1992).

(3) This model extends that of Tudela and Young (2005) by incorporating collateral constraints, bequests and endogenous house prices.

(4) The real interest rate is 1 percentage point higher for the first five years, 0.5 percentage points higher for the next five years, 0.25 percentage points higher after ten years, 0.125 percentage points higher after fifteen years, etc. Because the model is forward looking, the expected future path of interest rates affects current spending decisions. This makes the assumed persistence of the shock important.
In both simulations, consumption falls in the first period, reflecting the operation of the channels described above: the decline relative to base is around 2% with balance sheets as in 2005 and about 1.6% with balance sheets in 1995 when indebtedness was lower. This reflects the stronger effects of interest rates on spending when debt levels are higher, as in the 2005 NMG Research survey.

How debt levels affect the underlying dynamics of the economy

Greater levels of household debt may also affect the underlying dynamics of the economy and accentuate its cyclicality through ‘financial accelerator’ effects. An example of how these effects work would be if higher house prices strengthened borrower balance sheets and thereby encouraged lenders to extend more credit or do so more cheaply, so that house prices rose further. Large (2004) makes the point that the relationship between debt and asset prices may accentuate the size of cyclical fluctuations in spending: ‘Increases in house prices and secured debt have tended to reinforce each other. If either has ‘overshot’ — for instance, because of unrealistic expectations of income growth — the other is likely to have overshot too’. Shin (2006) provides a more formal analysis of these interactions.

While such interactions between borrower and lender balance sheets could be important, it is not clear that they have been in recent years. For example, household spending might have been affected by changing credit conditions, but such effects have been quite gradual and modest. Similarly, there is evidence that balance sheet or liquidity problems among the banks could cause them to tighten conditions in the future. But again, the current financial position of leading lenders in the United Kingdom suggests that this is unlikely to be a problem at the moment (Bank of England (2006a)). Nevertheless, Irving Fisher’s analysis of debt deflation in the 1930s and more recent evidence from Japan emphasises the potential difficulties that can be caused by the interaction of borrower and lending balance sheet problems. Moreover, Tucker (2003) notes that should balance sheet difficulties occur in the United Kingdom, the subsequent adjustment ‘would complicate the operation of monetary policy in ways that are hard to anticipate. It will not do to argue that faced with such retrenchment, the Bank could reduce interest rates, since we do not know very much about how much purchase monetary policy would have in such circumstances’. This emphasises the potential difficulties these interactions would cause should they occur and the reasons for continuing to monitor household and lender balance sheets.

Conclusion

Overall, it would appear that there are enough buffers on both the household and lender balance sheets for the build-up of household debt not to complicate the operation of monetary policy in the current conjuncture. But there is no guarantee that this situation, where balance sheets seem likely to have played a largely passive role in the medium-term evolution of the economy, will persist. Larger shocks than seen recently, particularly shocks impacting on interest rates, income or employment, could cause adverse interactions between debt, house prices and consumption. Assessing the possible effects of such shocks can be assisted by models such as the modified life-cycle model outlined earlier. But there is also a continuing need to monitor balance sheets of both borrowers and lenders so that developing problems can be anticipated and addressed. In recent years, the Bank of England has commissioned surveys of household balance sheets precisely for this purpose. It has recently announced plans to introduce a systematic survey of lenders to supplement the information gained from its regular liaison activities (Bank of England news release (2006b)). Careful analysis of this information will be vital in assessing the role that household debt plays in the future evolution of the UK economy.
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