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THE BRITISH HOUSEHOLD
PANEL SURVEY**

2005

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**Documentos de Trabajo
N.º 0511**

BANCO DE ESPAÑA



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(*) This paper was largely written when Ana Del-Río was on secondment at the Bank of England. The views expressed in this paper are those of the authors, and not necessarily those of the Bank of England or Banco de España. We are grateful to Andrew Benito, Olympia Bover, Peter Brierley, John Ermisch, Stephen Jenkins, Merxe Tudela, two anonymous referees and participants at seminars held at the Bank of England, Banco de España and the 2003 British Household Panel Survey research conference for helpful comments and suggestions; any remaining errors are our own.

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ISSN: 0213-2710 (print)

ISSN: 1579-8666 (on line)

Depósito legal:

Imprenta del Banco de España

Abstract

Household indebtedness has risen sharply in recent years, with large increases in both secured and unsecured borrowing. In this paper, waves 5 and 10 of the British Household Panel Survey (BHPS) for 1995 and 2000 are used to examine the determinants of participation in the unsecured debt market and the amount borrowed. Probit models for participation are estimated and age, income, positive financial prospects and housing tenure are found to be very significant and have the expected sign according to a life-cycle model for consumption. Regressions to explain the level of borrowing by individuals suggest that income is the main variable explaining cross-sectional differences in unsecured debts.

The increase in aggregate unsecured debt between 1995 and 2000 does not seem to be closely linked to changes in the determinants of debt market participation and has been mainly associated with the larger amounts borrowed by those with debts. Increases in income, better educational qualifications and improved prospects regarding the financial situation contributed to this result. The major part of the overall increase in unsecured debt is not explained by variables at the individual level, but is accounted for by common, unmodelled macroeconomic factors.

Key words: Unsecured debt, British Household Panel Survey

JEL classification: C21, D14, E21

Summary

Unsecured borrowing by households, mainly in the form of personal loans, overdrafts and credit cards, has grown rapidly over the past ten years or so. This has raised concerns that it could cause widespread financial difficulties and default among households who might struggle to keep up with their debt repayments. The validity of such concerns will depend to a large extent on the type of people who have increased their indebtedness and whether they are borrowing more because their economic circumstances have changed and they feel more confident about taking on additional financial commitments. Borrowing for these reasons is unlikely to be as risky as increased borrowing without a change in underlying economic conditions.

This paper examines survey evidence on the determinants and distribution of unsecured debt using waves 5 and 10 for 1995 and 2000 of the British Household Panel Survey (BHPS). Previous work in the Bank has used the BHPS to analyse the overall financial position of households, including the distribution of unsecured debt across different income and age groups. This paper looks in more detail at the determinants of the cross-sectional distribution of unsecured debt and whether this distribution has changed over time. That makes it possible to assess whether unsecured debt has increased because the factors determining its use have changed or whether more debt is held for given circumstances.

One of the key risks associated with unsecured debt is that it is increasingly used by high risk borrowers. Despite the increased prevalence of credit cards, there is no evidence from the BHPS that participation in the unsecured debt market rose between 1995 and 2000. In both years, around 39% of people claimed to have some debt in this form. These may not be the same people, as the BHPS suggests that 35% of the most indebted quartile in 1995 had no unsecured debt in 2000. But the evidence suggests that there has been no substantial change in the factors that determine whether an individual is likely to have unsecured debt or not.

In line with standard life-cycle considerations, econometric analysis indicates that the main determinant of the participation decision is the age of the borrower, with 20 to 30-year olds most likely to borrow unsecured. Other statistically significant factors are income, economic prospects, qualifications, job status, housing status and the extent of mortgage borrowing.

While there is no clear statistical evidence of a change in the determinants of participation in the unsecured credit market between 1995 and 2000, there was, though, a striking increase in the amount of debt held by borrowers between these two years. According to econometric estimates, the main determinant of the level of unsecured borrowing of borrowers is the level of individual income. Age seems to be less important in determining the amount of unsecured borrowing than the decision to participate in the unsecured market. The other statistically significant determinants of the amount of borrowing are economic prospects, qualifications, job status, housing status and the extent of mortgage borrowing. But, as with the participation decision, there is little evidence of a major change in the importance of these determinants between 1995 and 2000, although there does appear to have been a slight increase in the relative borrowing of those with high incomes. Instead, the main change between these years has been an increase in the amount borrowed throughout the distribution. This suggests that factors affecting all current and potential borrowers, regardless of their personal characteristics, were most important in explaining the rise in unsecured debt between 1995 and 2000.

Thus the rise in unsecured borrowing appears not to have been concentrated within poor risk groups, but to have been a general phenomenon affecting those likely to be borrowers to a similar extent. While it is not possible, on the basis of the information available, to explain the cause of this shift, it is consistent with lower rates of interest on unsecured debt. According to the theory outlined in this paper, lower rates on unsecured debt would raise both the unsecured and secured borrowing of those unable to borrow as much as they would like at secured interest rates, without encouraging further borrowing by those who are unlikely to participate in the unsecured market. This would improve the welfare of those who had been constrained by enabling them to spread their spending more smoothly over time.

Of course, more unsecured debt involves greater risks even if debt is not concentrated among high risk groups. Some individuals do have very high levels of debt in relation to their income and that exposes them to the risk that they will not be able to repay. But there is no evidence that this situation worsened between 1995 and 2000.

1 Introduction

Borrowing by UK households has risen rapidly in recent years and by the end of 2004 the overall amount owed was worth over 140% of annual post-tax income. The majority of this debt is accounted for by mortgages, secured on the borrower's home, but the proportion that is unsecured had reached around 20% of household income, almost double what it was in 1994.

Unsecured debt, mainly in the form of credit cards, overdrafts and personal loans, differs from secured debt in terms of its purposes, cost, flexibility and risk. Traditionally, its main purpose has been to finance durable consumption while secured debt has financed house purchase, but the purposes for which debt is used are changing. During the 1990s, more use was made of unsecured debt to finance holidays, clothing or special occasions¹ while secured debt increasingly financed consumption through mortgage equity withdrawal [see Davey (2001)]. These developments suggest that debt is much less closely related to particular purchases than in the past.

One of the factors behind shifts in the composition of borrowing is likely to be changes in the price at which people are able to borrow. Usually, unsecured borrowing is more expensive because of the greater risk to lenders in the absence of collateral. The greater availability of secured borrowing on better terms would therefore encourage mortgage equity withdrawal and the widespread substitution of secured for unsecured debt. However, there is also an increasing amount of aggregate unsecured debt that does not bear any explicit interest, arising from purchases offering interest-free credit or from the use of credit cards that do not bear interest if settled at the end of each month. This would tend to encourage the substitution of unsecured for secured debt. That both types of borrowing have risen rapidly at the same time suggests that these relative price effects may have offset each other. But it also carries with it the possibility that the risk of unsecured lending has changed as the characteristics of borrowers have altered.

Recent research at the Bank of England [May, Tudela and Young (2004)] has described the distribution of unsecured and secured debt across households in Britain as of September 2004 using a specially commissioned survey. This paper attempts to go further and assess what lies behind the greater use of unsecured debt by British households, since this potentially has implications for both macroeconomic and financial stability. It does this by means of a detailed investigation of the determinants of borrowing at the individual level using information from the 1995 and 2000 waves of the BHPS. This attempts to clarify the type of factors that influence borrowing and whether the importance of these factors has changed over time. Is it that people are borrowing more because they feel more confident about the future, or is it simply more convenient for them to finance spending in this way? What are the characteristics of borrowers and have these changed recently?

Overall levels of borrowing can be analysed using life-cycle permanent income hypothesis models, where debt allows individuals to smooth consumption over the life cycle and to finance the purchase of assets such as houses and consumer durables. Changing levels of borrowing can then be explained within this framework as a response to factors affecting spending, taking into account credit constraints and other supply-side factors that might influence the way in which spending is financed. In this paper we extend this model to take account of differences between secured and unsecured debt. Because secured debt is

1. Information on the purposes of unsecured borrowing is available from surveys of borrowers. The weight of durable consumption as the end-use of unsecured debt decreased from near 68% in 1995 to around 54% in 2002. Meanwhile, the weight of the financing of holidays, clothes and special occasions increased from below 3% of the stock of unsecured debt in 1995 to near 10% in 2002. While it cannot account for the change in overall borrowing, the share of new loans used for loan consolidation rose from around 6% to more than 12%. Source: NOP Financial Research Survey.

typically cheaper than unsecured debt, it will tend to be used in preference to unsecured debt by individuals with access to both types of debt. This points to the importance in the empirical analysis of taking into account the circumstances of the individual borrower, including their position in the housing market.

Our empirical analysis builds on previous household-level studies, mainly concerned with US households. For instance, Cox and Jappelli (1993) use the 1983 Survey of Consumer Finances (SCF) to estimate a cross-sectional demand for debt equation for US households. They find a positive relationship with permanent income and net worth and a negative relationship with current income and age. Duca and Rosenthal (1993) also use the 1983 SCF and find that the demand for debt of young households is positively related to wealth, income and household size and negatively related to unemployment. Crook (2001) focuses on a more recent period and finds that US households' demand for debt is related positively to home ownership, family size, and job status, while negatively related to net worth, age and risk aversion.

For British households, Bridges and Disney (2002) find that the access to unsecured debt of low-income households is positively associated with income-related and income generating characteristics. Banks et al. (2002) describe the distribution of British household debt according to the BHPS as a part of a very comprehensive analysis of the distribution of financial wealth in the UK in 2000. Cox et al. (2002) also use the BHPS to analyse the changes in the distribution of household debt-income ratios, income and assets across borrowers and conclude that the increase in debt-income ratios of British households during the second half of the 1990s was larger among the youngest and lowest-income households².

The paper is organised as follows. Section 2 extends a standard life-cycle model of consumption to take account of the relationship between secured and unsecured borrowing. Section 3 outlines the empirical method used. Section 4 describes unsecured debt in the BHPS and examines the determinants of debt in a cross-sectional approach. Section 5 focuses on debt changes using the panel dimension in the BHPS. Section 6 concludes.

2. We investigate the impact of unsecured debt on financial distress among British households in a separate paper [Del-Rio and Young (2005)].

2 The theoretical determinants of unsecured debt

One of the most important characteristics of unsecured debt is that it is usually expensive relative to other possible methods of finance, such as secured borrowing or running down asset holdings. This suggests that its use might be concentrated among those who do not have access to cheaper finance. In this section, we outline a calibrated version of the life-cycle model of consumption, where households are able to borrow at relatively low rates against the security of their house, but have to pay higher rates for unsecured borrowing³. In contrast to other models, there are no quantitative credit constraints in the unsecured market in this model, instead households are limited in the amount they can borrow at lower secured interest rates. This model captures many of the key characteristics of the UK debt market, in that a borrower's financial decisions appear to be strongly tied to their position in the housing market. The model provides a framework for understanding the effect of factors which vary across households, thereby helping to explain cross-sectional differences in indebtedness, and factors which change over time.

Households are assumed to be economically active for three periods, reflecting different phases of the life cycle. During this time they earn an exogenous income stream and consume non-durable goods and housing. They aim to maximise intertemporal utility and to die solvent. Their intertemporal utility function at the beginning of their lives is given by:

$$V_0 = \sum_{t=1}^3 \frac{(h_t^\alpha c_t^{1-\alpha})^{1-\gamma}}{(1-\gamma)(1+\delta)^t} \quad (2.1)$$

where h and c represent their ownership of housing and consumption of goods respectively, α is a parameter indicating their preference for housing relative to goods, γ is the coefficient of relative risk aversion and δ indicates their rate of time preference.

Households face the following flow budget constraint:

$$s_t + u_t = p_t c_t + q_t h_t + (1+r_{t-1})s_{t-1} + (1+r_{t-1} + \eta_{t-1})u_{t-1} - q_t h_{t-1} - y_t, \quad t=1,2,3,4. \quad (2.2)$$

where s and u are stocks of secured and unsecured debt respectively, y is exogenous nominal non-property income, p_t and q_t are the prices of goods and housing respectively, r is the rate of interest on secured debt and η is the premium on unsecured borrowing. It is assumed that all households aim to die with zero net worth, so that at the beginning of the period after their death (at date 4) the proceeds from the sale of the house is sufficient to pay off all remaining debt.

Households can use secured and unsecured debt to smooth their spending over time. The use of secured and unsecured debt is assumed to be constrained such that:

$$s_t \leq \phi_t q_t h_t \quad (2.3)$$

$$0 \leq u_t \quad (2.4)$$

The first expression states that secured debt cannot exceed a proportion, ϕ , of the value of the household's house qh . The second expression states that unsecured debt cannot be negative (so households cannot *lend* at high unsecured interest rates).

The choice of how much secured and unsecured debt to borrow is then determined jointly with that of how much to consume and how much to spend on housing.

³ No distinction is made at this stage between a household and the individuals within it. Our empirical analysis considers the borrowing decisions of individuals rather than households.

Optimal housing and non-housing consumption are derived by maximising (2.1) subject to (2.2), (2.3) and (2.4). There are three possible solutions at any date, depending on which of the borrowing constraints are binding. These are reflected in the first order conditions for intertemporal consumption over time (2.5) and the choice between housing and goods (2.6), written for the case when the secured debt constraint is binding:

$$\frac{\partial v_{it}}{\partial c_{it}} \bigg/ \frac{\partial v_{it+1}}{\partial c_{it+1}} = \frac{(1+r_t + \eta_{it})p_t}{(1+\delta_i)p_{t+1}} \quad (2.5)$$

$$\frac{\partial v_{it}}{\partial c_{it}} \bigg/ \frac{\partial v_{it}}{\partial h_{it}} = \frac{(1+r_t + \eta_{it})p_t}{(1+r_t + \eta_{it})q_t - q_{t+1} - \eta_{it}q_t\phi_{it}} \quad (2.6)$$

In this case, both inter-temporal and intra-temporal consumption decisions are affected by the rate of interest on unsecured borrowing. When the secured debt constraint is not binding, the premium on unsecured debt drops out of these conditions. This has the effect of raising current relative to future consumption and changing the effective relative price of housing. The third possible outcome is a corner solution where household borrowing violates the secured borrowing constraint if consumption choices can be made at secured borrowing rates, but is within the constraint when choices are made at higher unsecured rates.

Depending on the exact specification of preferences, the model can be solved for the optimal time profile of consumption of housing and goods that satisfy the budget constraint and the terminal condition. Iterative methods need to be used, because behaviour at any date depends on whether secured borrowing constraints are expected to be binding in the future. The steady-state solution is illustrated here by means of a model calibrated roughly to the UK situation. The three periods of the model can be thought of as representing 15 years each.

The results are shown in Table A for different scenarios and for two different levels of the premium on unsecured borrowing. In the main case, income in the (15-year) first period is £300,000, consistent with annual income of £20,000. This rises to the equivalent of £40,000 per annum in the second stage of life, before falling back to £15,000 per annum in the last stage of life (which includes retirement). The rate of time preference has been set equal to the rate of interest on secured debt (0.3, equivalent to 2% per annum) so that in the absence of constraints individuals would smooth consumption over their life-cycle by borrowing when young, saving when in middle age and running down their assets in old age and at death. But the imposition of a limit on secured borrowing of up to 90% of the value of owned housing prevents individuals from reaching this optimum.

In the case where the premium on unsecured debt is 0.1, consumption of goods in the first period is virtually equal to income and the stock of housing is £54,400, just over 2.5 times annual income. This is financed by secured debt of £48,900, the maximum possible given the secured borrowing constraint. Unsecured borrowing in the first period is relatively small at £500. After the first period, the borrowing constraint in the model no longer binds, so that individuals choose the same level of consumption in the second and third stages of life. The pattern of income over time means that individuals build up financial assets during the second stage of life and run these down in the third stage, so that when they die the value of their house is sufficient to pay off their secured debt. Only in the first period of life is any unsecured debt borrowed.

In the same circumstances, but where the premium on unsecured debt is lower at 0.05, individuals are better able to smooth consumption over time. Consumption is still lower in the first stage of life and higher thereafter because of the limitation on secured borrowing, but it is higher in the first period than it would have been with a higher unsecured

borrowing premium. This is financed both by higher secured and unsecured borrowing; secured borrowing is higher since individuals choose to buy a larger stock of housing, with the additional amount of consumer spending effectively financed by unsecured borrowing, which eases the secured borrowing constraint somewhat. Note that despite the lower rate of interest on unsecured borrowing, those in the second and third stage of life do not use it either because they do not need to borrow or because cheaper secured borrowing is available.

Table A: Comparative statistics of calibrated model

£,thousands

| Period | Unsecured premium = 0.1 | | | | | Unsecured premium = 0.05 | | | | |
|--|-------------------------|----------|----------|----------|----------|--------------------------|----------|----------|----------|----------|
| | <i>c</i> | <i>h</i> | <i>s</i> | <i>u</i> | <i>y</i> | <i>c</i> | <i>H</i> | <i>s</i> | <i>u</i> | <i>y</i> |
| <i>Main case:</i> | | | | | | | | | | |
| 1 | 295.1 | 54.4 | 48.9 | 0.5 | 300 | 325.8 | 66.1 | 59.5 | 32.4 | 300 |
| 2 | 409.8 | 93.5 | -86.8 | 0 | 600 | 385.6 | 87.9 | -71.5 | 0 | 600 |
| 3 | 409.8 | 93.5 | 71.9 | 0 | 225 | 385.6 | 87.9 | 67.6 | 0 | 225 |
| <i>Higher secured borrowing limit ($\phi = 0.95$)</i> | | | | | | | | | | |
| 1 | 297.3 | 54.8 | 52 | 0 | 300 | 325.8 | 66.1 | 62.8 | 29.2 | 300 |
| 2 | 408.2 | 93.1 | -85.8 | 0 | 600 | 385.6 | 87.9 | -71.5 | 0 | 600 |
| 3 | 408.2 | 93.1 | 71.6 | 0 | 225 | 385.6 | 87.9 | 67.6 | 0 | 225 |
| <i>Low ownership of housing ($\alpha=0.0005$)</i> | | | | | | | | | | |
| 1 | 315.4 | 0.55 | 0.5 | 15.5 | 300 | 345.5 | 0.66 | 0.6 | 45.6 | 300 |
| 2 | 424.4 | 0.92 | -152.9 | 0 | 600 | 401.9 | 0.87 | -135.6 | 0 | 600 |
| 3 | 424.4 | 0.92 | 0.7 | 0 | 225 | 401.9 | 0.87 | 0.67 | 0 | 225 |
| <i>Low income expectations</i> | | | | | | | | | | |
| 1 | 267.1 | 60.9 | 28.1 | 0 | 300 | | | | | |
| 2 | 267.1 | 60.9 | 3.6 | 0 | 300 | | | | | |
| 3 | 267.1 | 60.9 | 46.9 | 0 | 225 | | | | | |
| <i>Less patience ($\delta=0.4$)</i> | | | | | | | | | | |
| 1 | 376.9 | 69.4 | 62.5 | 83.8 | 300 | 410.8 | 83.4 | 75.1 | 119.1 | 300 |
| 2 | 389.2 | 88.8 | 7.1 | 0 | 600 | 361.4 | 82.4 | 18.9 | 0 | 600 |
| 3 | 289.3 | 66 | 50.8 | 0 | 225 | 268.7 | 61.3 | 47.1 | 0 | 225 |

Main case: $\delta = 0.3$, $\alpha = 0.05$, $\gamma=0.25$, $\phi = 0.90$.

The second case we consider is of a higher secured borrowing limit of 95% of the value of the individual's house, rather than 90% as in the base case. The main effect is in causing individuals to substitute secured debt for unsecured debt with little or no noticeable effect on first period spending in either case. The reason for this negligible impact is that the change in the borrowing limit does little to alleviate the constraint. In the absence of any restriction on secured borrowing, individuals in the same circumstances would choose to invest £80,000 in housing and borrow £140,000, a loan to value ratio of 175%, using the additional resources to finance consumption of goods. Hence, the relaxation of the constraint does little to move individuals to their optimum position.

The third case shows the behaviour of those who are not owner-occupiers because they have no taste for home ownership (other than to a trivial extent). Consumption smoothing is prevented by the higher effective rate of interest on borrowing, which results in less consumption than optimal being chosen in the first stage of life. This is clearly less of a problem when the premium on unsecured borrowing is lower. In the cross-section, in comparison with those who have a stronger preference for housing, unsecured borrowing is higher for those who do not have access to the secured debt market, reflecting a higher level

of non-housing consumption, although their overall level of borrowing is lower since they do not have to finance the purchase of a house. Their net worth is also lower since they have no housing wealth.

The fourth case illustrates the importance of income expectations on borrowing. With second stage income expected to be the same as in the first stage of life, it is possible for the individual to smooth consumption without recourse to unsecured debt. Note that the stock of housing purchased in the first stage of life is higher than for those who have higher lifetime incomes but are constrained from borrowing as much as they would like, indicating the effect of the borrowing constraint on the intratemporal consumption decision.

The fifth case shows the effect of less patience. In the high-unsecured premium case, this leads to a hump-shaped path of consumption, with the premium on borrowing causing impatient individuals to restrain their desire for present consumption. Despite this, their unsecured borrowing exceeds their secured borrowing. In the low unsecured premium case, there is no hump shape in consumption as individuals are more able to achieve their preferred consumption path.

The implications of the model are that unsecured debt is likely to be used more by those who are young, impatient, with strong income expectations and no access to cheaper secured debt. It is likely to be used most when unsecured borrowing costs least. The model shows that there are situations where unsecured and secured debt tend to move in opposite directions in response to shocks, when the constraint on secured borrowing is relaxed for example, and when they move together, as when unsecured borrowing rates are reduced.

3 Estimating the empirical determinants of unsecured debt

The previous discussion is intended to provide a framework for understanding the determinants of unsecured debt rather than a model to be estimated. It suggests that unsecured borrowing is likely to be related to the household's position in the life-cycle, rate of time preference, access to cheaper secured finance, income and income expectations and the cost of unsecured borrowing. In this section, we describe how the determinants of the demand for unsecured debt may be estimated empirically. Suppose that the demand function for unsecured debt by individual i at date t , D_{it} , is of the following general form:

$$D_{it} = a_i + f_t(Y_{it}) + b_t Z_{it} - c_t r_{it}^u + \varepsilon_{it} \quad (3.1)$$

where a_i is an individual-specific fixed effect, Y represents the income and other economic circumstances of the individual, the function $f(\cdot)$ denotes that the (time-varying) relationship between D and Y could be non-linear, Z incorporates the individual's demographic and other personal characteristics, including age-related effects, r^u the individual-specific interest rate levied on unsecured debt and ε the unobserved determinants of unsecured debt. The coefficients, other than the fixed effect, a_i , can potentially vary over time.

Supply conditions in the unsecured credit market are reflected in the effective rate of interest charged on unsecured debt. Where individuals are credit-constrained, the effective rate can be thought of as being high enough to equate their demand for unsecured loans to the supply. For example, the effective interest rate might be given by:

$$r_{it}^u = r_t + \varphi_t - g_t(Y_{it}) \quad (3.2)$$

where r is the base rate, φ_t is the premium that financial institutions charge to the riskiest individuals and the negative (possibly non-linear) relationship between the effective rate and individual income reflects lower perceived lending risks at high levels of individual income. Substituting (3.2) into (3.1) then gives a reduced form debt function:

$$D_{it} = a_i + (f_t(Y_{it}) + c_t g_t(Y_{it})) + b_t Z_{it} - c_t (r_t + \varphi_t) + \varepsilon_{it} \quad (3.3)$$

This expression helps to clarify a number of points relevant to how it is estimated. First, in cross-sections, it is impossible to estimate the individual specific fixed effects, α_i , and the intercept term has to be imposed at the same value across all individuals. This means that any genuine fixed effects become part of the error term. If these are correlated with any of the explanatory variables, the relevant coefficients will be biased. So if individuals with a particularly high rate of time preference also choose to work more and so earn higher incomes, the estimated coefficient on income will overstate the response of unsecured borrowing to a change in income. Second, also in cross-sections, there is no variation across individuals in macroeconomic variables such as the base rate of interest, r , so their impact becomes part of the overall intercept term. Third, we allow the relationship between unsecured debt and income to be non-linear. In cross-section estimation below we do this by estimating separate intercept coefficients according to the individual's position in the income distribution. We use a similar approach to estimate age effects. Fourth, with panel data with a sufficiently long time dimension, it is possible to avoid the biases due to individual-specific fixed effects and to identify the impact of macroeconomic factors, but it is also necessary to assume that coefficients are either constant over time, or have a relatively simple structure.

In fact, most of our estimation effort is in estimating cross-section regressions for 1995 and 2000, but we do make some use of the limited panel information available as a check that the cross-section results are not strongly affected by correlation between individual fixed effects and explanatory variables.

A further econometric issue is how to deal with the fact that most people in our sample do not participate in the unsecured debt market. This could arise, as in the theoretical model, because they do not want any unsecured debt at prevailing interest rates; it could also reflect quantitative credit constraints or high entry costs that prevent them reaching their desired debt position. These two possibilities present different econometric problems [see Wooldridge (2002)]. In the former case, the econometric issue is that many observations are at a corner solution, in this case with no unsecured debt, and simply estimating the parameters in (3.3) over all households, including those without debt, using say a Tobit approach would be highly influenced by participation decisions. In the latter case, the econometric issue arises because of possible non-random sample selection that prevents some individuals participating in the market. In principle, such biases can be avoided by following the approach of Heckman (1979), which involves estimating a model of credit market participation, where this is conditioned on factors additional to those that determine the amount of debt borrowed. Studies similar to ours, such as Duca and Rosenthal (1993), Cox and Jappelli (1993) and Crook (2001), use a two-step Heckman procedure that involves including two additional terms in the debt equation to capture, firstly, the probability of an individual participating in the credit market, and secondly, their not being credit constrained. In the first step, probit models are used to estimate the probability of participating in the market and the probability of being unconstrained⁴. Then, the estimated effects are included as additional regressors in (3.3), so that the parameters can be interpreted as those of a true demand function.

We do not follow this approach for two reasons. First, unlike the US surveys, the BHPS does not provide any direct measure that would make it possible to discriminate between constrained and unconstrained individuals, although it is unlikely that many individuals in the UK are unable to borrow at all⁵. Second, the implementation of the Heckman procedure is quite problematic without a strong theoretical case for supplementary variables that affect the participation decision but do not influence the amount borrowed⁶. Partly for this reason, our results from using a Heckman approach are no different to those from simple OLS cross-section regressions⁷. This also suggests that any corner-solution biases are small. Given this and the results in previous studies we will focus separately on the participation equation (using a probit model) and on debt equations, using simple OLS cross-section regressions for those with debt, excluding non-participants.

4. According to Jappelli (1990), credit constraints affect 19% of households and as many as 30% of young households [Duca and Rosenthal (1993)]. Other related works are, Zeldes (1989), Cox and Jappelli (1993), Crook (1996), Gross and Souleles (2002). For the United Kingdom, Davies and Weber (1991), using household-level data and identifying unconstrained households as those with savings, found evidence of declining liquidity constraints but not of loosening credit constraints in the 1980s. Bayoumi (1993) found that softer liquidity constraints due to financial deregulation during the 1980s had a significant effect on UK consumption. More recently, Fernández-Corugedo and Muellbauer (2002) estimated an index of non-price credit conditions, and found evidence of looser credit restrictions during the 1980s and second half of the 1990s.

5. One possible proxy is given in wave 5, when individuals state whether they think that it was a right time to use credit in the hypothetical case that they wanted to buy something big. One of the possible answers to this question was 'Can't get credit' and that was only selected by 2.4% of 8,774 respondents.

6. Cox and Jappelli (1993) used years of education, occupation, area income, employment status, and rural/urban status as supplementary variables for the probability of having positive debt. Duca and Rosenthal (1993) and Crook (1996), by contrast, assumed that the same variables determined the probability of having debt and the amount borrowed (allowing for different parameters in the participation and debt equations).

7. Results using the Heckman procedure are available upon request. When conducting the two-step Heckman procedure, we have added dummies for region, race and employment status to the participation equation, as factors that might influence participation in the unsecured debt market without having much effect on the overall amount borrowed.

4 A cross-sectional analysis of the determinants of unsecured debt

4.1 The data

The BHPS⁸ is an annual national survey of the economic and demographic characteristics of British individuals and households. The first wave covered a representative sample of the population of Great Britain in 1991. This sample has remained broadly representative⁹ given that the same individuals are re-interviewed each year and, if they split-off from original households, all adult members of their new households are also interviewed. In 1991 the survey included around 5,500 households and 10,300 individuals (aged over 16 years).

Information on unsecured debt and financial assets is available only in waves 5 and 10 of the BHPS covering 1995 and 2000. For unsecured debt, individuals are asked about the overall amount they owe, excluding credit card and other bills being paid off in the month of the interview¹⁰. They are shown a card to prompt them about the forms in which they may have borrowed. In 1995, the prompt card contained the following list of debt instruments: *hire purchase agreements, personal loans (from bank, building society or other financial institution), credit cards, catalogue or mail order purchase agreements, DSS Social Fund loan, any other loan from a private individual, or anything else*. In 2000, two additional instruments, *overdrafts and student loans*, were added to this list.

This change in the list of unsecured debt instruments affects any analysis attempting to compare responses across the two waves of the survey. As both types of instrument were available in 1995, it is not clear how respondents with overdrafts or student loans would have included this type of borrowing in their answers to the survey at that time without being prompted. For example, they could have considered borrowing on overdrafts as a form of personal loan. But the change in question must leave room for doubt that this was the case. As shown in Table B, overdrafts represented nearly 7% of the total number of debt instruments mentioned in 2000. Student loans were a less significant 1% of total debt instruments. If borrowing using these instruments were entirely omitted in 1995, but not 2000, then a comparison would overstate the increase in unsecured household debt. There is some evidence against this in that Redwood and Tudela (2004) find that unsecured debt is more underreported relative to aggregate figures in 2000 than in 1995. This might suggest that the new listed instruments in 2000 were included in other categories in 1995. Throughout this analysis we assess the sensitivity of estimates to this potential problem by changing the sample in 2000.

8. The British Household Panel Survey (BHPS) is managed by the ESRC UK Longitudinal Studies Centre with the Institute for Social and Economic Research at the University of Essex. Detailed information can be found in Brice et al. (2002), available at <http://www.iser.essex.ac.uk/bhps/>.

9. The sample excludes households located north of the Caledonian Canal in Scotland. Since 1997, new samples have been added to the BHPS aimed at extending the coverage of some particular regions and groups of population. We exclude them to keep the sample representative of the British population as a whole.

10. If individuals do not know the exact amount they owe, they are asked to indicate whether it is more than £100, more than £500, more than £1,500, or more than £5,000. Depending on the case we assign a debt of £50, £300, £1,000, £3,250 or £7,000. This affects 310 borrowers (out of 6,889). If individuals report that the debt is a joint commitment we assign half of the value. In 2000 we can discover which part of the debt is a sole commitment but we do not use this information since it is not available for 1995. Joint commitments affect 984 and 709 individuals out of 3,481 and 3,458 debtors in 1995 and 2000 respectively. For each year, all unsecured debt values above the 99th percentile are recorded to the value of the 99th percentile. This is also done for unsecured debt-income ratios.

Table B: Number of unsecured debt instruments by age group

| 1995 | | | | | | | | | | | | |
|------------------|---------------|---------------|--------------|---------------------|-------------|------------------------|------------------------|----------------|--------------|-------------|-------------|-----------|
| age | hire purchase | personal loan | credit cards | mail order purchase | DSS | | | something else | student loan | overdraft | Total | Total (%) |
| | | | | | Social Fund | loans from individuals | loans from individuals | | | | | |
| 16-20 | 18 | 74 | 30 | 74 | 11 | 15 | 5 | - | - | 227 | 4.7% | |
| 20-25 | 110 | 258 | 144 | 136 | 19 | 33 | 8 | - | - | 708 | 14.7% | |
| 25-30 | 146 | 239 | 189 | 149 | 17 | 28 | 7 | - | - | 775 | 16.1% | |
| 30-35 | 192 | 210 | 215 | 179 | 12 | 24 | 3 | - | - | 835 | 17.3% | |
| 35-40 | 130 | 166 | 157 | 128 | 7 | 14 | 7 | - | - | 609 | 12.6% | |
| 40-45 | 115 | 138 | 150 | 89 | 10 | 6 | 5 | - | - | 513 | 10.6% | |
| 45-50 | 101 | 120 | 139 | 95 | 2 | 9 | 6 | - | - | 472 | 9.8% | |
| 50-55 | 59 | 73 | 104 | 63 | 3 | 5 | 4 | - | - | 311 | 6.5% | |
| 55-60 | 49 | 31 | 48 | 25 | 1 | 1 | | - | - | 155 | 3.2% | |
| 60+ | 58 | 26 | 76 | 47 | 1 | 3 | 4 | - | - | 215 | 4.5% | |
| Total | 978 | 1335 | 1252 | 985 | 83 | 138 | 49 | | | 4820 | 100% | |
| Total (%) | 20.3% | 27.7% | 26.0% | 20.4% | 1.7% | 2.9% | 1.0% | | | 100 | | |

| 2000 | | | | | | | | | | | | |
|------------------|---------------|---------------|--------------|---------------------|-------------|------------------------|------------------------|----------------|--------------|-------------|-------------|-----------|
| age | hire purchase | personal loan | credit cards | mail order purchase | DSS | | | something else | student loan | overdraft | Total | Total (%) |
| | | | | | Social Fund | loans from individuals | loans from individuals | | | | | |
| 16-20 | 13 | 44 | 51 | 51 | 10 | 11 | 56 | 94 | 6 | 336 | 5.8% | |
| 20-25 | 65 | 175 | 170 | 87 | 15 | 28 | 152 | 173 | 11 | 876 | 15.1% | |
| 25-30 | 142 | 233 | 238 | 114 | 20 | 25 | 113 | 77 | 9 | 971 | 16.7% | |
| 30-35 | 136 | 239 | 257 | 134 | 15 | 17 | 106 | 28 | 3 | 935 | 16.1% | |
| 35-40 | 136 | 212 | 278 | 125 | 14 | 19 | 76 | 12 | 6 | 878 | 15.1% | |
| 40-45 | 91 | 157 | 170 | 86 | 8 | 4 | 63 | 3 | 6 | 588 | 10.1% | |
| 45-50 | 72 | 110 | 124 | 55 | 3 | 4 | 33 | 3 | 8 | 412 | 7.1% | |
| 50-55 | 57 | 85 | 121 | 58 | 2 | 3 | 29 | 2 | 8 | 365 | 6.3% | |
| 55-60 | 28 | 61 | 69 | 44 | 3 | | 17 | 1 | 3 | 226 | 3.9% | |
| 60+ | 46 | 39 | 76 | 53 | | | 11 | | 6 | 231 | 4.0% | |
| Total | 786 | 1355 | 1554 | 807 | 90 | 111 | 656 | 393 | 66 | 5818 | 100% | |
| Total (%) | 13.5% | 23.3% | 26.7% | 13.9% | 1.5% | 1.9% | 11.3% | 6.8% | 1.1% | 100 | | |

A likely reason for the addition of the student loan category in the 2000 survey is that loans had by then become the main form of financial support for students. Up to and including academic year 1997/98 students were funded under a different set of arrangements, introduced in 1990/91, when non income-assessed student loans were introduced to provide extra resources towards living expenses and partially to replace grants. The main grant rates were frozen at their 1990/91 values until 1994/95 when the shift from grant to loan was accelerated by reducing the level of grant rates and increasing loan rates. Further details on the extent of student loan finance are provided by Callender and Wilkinson (2003). This shift in the student finance regime towards loans is also likely to distort unsecured debt market participation and borrowing, especially among individuals and their families who have been students during the new regime. Again, we try to avoid the distortion by varying the sample to exclude those affected.

4.2 Preliminary data description

Table C shows that the proportion of individuals reporting that they had any unsecured debt did not change between 1995 and 2000, with around 39% of individuals who answered this question claiming to have at least one form of unsecured debt in both years¹¹. Significantly, among those with some unsecured debt, the mean amount almost doubled from £1,489 in 1995 to £2,793 in 2000. Indeed, unsecured debt approximately

11. About 5% of individuals did not answer this question in both 1995 and 2000.

doubled at most points of the distribution with the median rising from £700 per debtor in 1995 to £1,500 in 2000 and the 90th percentile rising from £4,000 to £8,000. The ratio of unsecured debt to income also rose at most points of the distribution. For individuals with some debt, the median of the ratio increased from 8% in 1995 to 12% in 2000 while the 90th percentile rose from around 42% in 1995 to 70% in 2000, although the increase is more modest when we exclude full-time students from the sample¹².

Table C: Individual debt levels and debt-income ratios of debt-holders

| | 1995 | 2000 | 2000 (a) | 1995 | 2000 (a) |
|----------------------------------|------------------------------|-------|----------|-------|----------|
| | Excluding full time students | | | | |
| Individuals with no debt | 5,353 | 5,182 | 5,182 | 4,899 | 4,890 |
| Individuals with debt | 3,431 | 3,458 | 3,004 | 3,276 | 3,275 |
| Proportion of debtors | 0.39 | 0.40 | 0.37 | 0.40 | 0.40 |
| Debt (Levels £) | | | | | |
| sample size | 3,265 | 3,227 | 2,827 | 3,133 | 3,089 |
| mean | 1,489 | 2,973 | 2,708 | 1,492 | 2,936 |
| 10 th percentile | 60 | 100 | 100 | 60 | 100 |
| 30 th percentile | 250 | 500 | 500 | 250 | 500 |
| 50 th percentile | 700 | 1500 | 1500 | 700 | 1500 |
| 70 th percentile | 1,600 | 3,500 | 3,000 | 1625 | 3,500 |
| 90 th percentile | 4,000 | 8,000 | 7,500 | 4,000 | 8,000 |
| Debt-income ratio (%) (b) | | | | | |
| sample size | 3265 | 3257 | 2827 | 3133 | 3089 |
| mean | 21 | 39 | 24 | 18 | 31 |
| 10 th percentile | 1 | 1 | 1 | 1 | 1 |
| 30 th percentile | 3 | 5 | 4 | 3 | 5 |
| 50 th percentile | 8 | 12 | 10 | 7 | 11 |
| 70 th percentile | 17 | 26 | 22 | 16 | 24 |
| 90 th percentile | 42 | 70 | 54 | 39 | 61 |

(a) The number of households with unsecured debt excludes families whose debt is only in the form of student loans or overdrafts. Debt and debt-income ratios are calculated excluding households with overdrafts or student loans, no matter if they have other type of instruments.

(b) Excluding individuals with income below 100

As suggested by the life-cycle model and the simple model of Section 2, there are clear differences in unsecured debt market participation by age. Table D shows that in both 1995 and 2000, around 60% of individuals aged 20 to 35 years old had at least one form of unsecured debt. This fraction decreases with age to 10% for individuals older than 60. There is also a clear increasing relationship between unsecured debt market participation and income which is similar in both 1995 and 2000¹³.

12. Note that individuals provide the total amount of debt they owe and the different classes of instruments they use. There is no information on debt by instrument. Therefore, in the third column of Table C, when excluding households with overdrafts we are also excluding the debt that these borrowers may hold in other instruments. Since individuals with overdrafts are usually high debtors these figures might be biasing downward the true figure.

13. Income groups are deciles of the income distribution of the total sample in 1995. In 2000 decile values are updated with the Retail Price Index.

Table D: Proportion of borrowers and sample weights by age and income.

| % | Proportion of borrowers | | | | | Sample weights of each age and income group | |
|-----------------------------------|-------------------------|-----------|-----------|-----------------------|-----------|---|------------|
| | Total sample | | | Excluding ft students | | 1995 | 2000 |
| | 1995 | 2000 | 2000 (a) | 1995 | 2000 | | |
| age groups | | | | | | | |
| 16-20 | 24 | 33 | 26 | 34 | 34 | 9 | 8 |
| 20-25 | 58 | 60 | 57 | 59 | 59 | 9 | 9 |
| 25-30 | 58 | 62 | 61 | 58 | 62 | 10 | 10 |
| 30-35 | 57 | 57 | 56 | 57 | 57 | 11 | 10 |
| 35-40 | 54 | 55 | 54 | 54 | 55 | 9 | 10 |
| 40-45 | 48 | 49 | 49 | 49 | 49 | 8 | 9 |
| 45-50 | 43 | 41 | 41 | 43 | 41 | 9 | 8 |
| 50-55 | 40 | 33 | 33 | 40 | 33 | 7 | 9 |
| 55-60 | 28 | 31 | 31 | 28 | 31 | 6 | 6 |
| 60+ | 10 | 11 | 11 | 10 | 11 | 21 | 21 |
| <i>Total</i> | <i>39</i> | <i>40</i> | <i>39</i> | <i>39</i> | <i>40</i> | <i>100</i> | <i>100</i> |
| income groups (by deciles) | | | | | | | |
| 1 | 24 | 30 | 25 | 30 | 31 | 10 | 9 |
| 2 | 29 | 29 | 27 | 29 | 27 | 10 | 8 |
| 3 | 29 | 30 | 28 | 28 | 28 | 10 | 7 |
| 4 | 32 | 29 | 29 | 31 | 29 | 10 | 8 |
| 5 | 36 | 31 | 30 | 36 | 30 | 10 | 10 |
| 6 | 40 | 39 | 39 | 39 | 39 | 10 | 11 |
| 7 | 48 | 44 | 43 | 48 | 44 | 10 | 11 |
| 8 | 49 | 49 | 49 | 49 | 49 | 10 | 11 |
| 9 | 55 | 55 | 55 | 55 | 55 | 10 | 12 |
| 10 | 50 | 50 | 49 | 50 | 50 | 10 | 12 |
| <i>Total</i> | <i>39</i> | <i>40</i> | <i>39</i> | <i>39</i> | <i>40</i> | <i>100</i> | <i>100</i> |

(a) Households with overdrafts or student loans and with no other type of unsecured debt are excluded

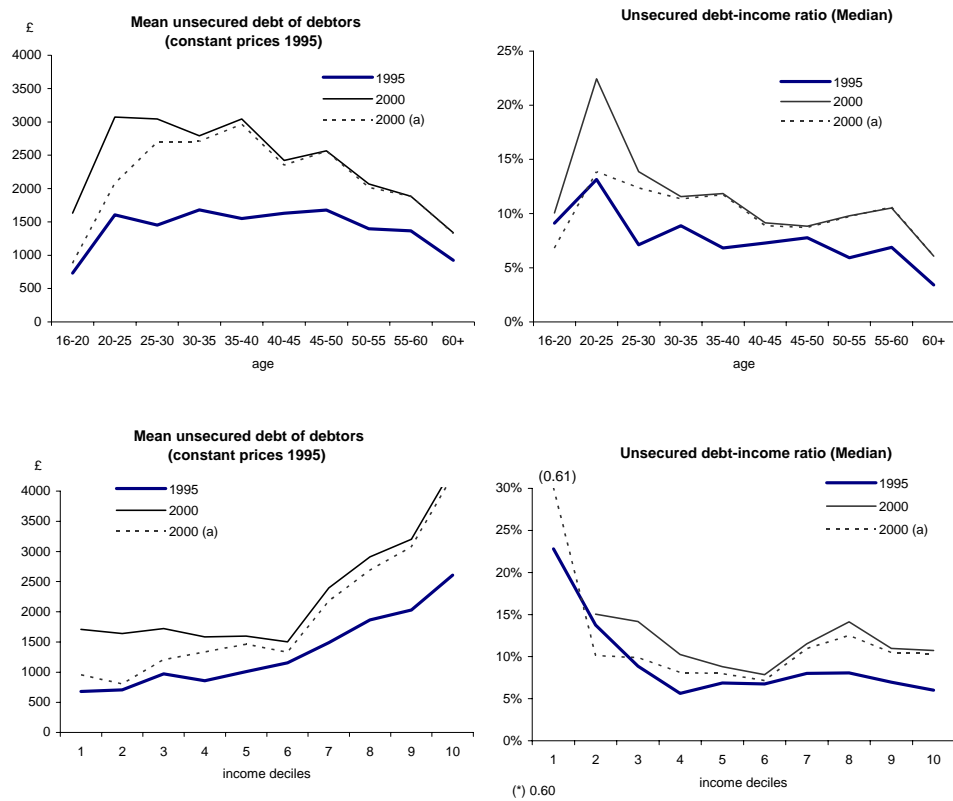
There is no significant change in the overall participation rate between 1995 and 2000. Within individual age groups, there is an increase in participation among those who are under 30 that is particularly marked for 16 to 20 year olds. Much of this is likely to reflect the shift in student finance between 1995 and 2000 as there is no change in participation for 16 to 25 year olds once full-time students are excluded (fourth and fifth columns of Table D). Similarly, the apparent increase in participation among the lowest income group appears to be due to greater participation by full-time students. Once they are excluded, there is no change in participation in the lowest income group.

In contrast to participation, there is no clear evidence of any systematic effect of age on the amount borrowed (see top panels of Chart 1 and Chart 1b), apart from for the oldest and youngest groups who tend to borrow less. The amount borrowed tends to rise in line with the level of income, with the unsecured debt to income ratio being fairly similar across all but the lowest income groups, who have by far the highest levels of unsecured debt in relation to income¹⁴.

14. In Cox et al. (2002) the unsecured debt-income ratio seems to be negatively correlated with age and income. Discrepancies can arise since their study focuses on households, not on individuals, and income variables and groups can differ. In addition our analysis excludes all new samples in the BHPS since 1997.

Debt levels and debt-income ratios are significantly higher for all groups in 2000 than in 1995. The increase seems to be more important for the lowest income decile and those between 20 and 25, although this appears to be affected by the change in BHPS questionnaire and methods of student finance. When those with *only* overdrafts or student loans are excluded the increase in debt levels is much more modest for these groups (see dashed lines in Chart 1)¹⁵. However, excluding these groups may leave out people with high debt levels for other reasons. Some evidence in favour of this view is that when full-time students are excluded (Chart 1b), there remains a large increase in debt for those with low incomes and those between 20 and 25.

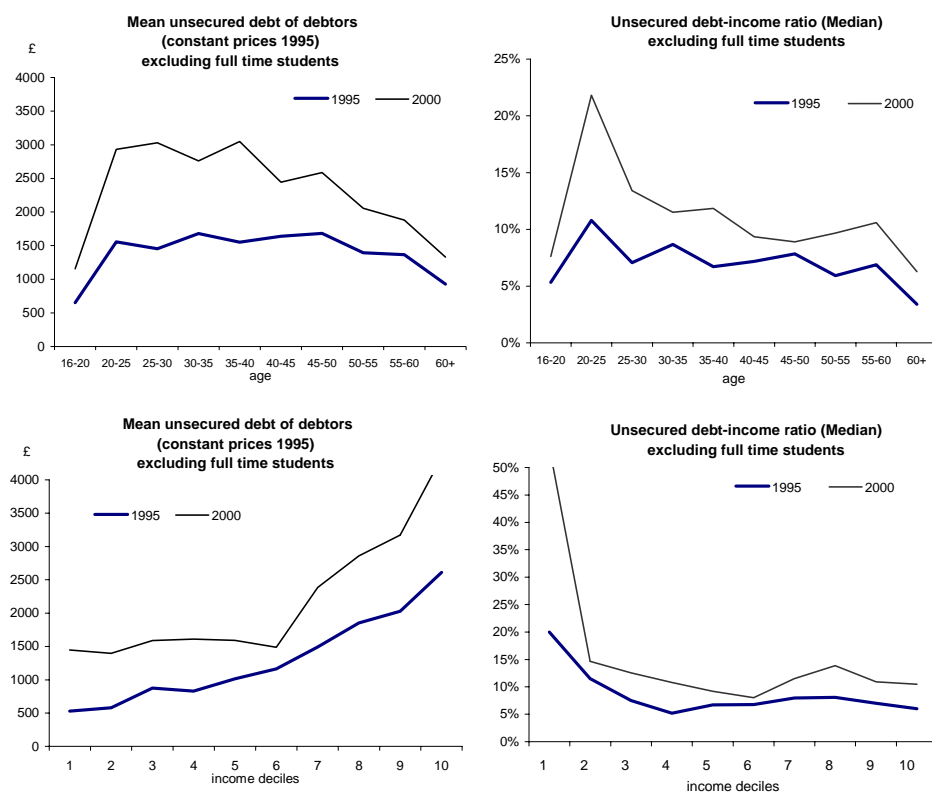
Chart 1: Unsecured debt levels and debt-income ratios by age and income



All figures are calculated excluding individuals with income below 100 pounds
(a) Excluding households with overdrafts or student loans

15. The increase in debt for all deciles is statistically significant.

Chart 1b: Unsecured debt levels and debt-income ratios by age and income
Sample excluding full time students



All figures are calculated excluding individuals with income below 100 pounds

Table E and Chart 2 show the relationship between unsecured debt and various measures of housing wealth and therefore secured debt capacity. There is a clear negative relationship between participation in the unsecured debt market and net housing wealth¹⁶, but the relationship between the amount borrowed and net housing wealth is less clear (see Chart 2). In 1995, the unsecured debt-income ratio appears to be independent of net housing wealth. The former increased most between 1995 and 2000 for those with low housing wealth, such that there is a slight decreasing relationship in 2000.

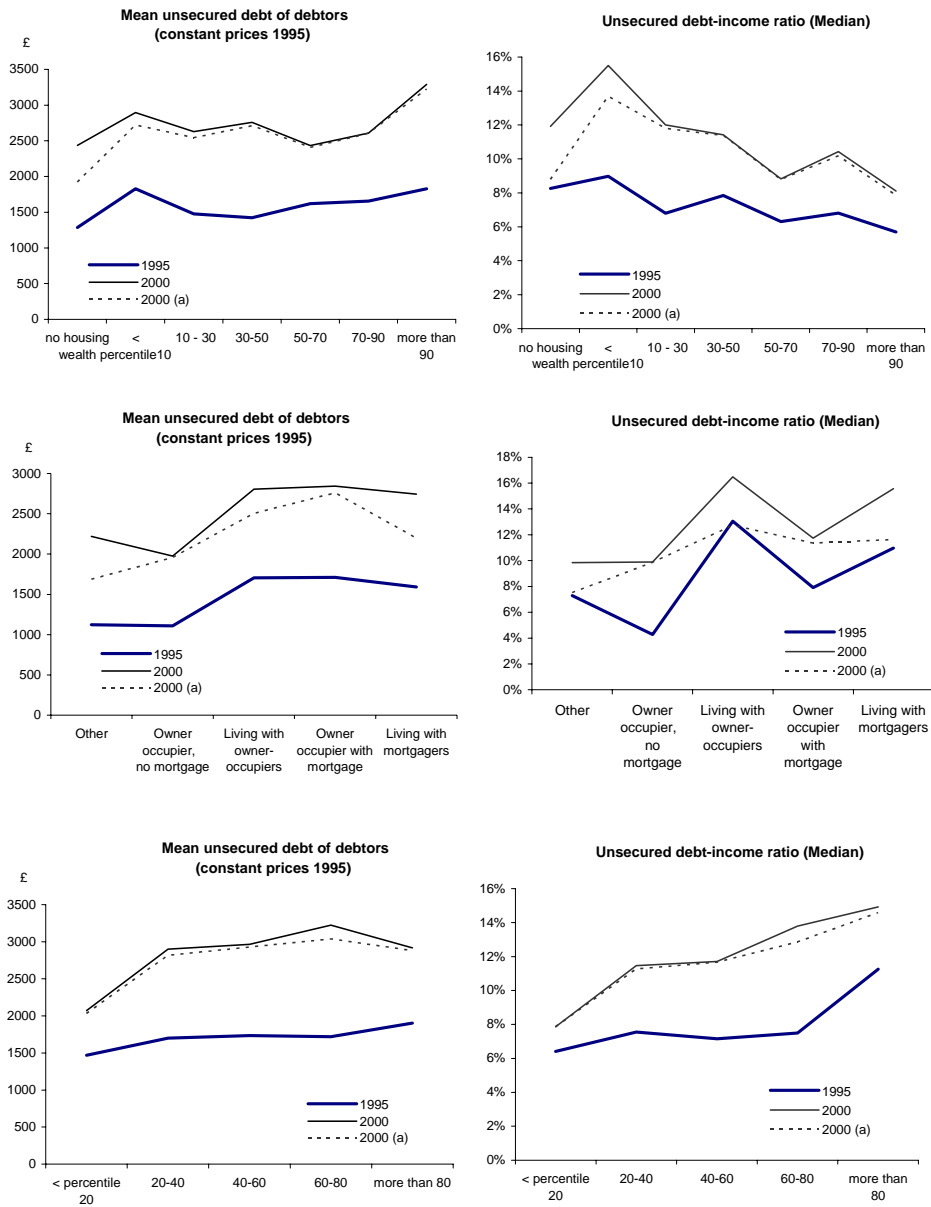
¹⁶ Net housing wealth is the value of the residential house net of mortgages. Since these are household variables in BHPS we assign half the value of the house and mortgage to the first and second person owning the accommodation.

Table E: Proportion of borrowers and sample weights by age and income.

| % | Proportion of borrowers | | | | |
|------------------------------|-------------------------|------|----------|-----------------------|------|
| | Total sample | | | Excluding ft students | |
| | 1995 | 2000 | 2000 (a) | 1995 | 2000 |
| Net housing wealth | | | | | |
| no housing wealth | 37 | 41 | 38 | 38 | 39 |
| < percentile10 | 67 | 66 | 66 | 66 | 67 |
| 10 - 30 | 55 | 55 | 55 | 55 | 54 |
| 30-50 | 39 | 39 | 39 | 39 | 39 |
| 50-70 | 32 | 32 | 31 | 31 | 31 |
| 70-90 | 26 | 24 | 23 | 23 | 25 |
| more than 90 | 21 | 21 | 21 | 21 | 21 |
| <i>Total</i> | 38 | 39 | 38 | 38 | 39 |
| Housing status | | | | | |
| Other | 40 | 43 | 41 | 41 | 40 |
| Owner occupier, no mortgage | 16 | 16 | 15 | 15 | 16 |
| Living with owner-occupiers | 23 | 29 | 26 | 26 | 25 |
| Owner occupier with mortgage | 53 | 53 | 52 | 52 | 53 |
| Living with mortgagers | 34 | 40 | 37 | 37 | 42 |
| <i>Total</i> | 39 | 40 | 39 | 39 | 40 |
| Mortgage-debtors | | | | | |
| < percentile 20 | 42 | 41 | 41 | 41 | 43 |
| 20-40 | 51 | 54 | 53 | 53 | 52 |
| 40-60 | 60 | 60 | 60 | 60 | 60 |
| 60-80 | 60 | 59 | 58 | 58 | 60 |
| more than 80 | 53 | 56 | 56 | 56 | 53 |
| <i>Total</i> | 53 | 54 | 54 | 54 | 53 |
| Financial wealth | | | | | |
| no financial wealth | 41 | 41 | 39 | 39 | 42 |
| quartile 1 | 51 | 55 | 54 | 54 | 55 |
| quartile 2 | 45 | 50 | 48 | 48 | 48 |
| quartile 3 | 34 | 38 | 36 | 36 | 35 |
| quartile 4 | 25 | 26 | 25 | 25 | 25 |
| <i>Total</i> | 40 | 42 | 41 | 41 | 41 |

(a) Households with overdrafts or student loans and with no other type of unsecured debt are excluded

Chart 2: Unsecured debt levels and debt-income ratios by housing-wealth and secured debt



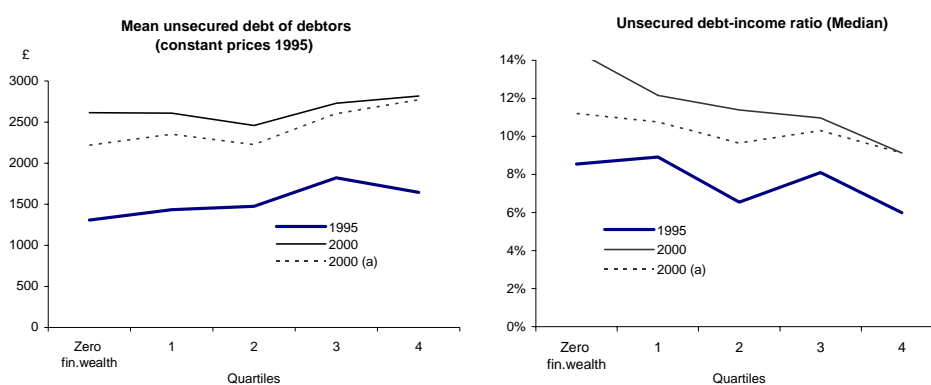
All figures are calculated excluding individuals with income below 100 pounds
 (a) Excluding households with overdrafts or student loans

Turning to housing status, owner-occupiers with a mortgage have a higher propensity to hold unsecured debt than other groups in both 1995 and 2000. They also have higher amounts of unsecured debt than owners with no secured debt. Further, among households with mortgages, there seems to be a weak positive correlation between the level of unsecured debt and the secured debt-income ratio in 2000 and a stronger positive relationship between the unsecured debt-income ratio and the secured debt-income ratio in 2000. These general relationships are broadly consistent with the theoretical model of Section 2, although it is not clear why those with relatively low secured debt-income ratios choose to have any unsecured debt rather than seeking to increase their lower-cost secured debt¹⁷.

As regards financial wealth¹⁸, there seems to be a negative relationship between the size of financial assets and participation in the unsecured debt market (see Table E and Chart 3)¹⁹. In 2000, there is a relatively clear decreasing relationship between unsecured debt-income ratios and financial wealth²⁰. Those with a low level of financial assets are more likely to hold unsecured debt to finance consumption.

All these figures point to a quite generalised increase in the average unsecured debt of borrowers between 1995 and 2000, while participation rates were broadly unchanged.

Chart 3: Unsecured debt levels and debt-income ratios by financial wealth



17. The increase in the unsecured debt of those with relatively high mortgage debt-income ratios could be related to a change in the mortgage market in 1998. From that time, borrowers with a secured loan to housing value ratio of less than 0.9 were exempted from paying for mortgage indemnity insurance. This might have caused some borrowers to substitute unsecured for secured borrowing. Fernández-Corugedo and Muellbauer (2002) estimate that this raised the long-run stock of aggregate unsecured credit by 8%.

18. This variable does not include assets in the form of pension funds or insurance products.

19. Financial wealth groups are percentiles for those with positive financial assets. We consider separately those with no financial wealth. We assign equal shares if savings are held jointly.

20. The same pattern is observed when considering only liquid financial assets.

4.3 Estimation results

While the preceding section provides a broad overview of unsecured debt and its correlation with the characteristics and circumstances of individual borrowers, a major limitation of purely descriptive analysis is the inability to disentangle the independent contributions of individual factors. In this sub-section, we use regression analysis to assess statistically the key factors determining participation and the amount borrowed in the unsecured debt market.

It is not clear whether decisions about unsecured borrowing are taken at the level of the individual borrower or the household. Certainly it is possible to think of some households where all decisions are collective and others where the individual members of the household appear to lead independent lives. Here, we suppose that the demand for unsecured debt is an individual decision although household circumstances matter. In order to take household characteristics into account we include as explanatory variables marital status, gender, number of dependent children, the income of the rest of the members of the household, whether the individual is head of household and the type of housing tenure.

The other explanatory variables in the debt and participation equations include age dummies to take into account the life-cycle stage of individuals and variables aimed at explaining the effect of current and expected income on consumption and borrowing. These variables are actual income, educational qualifications to proxy human capital²¹ and whether the individual expects an improvement in his financial situation. Employment status is included to proxy income uncertainty. Some of the income-related variables could also have an additional effect in the reduced form equation through their impact on the unsecured debt premium if they are correlated with the risk of default. We also include dummies to take into account whether individuals have access to the mortgage market and, in the case of mortgagors, distinguish them by the level of the mortgage debt-income ratio. Gross financial wealth is included in the form of a dummy variable distinguishing between those with no financial wealth and those with financial wealth below and above the median. Finally, we add region dummies. Other idiosyncratic differences in household preferences and interest rates will be reflected in the error term, because, as noted earlier, with cross-section data we cannot separate the random and systematic component of the residuals.

The results are presented in Table F, for the probit model of unsecured debt market participation, and Table G for the equation for the unsecured debt holdings of those who participate. We report only OLS results for the latter equation, although we also estimated it using a two-step Heckman procedure which attempts to control for sample selection bias by including the estimated probability of participation (in the form of the inverse of Mill's ratio) as an additional regressor. This variable is only significant in 2000 when it is negative, suggesting that the unobservable characteristics that induce people to participate in the unsecured debt market are negatively correlated with the unobservable factors determining how much they borrow having entered the market. One possible explanation for this effect is that the unobservable (to the researcher) characteristics of those who are the most eligible borrowers from the perspective of lenders also reduce the amount that these individuals wish to borrow. This is the opposite of the effect that would be obtained if market participation decisions were affected by the presence of entry costs as in Crook (2001). However, it is not clear why this factor should be stronger in 2000 than 1995²². As the other coefficients are not affected by the inclusion of this term we focus on the OLS results.

21. We consider three groups. The first one corresponds to individuals with the highest educational qualification including a higher degree, first degree, teaching and other higher qualifications. The second group includes those with nursing, GCE A Levels, GCE O Levels or equivalent, commercial qualifications and apprenticeships. The third group comprises those without qualifications.

22. An alternative possible interpretation is related to the presence of costs when withdrawing equity from the value of housing. These costs may induce individuals with a higher demand for funds to borrow in the secured debt market while only those with a lower demand for funds would borrow in the unsecured debt market, even though they have to pay a premium. This effect would be stronger in the more buoyant housing market conditions of 2000.

For the purposes of comparing parameters between 1995 and 2000 we include all variables interacted with a dummy for the year 2000 (instead of carrying out two separate estimations). In addition, because of concerns about changes in the survey questions and nature of student finance between 1995 and 2000, we present separate results for the whole sample (Model 1) and for over-35 year olds only (Model 2). This is to generate exogenously a sample that contains almost nobody with either student loans or overdrafts in 2000. We also used other methods to ensure comparability between the 1995 and 2000 samples, although these are not reported in full²³.

Since most of the explanatory variables take the form of dummy rather than continuous variables, the estimation is relative to a 'reference group' for whom only the constant term is evaluated. The reference group is indicated clearly in the table²⁴. According to the estimated probit model, the probability of having unsecured debt for the reference group was 0.53 in 2000 and we cannot reject the null hypothesis that this probability is unchanged from that in 1995.

We now discuss the results for each potential explanatory variable looking first at its effect on the participation decision and then on the decision as to how much to borrow.

23. In particular, we re-estimated the participation equation excluding those who report that their *only* form of unsecured debt in 2000 is student loans or overdrafts. (This reduces the sample by 185 observations, of which 147 are individuals reporting all their debt in overdrafts.) These individuals might have been included as debtors in 1995, depending on how they interpreted the debt categories listed in the questionnaire in 1995. We re-estimated the equation for the unsecured debt levels, including dummy variables interacting with age for individuals with overdrafts and student loans. (See Table B for distribution of these instruments by age.) We also carried out the estimations using income dummies and results were not altered qualitatively.

24. White males, head of household, co-habiting, with no dependent children, living in Inner London, aged 20-30, with a high level of education, employed, whose house is owned outright with a value below the 30th percentile in the sample population, with income between the 50th and 70th percentiles and no financial wealth. The head of the household in the BHPS is the principal owner or renter of the residence, and if there is more than one potential head, the eldest is selected.

Table F: Probit model for unsecured debt market participation

| | Model 1: Total sample | | | | | | Model 2: older than 35 year old | | | | | |
|---|--|---------------------------|---------|-------|--------------|---------|---------------------------------|-------|--------------|---------------------------|--------------|---------|
| No. observations | 14369 | | | | | | 9088 | | | | | |
| chi2(117) | 2657.55 | | | | | | 1758 | | | | | |
| Prob>chi2 | 0.000 | | | | | | 0 | | | | | |
| Pseudo R2 | 0.1687 | | | | | | 0.181 | | | | | |
| log likelihood | -8080 | | | | | | -4783 | | | | | |
| Correctly classified | 70% | | | | | | interacted with year 2000 | | | | | |
| | | interacted with year 2000 | | | | | | | | interacted with year 2000 | | |
| variable | reference group | mg effect | | | | | | coeff | std.err | coeff | std.err | |
| | | coeff | std.err | (a) | coeff | std.err | coeff | | | | | std.err |
| Not head of household | (head of the hhold) | -0.03 | 0.05 | -0.01 | -0.12 | 0.07 | | | -0.15 | 0.07 | 0.01 | 0.10 |
| Female | (male) | 0.15 | 0.04 | 0.06 | -0.01 | 0.06 | | | 0.31 | 0.07 | -0.20 | 0.09 |
| Divorce/separated | | 0.02 | 0.07 | 0.01 | 0.02 | 0.10 | | | -0.01 | 0.09 | 0.13 | 0.12 |
| Widow | (couples) | -0.28 | 0.09 | -0.11 | -0.09 | 0.14 | | | -0.37 | 0.10 | -0.01 | 0.15 |
| Never married | | -0.12 | 0.05 | -0.05 | 0.16 | 0.08 | | | -0.22 | 0.09 | 0.18 | 0.13 |
| One dependent child | (Nn dep. children) | 0.00 | 0.05 | 0.00 | 0.07 | 0.07 | | | -0.02 | 0.07 | 0.21 | 0.10 |
| Two dependent children | | 0.03 | 0.05 | 0.01 | 0.01 | 0.08 | | | -0.03 | 0.07 | 0.22 | 0.10 |
| Three or more dep. children | | 0.13 | 0.07 | 0.05 | 0.07 | 0.11 | | | 0.13 | 0.10 | 0.25 | 0.15 |
| Race (not white) | | -0.39 | 0.10 | -0.15 | 0.03 | 0.13 | | | -0.65 | 0.15 | 0.20 | 0.21 |
| Aged 16 to 20 | | -0.53 | 0.08 | -0.20 | 0.00 | 0.12 | | | | | | |
| Aged 30 to 45 | | -0.18 | 0.05 | -0.07 | -0.01 | 0.07 | | | | | | |
| Aged 45 to 60 | (aged 20 to 30) | -0.33 | 0.06 | -0.13 | 0.00 | 0.08 | | | -0.14 | 0.06 | 0.08 | 0.08 |
| Aged 60 or more | | -0.87 | 0.09 | -0.30 | 0.20 | 0.13 | | | -0.62 | 0.09 | 0.23 | 0.14 |
| Medium qualification | (high level) | -0.08 | 0.04 | -0.03 | -0.08 | 0.06 | | | -0.05 | 0.05 | -0.02 | 0.07 |
| No qualifications | | -0.30 | 0.05 | -0.12 | 0.02 | 0.08 | | | -0.25 | 0.06 | 0.07 | 0.09 |
| Self-employed | (employed) | -0.14 | 0.06 | -0.06 | 0.19 | 0.09 | | | -0.11 | 0.08 | 0.14 | 0.11 |
| Unemployed | | -0.20 | 0.08 | -0.08 | -0.04 | 0.13 | | | -0.08 | 0.12 | -0.24 | 0.20 |
| Retired | | -0.29 | 0.08 | -0.11 | -0.08 | 0.12 | | | -0.27 | 0.09 | -0.10 | 0.13 |
| Full time student | | -0.18 | 0.08 | -0.07 | 0.27 | 0.13 | | | -0.02 | 0.31 | 0.01 | 0.43 |
| Other labour status | | -0.17 | 0.06 | -0.07 | -0.03 | 0.08 | | | -0.14 | 0.07 | -0.08 | 0.10 |
| Income (y) <= perc 10th (p10) | (per 50th < income < perc 70th) | -0.39 | 0.08 | -0.15 | 0.07 | 0.11 | | | -0.28 | 0.11 | 0.07 | 0.17 |
| between 10th and 30th | | -0.20 | 0.06 | -0.08 | 0.06 | 0.08 | | | -0.30 | 0.07 | 0.20 | 0.11 |
| between 30th and 50th | | -0.04 | 0.05 | -0.02 | -0.10 | 0.08 | | | -0.07 | 0.07 | -0.01 | 0.10 |
| between 70th and 90th | | 0.11 | 0.05 | 0.05 | 0.04 | 0.07 | | | 0.17 | 0.07 | -0.03 | 0.09 |
| larger than the percentile 90th | | 0.08 | 0.07 | 0.03 | -0.02 | 0.09 | | | 0.22 | 0.08 | -0.17 | 0.11 |
| Income other members (*10,000) | | -0.02 | 0.01 | 0.00 | 0.03 | 0.02 | | | 0.01 | 0.02 | 0.00 | 0.00 |
| Not owner-occupier | (owners-occupiers with no mortgage and hw < perc.30th) | 0.38 | 0.09 | 0.15 | -0.18 | 0.13 | | | 0.30 | 0.10 | -0.16 | 0.13 |
| Living with mortgage-debtors | | 0.14 | 0.11 | 0.11 | -0.13 | 0.15 | | | 0.17 | 0.15 | -0.07 | 0.20 |
| Living with owner occupiers | | -0.05 | 0.12 | 0.12 | -0.02 | 0.17 | | | 0.12 | 0.15 | -0.19 | 0.21 |
| Secured-debt/income < 20th perc | | 0.32 | 0.10 | 0.10 | -0.23 | 0.14 | | | 0.27 | 0.11 | -0.15 | 0.15 |
| between 20th and 40th | | 0.36 | 0.10 | 0.10 | -0.14 | 0.14 | | | 0.30 | 0.11 | -0.07 | 0.15 |
| between 40th and 60th | | 0.50 | 0.10 | 0.10 | -0.18 | 0.14 | | | 0.52 | 0.12 | -0.16 | 0.16 |
| between 60th and 80th | | 0.44 | 0.11 | 0.11 | -0.13 | 0.15 | | | 0.47 | 0.12 | -0.08 | 0.17 |
| larger than the 80th percentile | | 0.39 | 0.11 | 0.11 | -0.12 | 0.15 | | | 0.51 | 0.12 | -0.18 | 0.17 |
| No mortgage, p30 < housing equity < p50 | | 0.02 | 0.13 | 0.13 | -0.22 | 0.19 | | | -0.08 | 0.14 | -0.09 | 0.19 |
| between 50th and 70th | | 0.24 | 0.12 | 0.12 | -0.34 | 0.17 | | | 0.21 | 0.12 | -0.29 | 0.18 |
| between 70th and 90th | | 0.12 | 0.14 | 0.14 | -0.31 | 0.19 | | | 0.10 | 0.14 | -0.22 | 0.20 |
| larger than the 90th percentile | | 0.13 | 0.18 | 0.18 | -0.30 | 0.25 | | | 0.03 | 0.18 | -0.20 | 0.25 |
| Positive fcial wealth < median | (zero fin. wealth) | 0.06 | 0.04 | 0.04 | 0.11 | 0.06 | | | 0.16 | 0.06 | 0.11 | 0.08 |
| Positive fcial wealth > median | | -0.32 | 0.05 | 0.05 | 0.10 | 0.07 | | | -0.21 | 0.06 | 0.02 | 0.08235 |
| Positive expectations on future financial situation | | 0.17 | 0.04 | 0.04 | 0.10 | 0.05 | | | 0.19 | 0.05 | 0.15 | 0.07 |
| constant | | -0.03 | 0.15 | 0.15 | 0.10 | 0.21 | | | -0.44 | 0.19 | 0.05 | 0.26 |

Notes to table:

- The marginal effect is for a discrete change in each dummy variable from 0 to 1.
- Estimation is carried out for 1995 and 2000, interacting each variable with a 2000 dummy. Standard errors are robust to heteroskedasticity. The estimation also allows for 17 regional dummies which are not reported. Percentile values are calculated for the total sample. The income quantiles are £1,328, £4,246, £ 7,376, £12,027 and £21,316 in 1995. They are updated to 2000 prices by the RPI. Secured debt to income ratio quantiles are 0.73, 1.21, 1.71, 2.5 in 1995 and 0.81, 1.25, 1.77 and 2.52 in 2000. Housing wealth quantiles for owner occupiers without a mortgage are £20,000, £30,000, £42,000, £60,000, £90,000 in 1995 and £25,000, £42,500, £60,000, £90,000, £150,000 in 2000. Financial wealth includes liquid and non-liquid financial assets and median values correspond to £1,560 in 1995 and £2,250 in 2000. The category 'other' in labour status includes maternity leave, family care, school, long term sick and disabled and those on government training schemes.

Table G: Cross-section regressions of unsecured debt levels

| | Model 1 | | | | Aged>35 | | | |
|---|----------------------------------|---------|-------------|---------|----------------------------------|---------|--------------|---------|
| | coeff | std.err | coeff | std.err | coeff | std.err | coeff | std.err |
| number obs | 5576 | | | | 3010 | | | |
| R-squared | 0.26 | | | | 0.30 | | | |
| Adj R-squared | 0.25 | | | | 0.27 | | | |
| | <i>Interacted with year 2000</i> | | | | <i>Interacted with year 2000</i> | | | |
| | coeff | std.err | coeff | std.err | coeff | std.err | coeff | std.err |
| Not head of the household | -0.06 | 0.08 | -0.05 | 0.11 | 0.03 | 0.13 | -0.09 | 0.18 |
| Female | -0.35 | 0.07 | 0.03 | 0.10 | -0.54 | 0.12 | 0.09 | 0.16 |
| Divorce/separated | 0.01 | 0.11 | 0.01 | 0.16 | 0.17 | 0.16 | -0.06 | 0.21 |
| Widow | -0.17 | 0.21 | -0.16 | 0.32 | -0.05 | 0.23 | -0.20 | 0.33 |
| Never married | 0.13 | 0.09 | 0.06 | 0.13 | 0.28 | 0.18 | 0.12 | 0.26 |
| 1 dep. Child | -0.18 | 0.08 | -0.09 | 0.11 | 0.07 | 0.11 | -0.13 | 0.16 |
| 2 dep. Children | -0.17 | 0.08 | -0.05 | 0.12 | -0.01 | 0.12 | -0.05 | 0.17 |
| 3 or more dep. Children | -0.33 | 0.11 | 0.24 | 0.16 | -0.18 | 0.16 | 0.38 | 0.22 |
| Not white | 0.28 | 0.18 | -0.09 | 0.26 | 0.30 | 0.31 | -0.23 | 0.41 |
| Aged 16 to 20 | -0.74 | 0.14 | 0.03 | 0.20 | | | | |
| Aged 30 to 45 | 0.00 | 0.07 | -0.17 | 0.11 | | | | |
| Aged 45 to 60 | -0.16 | 0.09 | -0.14 | 0.13 | -0.04 | 0.09 | -0.02 | 0.14 |
| Aged 60 or more | -0.31 | 0.20 | -0.21 | 0.28 | -0.17 | 0.20 | -0.09 | 0.29 |
| Medium qualification | -0.13 | 0.06 | -0.09 | 0.09 | -0.14 | 0.09 | 0.04 | 0.12 |
| No qualifications | -0.27 | 0.09 | -0.12 | 0.14 | -0.28 | 0.11 | -0.03 | 0.16 |
| Self employed | 0.39 | 0.11 | -0.16 | 0.15 | 0.34 | 0.13 | 0.04 | 0.19 |
| Unemployed | -0.38 | 0.14 | 0.27 | 0.23 | -0.75 | 0.22 | 1.00 | 0.37 |
| Retired | -0.39 | 0.19 | 0.23 | 0.28 | -0.41 | 0.20 | 0.36 | 0.29 |
| Full time student | 0.60 | 0.15 | -0.05 | 0.25 | 0.64 | 0.52 | -1.41 | 0.70 |
| Other labour status | -0.27 | 0.10 | -0.13 | 0.14 | -0.42 | 0.14 | 0.08 | 0.20 |
| Income (y) <= perc 10 th (p10) | -0.79 | 0.14 | 0.34 | 0.20 | -0.75 | 0.21 | 0.06 | 0.32 |
| between 10 th perc and 30 th perc | -0.47 | 0.10 | 0.01 | 0.15 | -0.56 | 0.14 | 0.11 | 0.20 |
| between 30 th perc and 50 th perc | -0.31 | 0.09 | 0.05 | 0.13 | -0.41 | 0.13 | 0.15 | 0.18 |
| between 70 th perc and 90 th perc | 0.40 | 0.08 | 0.06 | 0.11 | 0.23 | 0.12 | 0.27 | 0.16 |
| larger than 90 th perc | 0.62 | 0.11 | 0.28 | 0.15 | 0.40 | 0.14 | 0.53 | 0.19 |
| Income of other members (coef * 10 ³) | 0.09 | 0.03 | -0.03 | 0.03 | 0.08 | 0.04 | -0.03 | 0.05 |
| Not owner-occupier | 0.20 | 0.20 | -0.21 | 0.27 | 0.03 | 0.22 | -0.08 | 0.29 |
| Living with mortgage-debtors | 0.20 | 0.22 | -0.05 | 0.30 | 0.13 | 0.30 | -0.08 | 0.39 |
| Living with owner occupiers | 0.36 | 0.25 | 0.05 | 0.34 | 0.26 | 0.33 | 0.12 | 0.44 |
| Secured-debt/income < 20 th perc | 0.14 | 0.21 | -0.27 | 0.29 | 0.14 | 0.22 | -0.23 | 0.30 |
| between 20 th perc and 40 th perc | 0.35 | 0.21 | -0.19 | 0.28 | 0.30 | 0.22 | -0.10 | 0.30 |
| between 40 th perc and 60 th perc | 0.28 | 0.21 | -0.17 | 0.28 | 0.35 | 0.23 | -0.12 | 0.31 |
| between 60 th perc and 80 th perc | 0.29 | 0.21 | -0.07 | 0.28 | 0.29 | 0.23 | 0.13 | 0.31 |
| larger than 80 th perc | 0.53 | 0.21 | -0.16 | 0.29 | 0.70 | 0.23 | -0.18 | 0.32 |
| No mortgage, p30 < housing equity < p50 | 0.22 | 0.30 | 0.07 | 0.42 | 0.18 | 0.32 | 0.14 | 0.44 |
| between 50 th perc and 70 th perc | 0.40 | 0.27 | -0.02 | 0.39 | 0.31 | 0.28 | 0.10 | 0.40 |
| between 70 th perc and 90 th perc | 0.08 | 0.31 | -0.13 | 0.44 | 0.03 | 0.32 | -0.19 | 0.44 |
| larger than 90 th perc | 0.08 | 0.37 | 0.77 | 0.52 | 0.21 | 0.39 | 0.58 | 0.54 |
| Positive fcial wealth < perc 50 th | -0.12 | 0.07 | -0.02 | 0.10 | 0.03 | 0.10 | -0.12 | 0.14 |
| Positive fcial wealth > perc 50 th | -0.11 | 0.08 | -0.15 | 0.12 | 0.04 | 0.11 | -0.27 | 0.15 |
| Positive expectations on future fcial situation | 0.23 | 0.06 | -0.01 | 0.08 | 0.33 | 0.09 | -0.08 | 0.12 |
| constant 2000 | 0.86 | 0.35 | | | 0.47 | 0.41 | | |
| Constant | 6.40 | 0.25 | | | 6.30 | 0.30 | | |

Notes to table:

a) Estimation is carried out for 1995 and 2000, interacting each variable with a 2000 dummy. Standard errors are robust to heteroskedasticity. The estimation also allows for 17 regional dummies which are not reported. Percentile values are calculated for the total sample. The income quantiles are £1,328, £4,246, £ 7,376, £12,027 and £21,316 in 1995. They are updated to 2000 prices by the RPI. Secured debt to income ratio quantiles are 0.73, 1.21, 1.71, 2.5 in 1995 and 0.81, 1.25, 1.77 and 2.52 in 2000. Housing wealth quantiles for owner occupiers without a mortgage are £20,000, £30,000, £42,000, £60,000, £90,000 in 1995 and £25,000, £42,500, £60,000, £90,000, £150,000 in 2000. Financial wealth includes liquid and non-liquid financial assets and median values correspond to £1,560 in 1995 and £2,250 in 2000. The category 'other' in labour status includes maternity leave, family care, school, long term sick and disabled and those on government training schemes.

Personal characteristics and age

The estimation results suggest that personal characteristics have a significant effect on the propensity to have unsecured debt. Females are more likely to have unsecured debt, although the amount borrowed is significantly smaller than for men. Widows and the never-married are significantly less likely to have any unsecured debt. Non-whites are also less likely to have unsecured debt.

The age profile effects in the participation equation are consistent with the theoretical life-cycle model of consumption, in that the probability of having unsecured debt decreases with age for all but those aged 16 to 20. Indeed, according to the estimated marginal effects, age is the variable that most strongly affects participation. The results suggest that the probability of participating in the unsecured debt market is 25 to 30 percentage points lower for individuals older than 60 compared with those aged 20 to 30. Those aged 16 to 20 have a significantly lower probability of having debt (around 20 percentage points) than the reference group, perhaps reflecting their economic immaturity. The age profile did not change significantly between 1995 and 2000.

There is less evidence of any impact of age on the amount of unsecured debt of those who are borrowers. The basic results, shown as Model 1, do not suggest that the amount borrowed varies significantly by age, except that the under-20s borrow significantly less, again reflecting their economic immaturity. Nor is there any evidence that this changed significantly in 2000. The results are similar in Model 2 when we restrict the analysis to the over-35s. Age effects are discussed further in Section 5 where they appear more prominent in a panel estimation using the same data set.

Income

Differences in income also introduce significant differences in the probability of participating in the unsecured debt market. Individuals with income below the 30th percentile have a significantly lower probability of having any unsecured debt, with an even lower probability for those below the 10th percentile. And individuals with income between the 70th and 90th percentiles have a significantly higher probability of having unsecured debts, although this effect is not significant above the 90th percentile in Model 1. The null hypothesis that the coefficients of each income group are similar in 1995 and 2000 cannot be rejected at the 5% level of significance.

There is also a strong positive relationship between the amount of unsecured debt held and income²⁵. The size of coefficients shows that income is the main variable explaining differences in holdings of unsecured debt. Comparing the results for 1995 and 2000, there is little change in the estimated coefficient for those in the main body of the income distribution. For the lowest-income group the hypothesis of equal coefficients in 1995 and 2000 is rejected at the 10% significance level in Model 1, suggesting that the tendency of the lowest income group to hold smaller amounts of unsecured debt than the reference group was greater in 1995 than in 2000. By contrast, the tendency of the highest income group to hold larger amounts of unsecured debt was accentuated in 2000 compared with 1995. These results are sensitive to the treatment of student loans and overdrafts. If we restrict the sample to the over-35s, then there is no change in the coefficient for those in the bottom decile of the income distribution, suggesting that the effect in the full sample is associated with a change in reported borrowing of the young, whether real or because of a change in the survey questions. But the increased borrowing by those at the top of the income distribution is more apparent when the sample is restricted to the over-35s.

25. Alternatively, we also included income and the square of income as explanatory variables. Qualitative results were the same.

Positive financial expectations

Positive expectations of the individual's future financial position are also associated with a larger probability of participation in the unsecured debt market. The marginal effect of this variable is stronger in 2000 than in 1995 suggesting that the confident are more willing or able to borrow in 2000 than 1995. Good economic prospects are also important in determining the amount of unsecured debt held. Table F shows that the dummy variable for positive expectations about the future financial situation is highly significant and positive, with no apparent change in the coefficient between 1995 and 2000²⁶.

Educational qualifications

Having higher educational qualifications is associated with a higher probability of having unsecured debt. In particular, individuals with no educational qualifications have a probability of having debt that is more than 10 percentage points lower than that of high-educated ones. Qualification dummies also indicate that, for debt holders, the higher the educational qualification the larger the amount of unsecured debt held. This would be consistent with better qualifications making individuals both more optimistic and more confident about their future income levels. There is no strong evidence of a change in the link between qualifications and indebtedness between 1995 and 2000.

Labour market status

As regards labour status, the retired have a lower probability of having debt, by about 11 percentage points than for the employed. This is in addition to the age effect and suggests that retired people are less likely to have unsecured debt at every age than those in work. They also tend to have less unsecured debt when they do borrow. According to Model 1, the unemployed also have a lower probability of participating in the unsecured debt market than the employed, consistent with their greater uncertainty of future income. This effect is not found when focusing on the over-35s suggesting that it is related to the young unemployed. Interestingly, the amount of unsecured borrowing by the unemployed, keeping constant all other characteristics, is significantly lower relative to the reference group in 1995. But in 2000, this effect is less apparent, especially when focusing on the over-35s. This is consistent with the more depressed labour market in 1995, when the unemployed would have faced more uncertainty about their prospects, while in 2000 unemployment might have been considered more of a temporary problem. Another possible interpretation would be the presence of looser credit restrictions for the unemployed in 2000.

When considering the total sample, the self-employed appear less likely to borrow in the unsecured credit market than the employed, although there is evidence of an increase in this propensity between 1995 and 2000. Moreover, they tend to have more debt when they do borrow. This might reflect a greater general demand for finance for business reasons among those who participate in the market.

26. At the suggestion of a referee, we also included a financial surprise variable in the estimation, but this was not significant.

Students

The interpretation of the results for full-time students is complicated by the change in the wording of the question in the survey and the change in student finance regime²⁷. They appear to have had a lower propensity to participate in the unsecured debt market than the employed in 1995, but this may be because they were not asked to include student loans in their answer to the question. There is a significant increase in participation in 2000 when student loans and overdrafts are included. Then, the estimated marginal effect of being a full-time student is positive but insignificant, suggesting that the likelihood of full-time students participating in the unsecured credit market is the same as for other individuals with the same characteristics.

For those who do participate, full-time students had a relatively larger demand for unsecured debt than the employed, with no evidence of a change between 1995 and 2000. The larger demand is likely to be due to their better prospects and access to cheaper credit relative to their peers of similar observable circumstances. The lack of an observable change in the demand for unsecured debt by students relative to the reference group is surprising given the change in student finance regime. It suggests that the increased borrowing by students does not stand out when compared with others with similar characteristics in full-time employment.

Housing tenure

Housing tenure and access to secured debt affect mainly the probability of having unsecured debt, with a significant effect on the amount borrowed only among those with very high levels of secured debt relative to their incomes. Those who are renters or have a mortgage tend to have on average around a 15 percentage points higher probability of having unsecured debt than those living in houses owned outright. Differences in the ratio of mortgage debt to income produce a slight hump-shaped pattern with respect to the probability of having unsecured debt, with the highest participation being among those whose mortgage debt-income ratio is around the median. There is no strong evidence of any change between 1995 and 2000, although all categories are lower relative to the reference group. In terms of the amount borrowed, only those with a secured debt-income ratio above the 80th percentile of the distribution have significantly more unsecured debt than the reference group, consistent with those individuals having used up cheaper sources of funds.

Financial wealth

Financial wealth is also an important factor. Consistent with Banks et al. (2002), those with no financial wealth (reference group in the regression) are more likely to have unsecured debt than those with the largest financial asset holdings. However, having a moderate amount of financial assets is associated with a larger probability of having some unsecured debt, especially in 2000. In terms of the quantity of debt, the empirical results indicate that those with financial assets have lower amounts of unsecured debt.

Macroeconomic factors

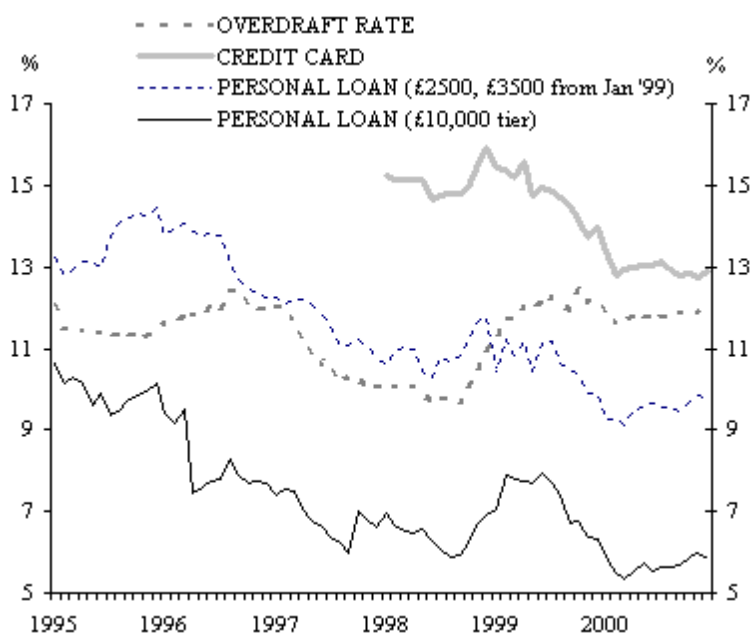
According to Model 1 there is a substantial increase in the constant term in the unsecured debt level equation between 1995 and 2000. This implies a major increase in the overall debt held by reference borrowers, unconnected with any changes in the explanatory factors specified in the equation. Given the generally small changes in the coefficients on the explanatory variables between 1995 and 2000, this increase can be considered as generalised and probably explained by changes in the macroeconomic environment and credit market structure that cannot be modelled appropriately with our data set. However,

²⁷. In 1995, full-time students held nearly 50% of their debt commitments in the form of personal loans. In 2000, nearly 30% were overdrafts and another 30% was classified as the category *something else* in the show card.

it cannot be discarded that this is an effect of the change in methods of student finance and the BHPS questionnaire since the increase in the constant disappears when focusing only on those aged over-35.

Some evidence that movements in unsecured debt spreads may have contributed to the generalised increase in amounts of unsecured debt held between 1995 and 2000 is shown in Chart 4. As can be seen, spreads differ largely by type of debt instrument and the reduction of spreads during the second half of the 1990s does not affect all instruments equally. While the interest rate spread on personal loans (of more than £10,000) has fallen sharply from around 10 to 6 percentage points, this contrasts with a fall from 12 to 10 percentage points in the case of overdrafts. As regards the maturity of unsecured debt, the proportion of personal loans with an original maturity greater than four years increased from 22% in 1995 to 35% in 2000. The proportion of loans with an original maturity between one and four years decreased from 64% to around 50%. Whether this is a demand or supply effect is unclear, but it has allowed individuals to sustain higher levels of debt without increasing regular repayments of debt.

Chart 4: Spread between unsecured debt interest rates and the retail bank base rate: personal loans, overdrafts and credit cards (quoted interest rates)



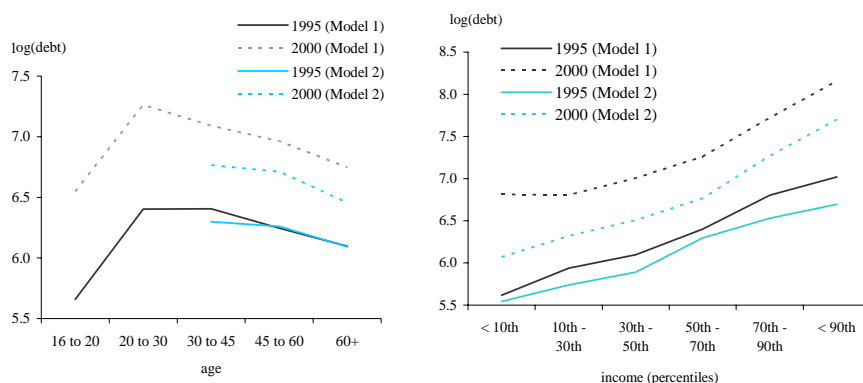
Source: Bank of England.

Explanatory variables

A useful way of summarising the estimation results is to show the fitted value of unsecured debt conditional on having such debt. Chart 5 shows the predicted age and income profile of unsecured debt levels for the reference group. In contrast with the simple patterns that might be present in the raw data, the regression approach makes it possible to hold constant all other factors (such as housing tenure, labour market status) that might also vary with income and age. A shallow hump-shaped profile of unsecured debt holdings with respect to age is apparent. The profile with respect to income is fairly flat up to about median income,

unsecured debt is sharply increasing in income beyond that. Chart 5 emphasises the shift in unsecured debt between 1995 and 2000 at all ages and income levels, although the increases are significantly lower and statistically not significant according to the estimation results when focusing only on those aged over-35.

Chart 5: Predicted unsecured debt by age and income (for reference group)



While the increase in total unsecured debt between 1995 and 2000 could be a generalised phenomenon, the evolution of individual characteristics found to be relevant to debt market participation still contributes to the overall increase. Table D showed unsecured debt sample weights of different population groups by some of the key variables determining unsecured debt market participation and amount of debt held. As can be seen, there are some important shifts in the population characteristics that might have affected the stock of aggregate debt. In particular, the shift in the number of individuals towards higher income groups (in real terms) is quite marked. There is also an increase in the proportion of individuals with high qualifications from 29% in 1995 to 38% in 2000. These two characteristics are positively related to both participation and amount of debt and so help to explain the increase in the amount of unsecured debt held by the sample as a whole. Nevertheless, their quantitative impact is small relative to the predicted change in the amount borrowed per individual. For example, the predicted weighted average debt level for 20-30 year olds with income in the 50th-70th percentile increased by 128% between 1995 and 2000, of which only about 8% is due to the increase in qualifications of this group. Similarly the general improvement in income would account for around 10% of the increase in aggregate debt.

5 Changes in levels of unsecured debt: panel estimation

The preceding analysis has made no use of the fact that the same individuals are present in both the 1995 and 2000 samples, so that their behaviour may be tracked over time. In this section we discuss evidence on changes in the borrowing of the individuals appearing in both samples. With a longer panel, this would be the preferred method of analysis so long as the model coefficients are not changing over time, as it purges individual specific effects from the estimation. But with the very short panel available, this approach is used here to check that the assumptions underlying the cross-section estimation are not too restrictive.

Table H shows that despite the apparent stability in unsecured debt market participation and general increase in the amount borrowed, there is considerable change in the position of individual borrowers as they move into and out of debt. Among those in the top quartile of debt in 1995, 41% of them were still highly indebted in 2000, but 35% of them had reduced their debt to zero. There appears to be more persistence at low debt levels in that 78% of people with no unsecured debt in 1995 still had no debt in 2000, whereas only 8% of them had moved to the top quartile.

Table H: Unsecured debt transitions between 1995 and 2000

Transition matrix: number of individuals by debt levels in 1995 and 2000 (*)

| 2000 | 1995 | | | | | Total 00 |
|--------------------------|---------|--------------------|--------------------------|--------------------------|-------------------|----------|
| | no debt | debt< 1st quartile | between quartile 1 and 2 | between quartile 2 and 3 | debt>3rd quartile | |
| no debt | 3,119 | 310 | 268 | 213 | 247 | 4,157 |
| debt< 1st quartile | 255 | 140 | 94 | 59 | 39 | 587 |
| between quartile 1 and 2 | 219 | 86 | 110 | 90 | 76 | 581 |
| between quartile 2 and 3 | 207 | 58 | 85 | 117 | 121 | 588 |
| debt>3rd quartile | 197 | 49 | 84 | 117 | 219 | 666 |
| Total 95 | 3,997 | 643 | 641 | 596 | 702 | 6,579 |

(*) Debt percentiles correspond to £180, £650 and £2000 in 1995, and £400, £1500 and £4000 in 2000. This matrix includes only those individuals in the sample in both 1995 and 2000.

Distribution of individuals in the panel by debt levels in 1995 and 2000 (as % of Total 95)

| 2000 | 1995 | | | | |
|---|---------|-------------------|--------------------|-------------------|------------|
| | no debt | debt< percent25th | p25th<debt < p50th | p50th<debt< p75th | p75th>debt |
| no debt | 78% | 48% | 42% | 36% | 35% |
| debt< percentile25th (*) | 5% | 17% | 10% | 7% | 4% |
| between 25 th and 50 th | 4% | 11% | 14% | 10% | 6% |
| between 50 th and 75 th | 6% | 11% | 16% | 17% | 14% |
| <percentile 75 th | 8% | 13% | 19% | 31% | 41% |
| Total 95 | 100% | 100% | 100% | 100% | 100% |

The cross section estimation reported in section four is motivated by the general reduced form debt function (3.3). Differencing (3.3), assuming no change in the coefficients across the two years, eliminates the individual specific effects and gives:

$$\Delta D_{it} = \Delta f_t(Y_{it}) + c \Delta g_t(Y_{it}) + b \Delta Z_{it} - c \Delta(r_t + \varphi_t) + \Delta \varepsilon_{it} \quad (5.1)$$

Thus, in general terms, the change in the unsecured debt of an individual responds to changes in economic circumstances (reflected here in the income term), changes in personal characteristics, including a general age effect as the individual moves further along the life-cycle and changes in macroeconomic conditions (reflected here in the change in interest rates).

We estimate this equation using the change in the level of unsecured debt as the dependent variable. But the right-hand side variables are not simply the differences of the variables included in the cross section regressions. In the cross-section, we used a banded income variable to pick up possible non-linear effects. Here we include the change in income allowing for a non-linear effect. We also include the change in educational qualifications²⁸, in labour status, in financial wealth and in the outstanding mortgage stock. The changes in labour status are considered with different dummy variables indicating whether the individual found a job, became unemployed or other combinations of the different labour status considered previously. Changes in the mortgage stock are split into four categories. We consider separately the change in the mortgage of those increasing the stock of secured debt, the change of those decreasing the mortgage and dummy variables for those who have an unchanged positive mortgage and those who have no mortgage in 1995 and 2000. We also include age dummies to capture the stage of the life cycle and a dummy variable to consider whether the individual expects an improvement in his financial situation²⁹. The constant term picks up the effect of general changes in macroeconomic and credit market conditions relevant to the reference group, who consist of individuals between the age of 20 and 30 in 2000 who are employed in both years. To some extent this also captures a life-cycle effect to the extent that the reference group are of an age where they are expected to be increasing their indebtedness in line with the hump-shaped profile shown in Chart 5.

The estimation results are presented in Table I. Two adjustments are included to deal with the change in survey question. In the first case, we include a dummy variable for those with overdrafts and student loans in 2000. In the second case, we exclude individuals with student loans and overdrafts in 2000.

²⁸. This variable is the change in a variable that takes the value 3 for high educational level, 2 for medium and 1 for no qualifications.

²⁹. Note that we do not include the *change* in age as would be strictly consistent with differencing (3.3).

Table I: Panel estimation for the change in debt levels

| Dependent variable | Dt-Dt-1 | 2000 | | dummy for overdrafts and st.loans | | exc. Individuals with overdrafts and st.loans | |
|--|-------------------------|----------------|--------|-----------------------------------|--------|---|--------|
| | | 2000 | | 2000 (a) | | 2000 (b) | |
| year | | | | | | | |
| Number of obs. | | 4875 | | 0 | | 2328 | |
| F test | | 10.4 | | 13.3 | | 7.6 | |
| Prob F test | | 0.000 | | 0.000 | | 0.000 | |
| R2 | | 0.095 | | 0.149 | | 0.063 | |
| Root MSE | | 2487 | | 2411 | | 2328 | |
| explanatory variables | reference group | coeff | t-stat | coeff | t-stat | coeff | t-stat |
| Increase in income (high income individuals in 1995) | | 0.02 | 3.09 | 0.02 | 3.24 | 0.02 | 3.21 |
| Increase in income (low income individuals in 1995) | | 0.04 | 3.03 | 0.02 | 2.15 | 0.03 | 2.41 |
| Expectations of better financial situation | | 415.35 | 4.06 | 344.91 | 3.45 | 316.13 | 3.18 |
| Increase in educational qualification | | 472.27 | 3.67 | 276.00 | 2.31 | 148.10 | 1.25 |
| 20 years old in 2000 | (20 to 30 years old) | 380.54 | 0.45 | 438.70 | 0.85 | -168.08 | -0.59 |
| 30 to 45 years old | | -297.93 | -2.11 | -118.39 | -0.85 | -157.15 | -1.15 |
| 45 to 60 years old | | -635.94 | -4.12 | -406.02 | -2.66 | -484.90 | -3.23 |
| Older than 60 | | -669.08 | -3.79 | -423.77 | -2.43 | -504.85 | -2.90 |
| Becoming unemployed in 2000 | (employed in 95 and 00) | -258.25 | -0.77 | -249.94 | -0.79 | -333.04 | -1.09 |
| Unemployed in 1995 and 2000 | | -600.52 | -2.14 | -506.17 | -1.86 | -530.68 | -1.92 |
| Becoming employed/self employed in 2000 | | 458.88 | 2.88 | 135.29 | 0.89 | 39.63 | 0.27 |
| From self-empl to employed | | -435.41 | -1.60 | -436.64 | -1.61 | -432.14 | -1.60 |
| From employed to self-employ | | -104.06 | -0.25 | -98.49 | -0.24 | -126.76 | -0.30 |
| Self-employed in 1995 and 2000 | | 317.98 | 1.32 | 324.90 | 1.35 | 297.04 | 1.23 |
| Retired in 2000 | | -159.86 | -1.21 | -195.04 | -1.49 | -221.72 | -1.69 |
| Full time student in 2000 | | 538.75 | 1.20 | -648.03 | -2.08 | -964.57 | -6.69 |
| Other | | -298.27 | -3.01 | -337.48 | -3.46 | -411.00 | -4.45 |
| Change in mortgage stock (if positive) | | 0.01 | 1.52 | 0.01 | 1.26 | 0.01 | 1.26 |
| Change in mortgage stock (if negative) | | -0.01 | -1.44 | -0.01 | -1.44 | -0.01 | -1.45 |
| No change in mortgage stock (positive mortgage) | | -174.41 | -1.00 | -166.40 | -0.96 | -140.07 | -0.81 |
| No change in mortgage stock (zero mortgage) | | -83.55 | -0.81 | -72.29 | -0.72 | -45.31 | -0.45 |
| Changes in financial wealth | | -0.01 | -1.85 | -0.01 | -1.72 | -0.01 | -1.68 |
| Changes in net wealth (dummies) | | 6.04 | 0.19 | 13.23 | 0.42 | 20.96 | 0.67 |
| Constant | | 1066.22 | 4.74 | 800.36 | 3.65 | 973.74 | 4.54 |
| Individuals with overdrafts and st. loans | | | | 4350.89 | 10.81 | | |

(a) including a dummy for individuals with overdrafts and student loans.

(b) excluding individuals with overdrafts and student loans.

Note: Income gearings percentiles correspond to 9%, 13% and 20%. Median value of financial wealth is £2,250. Region 2 includes South East excluding London, South West and East Anglia. Region 3, East and west Midlands. Region 4, Greater Manchester, Merseyside and rest of the North West. Region 5, South Yorkshire, West Yorkshire, Rest of Yorks and Humber and Tyne & Wear and Rest of the North. Region 6, Wales and Scotland.

The results are consistent with those found in the cross-sectional analysis and suggest that the assumptions underlying it are not too restrictive, although the effect of age is much more apparent here once the individual specific fixed effects have been differenced out³⁰. Those aged between 45 and 60 reduced their unsecured debt by over £500 more than those between 20 and 30, while those over 60 reduced their debt by over £700 more than their younger counterparts.

The increase in income is statistically significant in explaining the increase in unsecured debt. When separating this effect between low and high-income individuals³¹, this effect is larger for those with low incomes in 1995, consistent with a non-linear effect.

As in the cross-section results, there is clear evidence of the effect of expectations on unsecured borrowing. Expectations of a better financial situation have a significant positive impact. Similarly, an increase in educational qualifications raises unsecured borrowing.

Changes in the labour market position of the individual also have an impact on borrowing. The effect of being unemployed in both 1995 and 2000 appears to offset the general upward trend in borrowing, although this effect is not precisely determined

³⁰. Note that we keep the same age groups as in previous analysis. Since age dummies enter contemporaneously in the panel equation the youngest individuals are 20 years old, that is, they were 16 years old in 1995.

³¹. High (low) income individuals are those above (below) the median income distribution of 1995.

statistically. Becoming employed or self-employed (from being without work) has a significant positive effect on the change in debt.

The impact of changes in the secured debt market is again surprising in that there is evidence of increasing unsecured debt among those reducing their mortgage³². This is consistent with the cross-section evidence that some unsecured borrowing is being undertaken by those who have unused secured debt capacity.

As with the cross-section results, there is clear evidence of a general increase in unsecured debt captured in the constant term in the equation, worth £600 per individual. This is close to the median increase between 1995 and 2000 of £800 for those with unsecured debt in the whole sample, indicating that this factor is most important in explaining the general increase. This effect is present even when individuals with student loans or overdrafts are excluded from the comparison.

32. Note that a reduction in mortgages is included as a negative increase. Hence, the negative coefficient implies an increase in unsecured debt.

6 Conclusions

The rapid rise in unsecured borrowing since the mid-1990s has raised concerns about the ability of households to repay these loans. While aggregate information is useful in tracking changes in the average size of loans, it cannot reveal whether shifts in the amount of borrowing by individual households are increasing their overall level of risk. One possibility is that unsecured borrowing is increasingly being undertaken by high-risk households.

In order to assess these risks and how they have changed over time, this paper examines survey evidence on the determinants and distribution of unsecured debt. It uses waves 5 and 10 of the BHPS to examine the determinants of participation in the unsecured debt market, the amount borrowed and changes between 1995 and 2000, the years in which the surveys were carried out. The analysis suggests that there is no strong evidence that borrowing is concentrated among high-risk households or that the determinants of borrowing have changed substantially between 1995 and 2000.

There is no evidence from the BHPS that participation in the unsecured debt market rose between 1995 and 2000. In both years, around 39% of people claimed to have some debt in this form. Of course, these need not be the same people, the longitudinal nature of the BHPS suggests that 35% of the most indebted quartile in 1995 had no unsecured debt in 2000. But the evidence suggests that there has been no substantial change in the factors which determine whether an individual is likely to have unsecured debt or not.

In line with standard life-cycle considerations, econometric analysis indicates that the main determinant of the participation decision is the age of the borrower, with 20 to 30 year olds being most likely to borrow unsecured. Other statistically significant factors are income, economic prospects, qualifications, job status, housing status and the extent of mortgage borrowing. In general, individuals who would appear to be high-risk borrowers are less likely to have any unsecured debt.

While there is no clear statistical evidence of a change in the determinants of participation in the unsecured credit market between 1995 and 2000 there was, though, a striking increase in the amount of debt held by borrowers between these two years. According to econometric estimates, the main determinant of the level of unsecured borrowing of borrowers is the level of individual income. The other statistically significant determinants of the amount of borrowing are economic prospects, qualifications, job status, housing status and the extent of mortgage borrowing. But, as with the participation decision, there is little evidence of a major change in the importance of these determinants between 1995 and 2000, although there does appear to have been a slight increase in the relative borrowing of those with high incomes. Instead, the main change between these years is that there has been an increase in the amount borrowed throughout the distribution. This suggests that factors affecting all current and potential borrowers, regardless of their personal characteristics, were most important in explaining the rise in unsecured debt between 1995 and 2000. Notwithstanding, the increase might be biased upward due to the change in the survey questionnaire.

Thus the rise in unsecured borrowing appears not to have been concentrated within poor risk groups but to have been a general phenomenon affecting those likely to be borrowers to a similar extent. While it is not possible on the basis of the information available to explain the cause of this shift, it is consistent with lower rates of interest on unsecured debt. According to the theory outlined in this paper, lower rates on unsecured debt would raise both the unsecured and secured borrowing of those unable to borrow as much as they would like at secured interest rates, without encouraging further borrowing by those who are

unlikely to participate in the unsecured market. This would improve the welfare of those who had been constrained by enabling them to spread their spending more smoothly over time. In this sense, the increase in unsecured debt has been beneficial.

Of course, more unsecured debt involves greater risks even if it is not concentrated among high risk groups. Some individuals do have very high levels of debt in relation to their income that expose them to the risk that they will not be able to repay. But there is no evidence that this situation worsened between 1995 and 2000.

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