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DEBT AND FINANCIAL EXPECTATIONS: AN INDIVIDUAL AND HOUSEHOLD LEVEL ANALYSIS

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Abstract

In this paper we show that optimistic financial expectations impact positively on both the quantity of debt and the growth in debt, at the individual and household levels. Our theoretical model shows that this association is predicted under a variety of plausible scenarios. In the empirical analysis we explore the determinants of debt and of growth in debt using British data. We find convincing support for our theoretical priors and show that it is optimistic financial expectations per se that are important in influencing debt, rather than the accuracy of individuals' predictions regarding their future financial situation.

JEL Classification: D18; D84; D91

I. INTRODUCTION

The last decade has witnessed a consumer credit explosion on both sides of the Atlantic, accompanying the sustained economic boom. In the U.K. the amount of unsecured borrowing accumulated by individuals and households, as a proportion of GDP, has more than doubled since 1993 to 16 per cent.[1] At the end of the third quarter of 2003 the total amount of unsecured debt was nearly £168 billion, or more than £4,000 for every adult of working age. Consequently policymakers are particularly interested in understanding what factors drive the decision to acquire increasing amounts of debt and whether or not such indebtedness is sustainable.

There is also considerable concern from social welfare lobbyists about the associated increase in personal debt problems experienced by individuals and families. For example, the National Association of Citizens Advice Bureau in the U.K.,[2] whose members dealt with approximately one million personal debt enquiries during 2001, reported a 39% increase in the number of new contacts in this area over the previous 4 years. Furthermore, they have highlighted the dramatic increase in the availability of unsecured consumer credit in the U.K. over the past 25 years.[3] Changes include the massive rise in the number of different credit cards available (1,300 in 2000) and the increase in the range of financial institutions offering unsecured loans. From being primarily the preserve of the major (high street) banks, consumers can now also obtain loans from building societies, U.K. and overseas-based finance companies and even supermarkets. In addition, the advent of telephone and internet-banking, and the availability of credit at the point of purchase have increased the accessibility of consumer credit and the speed with which loans can be obtained.

Amongst academic economists, research into the determinants of individual debt or household level debt is surprisingly scarce.[4] This is somewhat puzzling as the most common reasons for debt problems, including job loss and poverty, are all closely related to economics. One explanation for this is the lack of available data on debt, at the individual and household level, especially in the U.K. In this paper we partially redress the imbalance in the existing research, using recently available data.

Our broad aim is to explore the determinants of debt and the growth in debt at the individual and household level. We focus on one particular influence on the decision to acquire increasing amounts of debt, namely the financial expectations of individuals and households. Our theoretical framework predicts a positive association between individuals who are optimistic about their future financial situation and the amount of debt they acquire. In our empirical analysis, using samples derived from the 1995 and 2000 waves of the *British Household Panel Survey*, we find consistent statistical support for our main proposition.

The paper is set-out as follows: Section II reviews existing research in this area; Section III presents our theoretical framework; Section IV describes our data and methodology; Section V presents our empirical findings; whilst conclusions are presented in Section VI.

II. BACKGROUND

Debt

The economic psychology literature represents one area where there has been significant interest in the determinants of personal debt. Livingstone and Lunt (1992) analyse the determinants of the level of debt and repayments across individuals and find that attitudinal factors, such as whether individuals are pro or anti debt, are key determinants. Similarly, Lea et al. (1993) analyse individual level survey data and find that debt is correlated with economic, social and psychological factors. Individuals classified as 'serious' debtors are found to be characterised by low socio-economic class, low income and are less likely to be owner occupiers. The importance of economic factors in determining the extent of debt is also confirmed by Lea et al. (1995).

Davies and Lea (1995) analyse student attitudes towards debt and interpret their results in the context of a life-cycle theory of economic behaviour. Here, students borrow in order to finance their investment in human capital in anticipation of higher expected future income. Although, the authors do not explicitly focus on expectations, it is apparent that these play a key role in any life-cycle model.

Godwin (1997) explores the dynamics of households' use of credit and attitudes towards credit, using U.S. panel data. The findings suggest that there was considerable mobility in debt status during

the 1980s, with the majority of households in a different debt quintile in 1989 relative to 1983. In addition, attitudes towards credit became more negative over the 1980s. In a more recent U.S. study, Crook (2001) finds that income, home ownership and family size all impact positively upon the level of U.S. household debt. Interestingly, expectations of future changes in interest rates appear to have no impact on household debt.[5]

One intriguing puzzle observed by Gross and Souleles (2002) in the behaviour of credit card holders is their apparent targeting of a specific credit utilisation rate, with the consequent failure to eliminate costly outstanding balances using available liquid assets. Bertaut and Haliassos (2002) propose an accountant-shopper model of household expenditure to explain the phenomenon of such "debt-revolvers".[6] Together with Haliassos and Reiter (2003), Bertaut and Haliassos (2002) provide corroborating evidence from the 1995 and 1998 Surveys of Consumer Finance.

Credit constraints on individuals and households are an important issue in the literature. Japelli (1990) reports that 19% of his sample of U.S. households are either unable to obtain any loans at all or are discouraged from seeking credit due to past refusals. In addition, many individuals and households may incur debt, but to a lesser extent than desired. Therefore actual debt levels reported in sample surveys may fail to reflect the demand for credit, particularly amongst the young.[7] Cox and Japelli (1993) estimate the size of the gap between desired and achieved debt levels for the U.S. and find that, on average, desired debt levels are 75% higher than actual levels. Gross and Souleles (2002) demonstrate directly that borrowing constraints appear to be binding for many credit card holders as debt levels are observed to rise in response to increases in credit limits.

A further strand of the literature explores the consequences of default. In the U.S., bankruptcy law favours debtors considerably. As White (2003) shows, risk-averse borrowers can obtain partial wealth insurance through their residential location, careful management of their assets and their strategic choice of legal bankruptcy route, also noted in Fay et al. (2002). This makes borrowing more attractive to opportunistic individuals and households.[8] Bizer and DeMarzo (1992) show that borrowers have a greater incentive to acquire sequential loans in the presence of moral hazard, as the likelihood of repayment declines with rising debt levels. Indeed, Gropp et al. (1997) have shown that the level of

bankruptcy exemptions influences the accumulation of total debt amongst U.S. households. Lin and White (2001) extend the empirical analysis to the case of secured debt and also show that higher exemption levels lead to credit rationing.

In one of the few papers based on U.K. data, Bridges and Disney (2002) explore access to credit, default and arrears among low-income U.K. households. The results indicate that differences in the incidence of credit and default across households are influenced by labour market status, age, access to social security benefits and household composition. Finally, their empirical analysis is conducted at the household level, implying that the determinants of personal debt are also at the level of the household rather than at the level of the individual.

Financial Expectations

At the macroeconomic level, a number of studies, such as McNabb and Taylor (2002), have investigated the impact of consumer expectations upon either business cycle trends or household consumption patterns, as in Acemoglu and Scott (1994) for the U.K. and Carroll et al. (1994) for the U.S. The findings suggest that expectations impact upon the life-cycle consumption activities of households. Surprisingly, empirical analysis into how expectations influence the consumption (and savings) decisions of individuals has been somewhat scarce.

One reason for this may be the fact that scepticism about the use of information derived from subjective survey data still prevails in the economics literature, as Dominitz and Manski (1997) note. There are, however, a number of recent studies which exploit subjective information on income expectations, such as Guiso et al. (1992; 1996) and Japelli and Pistaferri (2000). Similarly, Donkers and Van Soest (1999) include subjective information such as time preference and risk aversion, available in a panel survey of Dutch households, to measure household preferences. Although they do not have access to information on financial expectations and focus on one specific type of debt (mortgages). They conclude that psychological variables are useful in analysing household behaviour under uncertainty in a life-cycle context.

The importance of expectations in determining the decision to save at the individual level has also been explored in the economic psychology literature. For example, Vanden Abeele (1988) reports a significant relationship between optimism and short-term saving. Similarly, Lunt and Livingstone (1991) find that saving is related to optimism about personal economic circumstances as well as optimism regarding the economy as a whole.

In the related literature on the demand for consumer durables, expectations play an important role. Pickering (1981) argues that models of the demand for consumer durables should include the nature of the decision-making process within the household, as well as consumers' expectations of general and personal economic conditions. Winer (1984) argues that such models should be refined by jointly modelling expectations of personal financial conditions and those for the general economic outlook. Similarly, Van Raaij and Gianotten (1990) explore the role of expectations in consumer spending using individual level survey data. The questions relate to individuals' evaluations and expectations regarding the general economic situation, including inflation and unemployment, as well as expectations about household finances. Such information is found to partially explain consumer credit.

In sum, these studies stress the importance of expectations but do not explicitly focus on debt. However, Van Raaij and Gianotten (1990, 271) comment that 'optimistic consumers tend to … borrow more than pessimistic consumers. Consumer credit and mortgages tend to increase when consumers are in an optimistic mood'. In the remainder of this paper, we explore the validity of this assertion, in the context of individual and household debt, from both a theoretical and an empirical perspective.

III. THEORETICAL UNDERPINNINGS

Some insight into the relationship between debt and expectations can be discerned from a simple life-cycle model. We present two versions of this model below. The first version is a stylised two period example of consumption and saving choice with uncertain consumer income. An exogenous upper bound on credit ensures that there are sufficient funds to repay any borrowing even when realised income is low. The second version is a three period extension of the first, where a lower bound on

credit determines repayment difficulties in the middle period and the third period is used as a device for a possible loan extension. The two period version provides the basic intuition for the positive relationship between 'optimistic' expectations of future income and the optimally chosen size of debt. The three period version confirms this intuition in the more general adverse case where consumers with low income are forced to take on more borrowing to face liquidity crises. Both versions consider the choice of borrowers and lenders simultaneously and are thus based on equilibrium, which reflects the competitive nature of personal sector finance in the U.S. and U.K. We also briefly consider some refinements of the basic scenario, such as the extent of liability of borrowers, the effect of over-optimistic expectations and the role of collateral. Our finding that optimistic financial expectations increase the level of debt is again valid in these more general scenarios.

Basic Intuition

Consider representative consumers living two periods t=1,2, who can borrow or save freely between periods at the safe ongoing (and for simplicity constant[9]) interest factor of R>1. There is full information - so lenders can observe the circumstances of borrowers at no cost and enforce the specifications of any loan agreement. Consumers have a twice differentiable and strictly concave utility function $U(C_t)$ where C_t is consumption, whose price is normalised to 1. Time preference equals the inverse of the safe interest factor and there are no bequests. Competitive risk neutral lenders seek to make zero expected profits from lending an amount L to consumers. First period income, $y_1 > 0$, is certain and second period income, $y_2 > 0$, is uncertain, with two income states: a high state, y_{2H}, occurring with exogenous probability p; and a low state, y_{2L}, occurring with probability 1-p, where $0<p<1$ and $0 < y_{2L} < y_{2H}$. The probability p represents the common expectation of borrower and lender that future financial circumstances will be favourable. So p, y_{2H} and y_{2L} describe a simple two-point distribution for income.

Borrowers can always repay the debt, i.e. $L < y_{2L}/R$. The upper bound on loan size will be relaxed later on. Consumption in each realised state of second period income is obtained directly from the budget constraint. In the first period consumers maximise lifetime expected utility:

$$U(y_1 + L) + (pU(y_{2H} - RL) + (1-p)U(y_{2L} - RL))/R \quad (1)$$

with first order condition:

$$U'(y_1 + L) = pU'(y_{2H} - RL) + (1-p)U'(y_{2L} - RL) \quad (2)$$

Free entry in a perfectly competitive financial market ensures that the zero expected profit condition of the lender is trivially satisfied. The size of the loan supply is indeterminate, as expected with constant returns to scale. Simple comparative statics gives:[10]

$$\partial L/\partial p = (U'(y_{2H} - RL) - U'(y_{2L} - RL))/(U''(y_1 + L) + R(pU''(y_{2H} - RL) + (1-p)U''(y_{2L} - RL))) > 0 \quad (3)$$

where both numerator and denominator are negative by concavity. So consumption smoothing explains the positive correlation between 'optimistic' financial expectations, p, and the optimally chosen size of debt, L. The wider the spread between second period income realisations, the stronger this effect.

Repayment Difficulties

Now assume that in the low state of second period income, consumer loans cannot be feasibly repaid. Lenders will grant loans to consumers in the first place so long as, on average, they expect to recover their monies, i.e. $L < (py_{2H}+(1-p)y_{2L})/R$. But they also impose a lower bound on L such that $L > y_{2L}/R$. This may be because it is costly for the lender to set up the loan below this level or because the value of y_{2L} is very close to zero (e.g. a basic form of income support). We consider unsecured lending and assume that borrowers are protected by limited liability. At the end of the section we relax both assumptions and see that they imply no loss of generality. So if the borrower is unable to repay in the second period, the lender cannot seize y_{2L}.[11]

Instead, the lender may consider a partial repayment of the existing loan, equal to gRL, where g is an exogenous percentage (e.g. the minimum repayment of 3% of the existing balance for most credit cards). The borrower could meet this repayment out of second period income, y_{2L}, plus extra funds coming from a new loan, L', to be repaid in the third period together with the remainder of the existing loan, (1-g)RL, at a new interest factor R' > 1, so long as the expected resources of the borrower allow the lender to break even on this new agreement. To keep matters tractable, we assume that third period

income y_3 is certain[12] and that there are no anticipated liquidity problems, i.e. $L' < y_3/R'$.[13] In other words, loan extensions are bounded above to stop consumers dying in debt. We will relax this assumption at the end of the section, when we examine the possibility of default.

The lender offers the new loan if he/she is no worse off, in so doing, than investing in the safe capital market instead. Evaluated at period 2 this gives the condition:

$$gRL - L' + R'\left((1-g)RL + L'\right)/R = L \tag{4}$$

which reduces to:

$$R' = R \tag{5}$$

in equilibrium. The loan supply size is again indeterminate and with competitive risk neutral lenders this makes sense - for sufficient third period borrower resources, consumption smoothing occurs at the safe rate R[14] and the size of lending is set by loan demand. Reality is very similar - borrowers with repayment difficulties often end up 'spreading' their debt over a longer period of time, with initial low repayments and accumulated debt carried later in life. Typically the payment factor g includes early payment penalties but also 'knocks down' some of the interest due under the existing agreement.[15] Given condition (5), the choice of L' in period 2 leads to full consumption smoothing[16] and to the demand for loan extensions L' (as a function of L fixed from the past):

$$L' = \left(y_3 - y_{2L} + RL(g - (1-g)R)\right)/(1+R) \tag{6}$$

The choice for the high income borrower is straightforward. Firstly, there is enough liquidity to repay the existing loan, i.e. $L < y_{2H}/R$. This follows from $L < (py_{2H} + (1-p)y_{2L})R$ and $L > y_{2L}/R$. Secondly, the lender has full information. Thus a high income borrower is prevented from cheating - pretending to be a low income type - because the lender can enforce the original agreement. Thirdly, the high income borrower has access to the instrument L' to fully[17] smooth out consumption between periods 2 and 3 and obtain:[18]

$$L' = \left(y_3 - y_{2H} + RL\right)/(1+R) \tag{7}$$

By equations (5)-(6) lifetime expected utility is then:

$$U\left(y_1 + L\right) + (1+R)\left(pU(C_{2H}) + (1-p)U(C_{2L})\right)/R^2 \tag{8}$$

where:

$$C_{2H} = \left(y_3 + Ry_{2H} - R^2L\right)/(1+R) \tag{9}$$

$$C_{2L} = \left(y_3 + Ry_{2L} - R^2L\right)/(1+R) \tag{10}$$

with the first order condition:

$$U'\left(y_1 + L\right) = pU'\left(C_{2H}\right) + \left(1-p\right)U'\left(C_{2L}\right) \tag{11}$$

The interior solution in L gives the consumer's demand for loans as a function of the model's parameters, which forms the basis of our empirical investigation. And by concavity:

$$\partial L/\partial p = \left(U'\left(C_{2H}\right) - U'\left(C_{2L}\right)\right)/\left(U''\left(y_1 + L\right) + R^2\left(pU''\left(C_{2H}\right) + \left(1-p\right)U''\left(C_{2L}\right)\right)/(1+R)\right) > 0 \tag{12}$$

So, as expected, the positive relationship between optimal loan size and 'optimistic' financial expectations carries through to the more general scenario where consumers have repayment difficulties. In fact, what operates here is a moral hazard argument. Given lifetime expected resources and the market conditions available in case of repayment difficulties (a payment of gRL and a further loan L' at the equilibrium rate R'=R), consumers want to take on as much debt as possible. Heightened expectations of future high income, p, allow them to do so.[19]

Refinements

Under the current setting the lender always grants a new loan in period 2 because the alternative is to receive zero from the low income borrower: on the one hand $y_{2L}/R < L$ and, on the other hand, limited borrower liability prevents the lender from seizing y_{2L}. However, if the borrower has unlimited liability then the lender can seize y_{2L}, so long as he/she is able to charge high income borrowers a factor R' set to satisfy zero expected profits:[20]

$$RL = pR'L + \left(1 - p\right)y_{2L} \tag{13}$$

That is:

$$R' = R + (1 - p)(R - y_{2L}/L)/p \tag{14}$$

where $L > y_{2L}/R$ implies $R' > R$. So R' includes a default premium. For the lender to offer this loan in the first place a recursive credit constraint must also be satisfied:

$$L < (py_{2H} + (1-p)y_{2L})/R' \quad (15)$$

where R' is set by equation (14).[21] In accordance with the literature on credit rationing [Stiglitz and Weiss, 1981], equation (15) is more binding when R' is high, which, from equation (14), happens when y_{2L} is low and p is high.[22] In particular, the 'over-optimistic' borrowers (for whom p takes its maximum value of 1) interpret the credit constraint (15) as $L < y_{2H}/R$. But since $y_{2H}/R > (py_{2H}+(1-p)y_{2L})/R'$ from equation (14), these borrowers may find themselves rationed by lenders.[23] This is only possible if the loan L at rate R' is the sole financial instrument available to borrowers between periods 1 and 2 and only if lenders can legally enforce the loan agreement once the second period state is realised – which they can do when borrowers have unlimited liability. Otherwise, high income borrowers would switch to the safe capital market in period 2, to avoid paying the higher interest R'. This would create complete credit rationing: only defaulters would require L at R' but the lender could not offer this loan since equation (13) is violated. Also, the lender's problem no longer has constant returns to scale, since R' depends on L. So in equilibrium the lender chooses R' on the basis of equation (14), where the optimal size of L is set by loan demand, obtained by maximising the borrower's lifetime expected utility subject to equation (14). To avoid this extra layer of analysis we have preferred to specify, at the start of this section, a simpler limited liability model where borrowers cannot end up with zero consumption. However, optimistic financial expectations continue to have a positive effect on debt when borrowers have unlimited liability.[24]

The above discussion indicates that unlimited liability is also akin to secured lending. In order to prevent the defaulting low income borrower from switching to the safe capital market in period 2, the current lender has first claim on the borrower's resources y_{2L}. Hence whenever future prospects of the borrower are low, i.e. $y_3/R < L$, the lender prefers to enforce default and seize y_{2L} rather than re-finance the borrower at the safe rate R.[25] Furthermore, the unlimited liability framework can be adapted to represent collateralised lending - that is, lending secured not only on borrower income but also on a particular borrower asset. Let k_t denote the price of collateral at t=1,2,3. Then equation (14) becomes:

$$R' = R + (1-p)(R - (y_{2L} + k_2)/L)/p \quad (16)$$

where a higher value of collateral in the relevant period, k_2, reduces the gap between the safe rate, R, and the 'value to loan' ratio, $(y_{2L}+ k_2)/L$ - also reducing the gap between R' and R. This accords with the observation that secured loans are offered at lower rates than unsecured loans and credit cards, even for common loan terms. At the limit, when collateral is sufficiently high to raise the LHS of $y_2/R < L$ to $(y_{2L}+ k_2)/L = R$, equation (16) reduces to R'=R. Default is then no longer necessary, since our three period loan extension model would apply, so long as $(y_3+ k_3)/R > L$. Otherwise, default could occur. Note also that the no default credit constraint is less binding in the case of a collateralised loan than in the case of an unsecured loan or a loan secured only on income, where the constraint is tighter at $y_3/R > L$. On the other hand, it is not entirely clear whether collateral strengthens the agents' response to optimistic financial expectations, although we predict that in general it will: the sign of $\partial^2 L/\partial p \partial k_t$ is more likely to be positive the stronger the degree of convexity of marginal utility, i.e. the stronger the precautionary savings motive in preferences.[26] Hence, our theoretical prediction of a positive relationship between optimistic financial expectations and debt accumulation is robust to the refinements introduced in this section.

IV. DATA AND METHODOLOGY

In the remainder of the paper, we explore the empirical determinants of the amount of debt at both the individual and household level in Great Britain, focusing on the role of financial expectations. We exploit information contained in the 1995 and 2000 waves of the *British Household Panel Survey* (*BHPS*), which are the only two years when questions related to debt were included. The *BHPS* is a random sample survey, carried out by the *Institute for Social and Economic Research*, of each adult member from a nationally representative sample of more than 5,000 private households (yielding approximately 10,000 individual interviews). For Wave one, interviews were conducted during the autumn of 1991. The same individuals are re-interviewed in successive waves - the latest available being wave twelve, collected in 2002.

In 1995 and 2000, respondents were asked: *how much in total do you owe*? This question relates to non-mortgage debt as details about mortgages are asked in a separate question.[27] The answers thus

provide information on the amount of outstanding debt. There is also further information on the type of debt (e.g. hire purchase, personal loan and credit card) although the specific amount for each type is not given. Surprisingly there is a distinct lack of alternative datasets for Great Britain, which contain information related to the amount of debt at the individual and household level.[28] The defining feature of the *BHPS*, for the purpose of our study, is that it contains information on the total amount of debt, at the individual and household level, as well as individuals' expectations about their future financial situation. There are, however, some limitations to the information provided in the *BHPS*. In particular, there is no information on the time period over which the debt was accumulated – we simply have a measure of the extent of indebtedness at a point in time.[29] This issue is explored in greater depth later on.

Our sample includes the employed and self-employed aged between sixteen and sixty-five.[30] We exclude the unemployed thereby concentrating on a more homogenous group. One would predict, for example, that credit rationing is relatively more stringent for the unemployed. Figures 1 and 2 below illustrate the distribution of debt across all employees and self-employees for 1995 and 2000. It is apparent that there are a significant number of individuals reporting zero personal debt.

The focus of our paper is to explore the effect of an individual's expectations of his/her future financial situation on the current extent of indebtedness. In the *BHPS*, respondents are asked the following question (with the response rates given in parentheses):

Looking ahead, how do you think you will be financially a year from now, will you be:

	1995	**2000**
Better off…….	*(30.9%)*	*(30.2%)*
Worse off than you are now……	*(11.4%)*	*(6.8%)*
Or about the same?……..	*(54.6%)*	*(60.3%)*
Don't know……..	*(3.1%)*	*(2.7%)*

Answers to this question implicitly incorporate a synthesis of an individuals' own financial outlook (e.g. pay and job security) with their expectations about the general economic environment (e.g. future interest rates and unemployment). We construct a Financial Expectations Index (FEI) where individuals who answer 'Worse off' to the above question are coded as '0', those who answer as 'About the same' are coded '1' as are people who respond 'Don't know', whilst individuals who

answer 'Better off' are coded as '2'. Thus the index ranks individuals according to their financial expectations from having a bleak outlook to being optimistic about their financial future. In the following, our aim is to explore how such financial expectations influence debt levels.

Random Effects Approach

We initially explore the data for 1995 and 2000, separately, adopting a random effects approach whereby the panel dimension relates to multiple observations of individuals within households. There is some variation in sample size across 1995 and 2000 with 1,561 and 1,779 households, respectively. The mean number of observations within the household in 1995 (2000) is 1.8 (1.6) and the total number of individuals is 2,700 (2,705).

We initially explore the determinants of the logarithm of the amount of outstanding debt.[31] Since we do not know over what time period the debt was accumulated, here we do not weight debt by income or wealth. By definition debt cannot be negative and so it is a censored variable. Hence, our approach to estimating the determinants of debt is to implement a random effects Tobit model to allow for the fact that a number of individuals report zero debt, following Bertaut and Starr-McCluer (2002).[32] Hence, we estimate the following:

$$\ln\left(d^{*}_{hi}\right) = \beta_1' X_{hi} + \beta_2' FEI_{hi} + \nu_{hi} \tag{17}$$

where:

$$\begin{aligned} \ln\left(d_{hi}\right) &= \ln\left(d^{*}_{hi}\right) \quad \text{if} \quad d^{*}_{hi} > 0 \\ \ln\left(d_{hi}\right) &= 0 \qquad\qquad \text{otherwise} \end{aligned} \tag{18}$$

$$\nu_{hi} = \alpha_h + \eta_{hi} \tag{19}$$

where the debt of individual i in household h is given by d_{hi} such that i=1,…,n with i $\in$ h & h=1,…,n_h, X_{hi} denotes a vector of personal characteristics, FEI_{hi} represents the index of financial expectations of individual i in household h, α_h represents the 'household' specific unobservable effect and η_{hi} is a random error term, $\eta_{hi} \sim IN(0, \sigma_h^2)$. Our theoretical framework [see equations (3) and

(12)], predicts $\beta_2 > 0$. We assume that α_h is $IN\left(0,\sigma_\alpha^2\right)$ and independent of η_{hi} and X_{hi}. The correlation between the error terms of individuals in the same household is a constant given by:

$$\rho = \text{corr}(\nu_{il},\nu_{ik}) = \sigma_\alpha^2 / \left(\sigma_\alpha^2 + \sigma_\eta^2\right) \quad l \neq k \tag{20}$$

where ρ represents the proportion of the total unexplained variance in the dependant variable contributed by the panel level variance component. The magnitude of ρ indicates the extent of the unobservable intra-household correlation in the determinants of debt.

Cross-Section Analysis

To explore the robustness of the results derived from the random effects approach, we investigate the determinants of household level debt, based on the sum of individuals' reported debt within each household, where each unit of observation relates to the head of household. Thus, the sample is heads of households only and the dependant variable is household debt:

$$\ln\left(\sum_{i\in h} d_i\right) = \beta_1' X_i + \beta_2' FEI_i + \varepsilon_i \tag{21}$$

where i = 1,…,n_h with n_h representing the number of heads of households. Figures 3 and 4 below illustrate the distribution of household debt across households, with an employed or self-employed head of household, for 1995 and 2000, respectively. In accordance with the distribution of individual debt, the figures indicate that there are a significant number of households reporting zero debt.

Although the focus of our paper lies in the role of financial expectations, we include a number of controls in our econometric analysis for personal and demographic characteristics in the vectors X_{hi} and X_i [see equations (17) and (21), respectively]. These explanatory variables include variables relating to the individual's financial situation. Specifically, we incorporate controls for lifetime income, as the amount of debt undertaken by the individual or household could be influenced by how one expects income to vary over the life-cycle. We have income data from 1991 onwards, and so include current and lagged gross usual monthly income variables to control for past income (i.e. income in each year 1991, 1992, 1993 and 1994). In addition, we include explanatory variables such as highest educational qualification, firm size, occupation and industry affiliation, which arguably influence

lifetime income. Explanatory variables are also incorporated to control for employment status, including dummy variables for if unemployed in the previous wave, whether the individual has a second job or a permanent contract.

We also control for an individual's wealth by including the natural logarithm of total savings plus total investments, a dummy variable controlling for the receipt of a windfall and the natural logarithm of house value (if owned without a mortgage). We also control for the natural logarithm of spouse's gross usual monthly pay, the total outstanding mortgage as a proportion of income, whether any of the debt is a joint responsibility and a dummy variable indicating whether the individual has an additional mortgage.

Demographic characteristics controlled for include marital status, the number of children (aged less than 18), region of residence, household size and car ownership. Finally, we also control for the month of interview as debt may have a seasonal component. Table 1 presents summary statistics for the variables used in our analysis for 1995 and 2000. These relate to individual level data – household level statistics are available from the authors on request. For each year, we provide two sets of summary statistics – those for all individuals and, in parentheses, those reporting positive debt only.

Growth in Debt

To gain an understanding of the determinants of debt accumulation over time, we also explore the growth in debt between 1995 and 2000. Ideally, in the econometric analysis described above we would weight debt by income or wealth so as to ascertain the degree of debt an individual or household holds in relation to other assets. However, due to the nature of the debt question we do not know the time period over which debt has been accumulated, i.e. the debt may have been acquired in the last year or over a longer period of time (a stock). Consequently, because the trajectory of debt is unobservable, it is unclear as to how one would weight the amount of debt [see Bridges and Disney (2002)]. However, since we know the amount of debt in 1995 and 2000, the growth in debt between 1995 and 2000 can be calculated. We are then able to weight the difference in individual debt by total annual income over the period 1995 to 2000:

$$\ln\left[\left(d_{hi}^{2000} - d_{hi}^{1995}\right) / \sum_{1995}^{2000} \text{Income}_{hi}\right] = \varphi_1' Z_{hi} + \sum_{j=0}^{5} \gamma_j FEI_{hit-j} + \varepsilon_{hi} \quad (22)$$

$$\varepsilon_{hi} = \lambda_h + \omega_{hi} \quad (23)$$

$$\rho = \text{corr}(\varepsilon_{il}, \varepsilon_{ik}) = \sigma_\lambda^2 / \left(\sigma_\lambda^2 + \sigma_\omega^2\right) \quad l \neq k \quad (24)$$

where Z_{hi} represents a vector of personal characteristics, with FEI_{hit-j} denoting the Financial Expectations Index in both current year (t=2000) and lags t-1 (1999) through to t-5 (1995), thus controlling for individual financial expectations over the six-year interval (1995-2000). We define λ_h to represent the 'household' specific unobservable effect and ω_{hi} is a random error term, $\omega_{hi} \sim IN(0, \sigma_h^2)$. We assume that λ_h is $IN\left(0, \sigma_\lambda^2\right)$ and independent of ω_{hi} and Z_{hi}. Hence, the correlation between the error terms of individuals in the same household, which captures the extent to which unobserved household specific factors explain growth in debt, is given by ρ.

It is not possible to use a simple difference of income in the denominator of equation (22) since we only know the growth in debt. Consequently, we estimate a log growth in debt model, weighted by total annual income over the period 1995 to 2000, by random effects. Figure 5 shows how the dependent variable is distributed, where again we focus upon a logarithmic measure following Gropp et al. (1997).[33]

We also explore whether the results derived for individual level growth in debt hold at the household level, based upon the growth in household level debt weighted by household income, where each observation relates to the head of household. Here, the sample consists of heads of household only and the dependent variable is the growth in household debt as a proportion of household income:

$$\ln\left[\sum_{i \in h}\left(\left(d_i^{2000} - d_i^{1995}\right) / \sum_{1995}^{2000} \text{Income}_i\right)\right] = \varphi_1' Z_i + \sum_{j=0}^{5} \gamma_j FEI_{it-j} + \varepsilon_i \quad (25)$$

where i = 1, n_h with n_h representing the number of heads of households.

V. RESULTS

In this section, we initially discuss the determination of the amount of debt, followed by the growth in debt and focus attention on whether financial expectations have a role to play. In the following discussion, the key coefficients of interest are shown in bold in Table 2. For brevity, only the coefficients of interest are reported in Tables 3, 5 and 6.

The Amount of Debt at the Individual Level: Random Effects Analysis

The results presented in Table 2, below, relate to the impact of financial expectations in the current year of interview upon the log amount of debt. The first two columns of Table 2 present estimates based upon the random effects Tobit estimator for 1995 and 2000.

Interestingly, in both years, current and lagged income has no significant impact on the amount of debt undertaken. Rather the value of the house is significant in determining the amount of debt,[34] along with marital status and whether the individual has a second job. Noticeably the amount of savings and investments, employment status and contract type are only significant for individual years, not both, and spouse's income, or whether the individual was unemployed in the previous year generally have no significant impacts upon debt in either years.

The predictions of our theoretical model suggest that optimistic financial expectations should impact positively on the amount of debt. Indeed, focusing upon the 1995 and 2000 results for individuals, this is found to be the case. The financial expectations index (FEI), which ranks individuals from having pessimistic to optimistic financial expectations, is characterised by a relatively large positive and significant coefficient. Interestingly, it is noticeably larger in 2000. In both 1995 and 2000, ρ is very small at 0.085 and 0.057, respectively, implying that unobserved intra-household correlations explain very little of the residual variance.

The Amount of Debt at the Household Level: Cross Section Analysis

The final two columns of Table 2 relate to the determinants of debt at the household level based upon equation (21). Essentially, the model is the same except that we are now estimating a standard cross

section Tobit model for each year, with debt and income (current and lagged) defined at the household, rather than the individual, level. The results are consistent with those based upon individual level debt, in that male heads of households are found to have lower debt (in 1995), as do married heads of households (in 2000). The value of the house has a negative and significant impact upon debt in both years, as found when considering individual level debt. Positive impacts upon household debt again come from sources similar to those found earlier - noticeably whether the head of household has a second job, has received a windfall (2000) and also contract type (2000). As previously found, current and lagged household income are always insignificant. Turning to the role of financial expectations for the heads of households, the results support our earlier findings with a positive and significant coefficient in both 1995 and 2000. Furthermore, household size is important in determining the amount of household debt in accordance with the findings of Crook (2001) and Gropp et al. (1997) for the U.S.

The evidence presented in Table 2 conforms with our theoretical priors, in that optimistic financial expectations, have a positive and significant impact on debt both at the individual and household level. We now subject our empirical analysis to a number of robustness checks by considering causality and the dynamics of financial expectations, with the results shown in Table 3.

Robustness Checks

The direction of causality between financial expectations and debt is as yet unclear. For example, an individual (household) who has taken on debt may be more optimistic about their financial future simply because they are now better off. So any significant correlation between debt and financial expectations might arise because debt has a causal impact upon positive financial expectations rather than the other way around. To explore this possibility, we replace current financial expectations with their lagged indicator (see Table 3 Panel A). So, for example, lagged financial expectations, denoted by FEI_{t-1}, in 1995 (period t) would be based upon the 1994 (period t-1) financial expectations value.

In Table 3, Panels A and B adopt the same format as Table 2 with the first two columns reporting the results of individual level debt for 1995 and 2000, and the final two columns corresponding to household level debt. The control variables used are the same as in Table 2 but the

detailed results are not reported for brevity. Focusing upon the 1995 results, we find that the lagged financial expectations index has a positive and significant impact upon debt. In 2000, the lagged financial expectations index is again significant for both individual and household debt. These results imply that the causal flow runs from financial expectations to debt rather than the other way around. Specifically financial expectations operate through being increasingly financially optimistic supporting our earlier results.

In Table 3 Panel B, we introduce both current and lagged expectations to ascertain whether financial expectations influence debt formation in a dynamic manner and once again report selected results. Across each year and specification, the financial expectations index has a positive and significant impact upon debt. Noticeably the lagged financial expectations index outweighs current financial expectations in each year. The difference between the coefficients is however insignificant (see the chi-squared and F statistics resulting from testing equality between the FEI current and lagged coefficients).

In the final panel of Table 3, Panel C, Granger causality is explored by estimating both financial expectations and debt equations in 2000, across individuals and heads of households. Specifically, financial expectations are found to Granger cause debt if the amount of debt undertaken can be predicted with a greater degree of accuracy using past values of financial expectations than by not doing so. If financial expectations Granger cause debt then lagged values of the financial expectations index in the debt equation should be significant. Conversely, if debt Granger causes financial expectations, then lagged values of debt in the financial expectations equation should be significant. We focus exclusively on 2000 when estimating financial expectations (first and third columns of Table 3) and debt equations (second and final columns of Table 3) and include the most recent lag.[35] Throughout Panel C, the coefficient on lagged debt is always insignificant in the expectations equation, at the individual or household level. Lagged financial expectations, on the other hand, are always significant in explaining current levels of debt. The positive estimated coefficient indicates that those with optimistic financial expectations take on more debt. Overall, these results suggest that optimistic financial expectations Granger cause debt.

To summarise, financial expectations appear to be an important determinant of debt accumulation and this finding is particularly robust. Furthermore, our findings suggest that the direction of causality is from financial expectations to debt.

Growth in Debt and Financial Expectations

Turning to the growth in debt between 1995 and 2000, initially expectations are defined by the financial expectations index, for each year, within the growth period (FEI_{hit-j}), as specified by equations (22) and (25). The distribution of financial expectations over the period are presented in the first two columns of Table 4. In each year, approximately 30% of individuals believed that their financial situation would be better off next year. The number of individuals with pessimistic financial expectations ranges between 219 (7.5%) in 2000 and 334 (11.5%) in 1995.

In Table 5, column 1, we present selected results on the growth of individual debt, estimated by random effects [see equation (22)], which indicate how financial expectations impact upon the growth in debt within the growth period. An array of controls are entered into the regressions, but again the full results are omitted for brevity. Financial expectations towards the end of the growth period are significant, specifically those in 2000 and 1999 (FEI_t and FEI_{t-1}), concurring with our previous findings of a positive impact. In addition, unobserved intra-household effects (given by ρ) are also small. Expectations at the start of the period (1995) and during the middle years are insignificant, although the chi-squared statistic indicates that the null hypothesis, that all the coefficients are jointly insignificant, can be rejected at the 5 per cent level.

In Table 5, column 2, we now consider the growth in household debt over the period and whether there is a role for household financial expectations in influencing debt. The dependent variable is now household debt weighted by total household annual income over the period, and is distributed as shown in Figure 6. Financial expectations are now a summation of individuals' financial expectations within the household, weighted by household size, and recoded to either '0=pessimistic', '1=same' or '2=optimistic'. Equation (25) is estimated by OLS with robust standard errors. Household financial expectations in 2000 clearly have the largest effect on the growth in debt. Again a joint test of the

significance of all financial expectations within the growth period is significant – indicating that they influence the growth in household debt.

Growth in Debt, Financial Expectations and Forecasting Success

A natural question to ask is does it matter whether the financial expectations formulated by an individual are correct? To ascertain forecasting success, we firstly compare the prediction, i.e. expectations at t, with the answer to the following question at t+1:

Would you say that you yourself are better off or worse off financially than you were a year ago?

Better off……..1
Worse off…….2
About the same……3
Don't know…..……..4

From our information about financial expectations, and the responses to the above question, we are able to formulate a series of binary dummies for whether individuals were correct or incorrect with respect to their financial expectations in each year. The distribution of correct financial expectations is shown in the final columns of Table 4. Clearly a higher proportion of individuals are correctly optimistic about their financial expectations next year compared to individuals with a correct pessimistic outlook.

The results of estimating equations (22) and (25), incorporating dummy variables for the accuracy of optimistic financial expectations are shown in Table 6.[36] At the individual level the only significant dummies are whether the individual made a correct optimistic forecast and incorrect optimistic forecast in 1999. In general, there is no role for the accuracy of financial expectations - evidence from a series of joint tests reveal that at the 5 per cent level neither the correct lags, incorrect lags, or both the correct and incorrect lags are significant. Similarly, at the household level there is no role for the accuracy of expectations as revealed by the joint F tests.

VI. CONCLUDING REMARKS

In this paper we have explored an issue which is extremely topical amongst both economists and policy makers: the determinants of the amount of debt and the growth of debt at the individual and household level. Our main concern has been with the role of financial expectations. Our theoretical framework

predicts a positive association between optimistic financial expectations and the amount of debt taken on. We then explore the empirical determinants of debt and growth in debt at the individual and household level, using data from the 1995 and 2000 waves of the *British Household Panel Survey*. In particular, we extensively explore the influence of individual and household expectations, regarding their future financial situation, on debt.

Our empirical findings provide convincing support for our theoretical priors in that optimistic financial expectations impact positively on the amount of outstanding debt and on the growth in debt. Our econometric results predict that individuals with optimistic financial expectations hold six (fifteen) times the amount of debt in 1995 (2000) relative to those with pessimistic financial expectations.[37] The corresponding figures weighted by income are the same in magnitude. Furthermore, our findings suggest that it is optimistic financial expectations *per se* which are important in influencing debt, rather than the accuracy of individuals' predictions regarding their future financial situation.

Our results may contribute to the understanding of why so many people encounter debt problems. Government policy could usefully be directed at identifying ways of curbing unrealistic financial optimism. However, careful targeting of such policies is necessary if adverse impacts on consumer expenditure and macroeconomic demand are to be avoided. In addition, further research into the formulation of financial expectations, and their influence on financial decision-making at the individual and household levels, is warranted.

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FOOTNOTES

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1. Unsecured borrowing excludes mortgage loans.

2. This is a similar organisation to the National Foundation for Credit Counselling in the U.S., but with a broader remit, including legal and social welfare advice.

3. See the U.K. National Association for Citizens Advice Bureau report "Daylight Robbery", available at http://www.citizensadvice.org.uk.

4. For example, the financial structure of households from an international perspective is explored in Guiso et al. (2002) yet there is little reference to debt.

5. Debt levels may also be influenced by tax laws specifically in the U.S., where some forms of borrowing are tax deductible as Poterba (2002) notes. However, this is not the case in the U.K. for non-mortgage debt.

6. They argue that consumption decisions are dissociated from portfolio allocations within the household. Consequently, the "accountant", who is in charge of household financial decision-making, attempts to control consumption expenditure by the "shopper", through holding credit card balances as a fixed proportion of their limit. The purchases of the "shopper" are bound by the credit limit and outstanding balance of the credit card, with the interpretation that debt is incurred to prevent more spending and that credit card debt can co-exist with high levels of liquid savings.

7. Cox and Jappelli (1990) show that a proportion of this latent demand for credit may be met from private transfers.

8. This is because U.S. debtors can choose to file for bankruptcy under one of two legal provisions (known as Chapter 7 and Chapter 13), which exempt the debtor from using either their wealth or their future earnings in repayment. The exemption limits for asset holdings vary across states. In the U.K., bankruptcy law is more stringent requiring all persons declaring bankruptcy to hand over control of their estate (liquid and illiquid financial assets) to a legal trustee. All assets, including residential accommodation and any business interests, may be disposed of or wound up by the trustee to meet their costs, creditors' demands and the cost of bankruptcy proceedings. All income, above subsistence level, may be used in repayments. Hence, in the U.K., there is no incentive for opportunistic debt accumulation.

9. That is, $R = 1 + r$, where $0 < r < 1$ is the safe interest rate. For economy of notation we take the interest rate to be time invariant, but our model could easily be re-written with different values of the interest factor at different times. This is equivalent to assuming that borrowers and lenders have perfect foresight, i.e. $E_t(R_{t+1}) = R_{t+1}$. In fact, we assume perfect foresight of third period income in the second version of the model. But we do not do so for the interest rate, partly to save notation - particularly in the life-cycle budget constraints – and, partly, because our focus is not on the inter-temporal profile of real interest rates.

10 The lender's problem is indeterminate but it is straightforward to verify that expected lifetime utility is concave in L. Hence, there will be an interior solution.

11. Here the consumer has no assets, only his/her income y_{2L}, but at the end of the section we consider the case of consumers who hold assets that can be used as collateral.

12. One could think of third period income as an endowment (e.g. an inheritance) or a fixed pension. Again, we implicitly assume perfect foresight of all future parameters (except second period income) for reasons of tractability.

13. It will turn out that R=R' in equilibrium (see below), so effectively we are assuming y_3>RL.

14. Alternatively, this would occur at a factor R' below or above R if the rate of time preference were above or below the safe interest rate, respectively. Again, we rule this out to save notation.

15. This is common practice in personal loan refinancing in the U.K.

16. That is $U'(y_{2L} - gRL + L') = U'(y_3 - R^2L(1-g) - RL')$.

17. That is $U'(y_{2H} - RL + L') = U'(y_3 - RL')$.

18. Of course, the optimal size of L' chosen by a high income borrower need not equal that chosen by the low income borrower. In fact, typically they are different, as shown by equations (7) and (9). We denote them both by L' to save notation.

19. Our approach can be compared to existing studies on debt, in particular Bertaut and Haliassos (2002), hereafter BH. Our loan extension is similar to BH's concept of debt revolving, although not entirely equivalent, because debt in our model can and will increase, as well as decrease, both in size and as a result of carrying forward interest payments, whereas in BH it is a fixed proportion of the credit limit. Like BH we adopt a life cycle approach, with credit constraints depending on income. However, there are differences in focus and purpose, which are translated into different formal structures. BH consider credit card debt only, and explicitly separate consumer behaviour into accountant and shopper, whereas we focus on a broad concept of personal debt, implicitly treating consumers as shoppers. In BH debt co-exists with high liquidity, in our model loan extensions mostly apply to consumers who are short of liquidity and cannot repay their loan. The interest rate in BH is binary whilst the interest rate in our model is continuous and adjusts in equilibrium.

20. This is exactly the same reasoning as in equations (4)-(5) - the lender must be no worse off than investing L in the safe capital market.

21. Equation (15) also implies $L < y_{2H}/R'$ since $L > y_{2L}/R > y_{2L}/R'$.

22. From Equation (14) $\partial R'/\partial p = -(R-y_{2L})/(1-p)^2 > 0$ and $\partial R'/\partial y_{2L} = -(1-p)/pL < 0$ when $L>0$ (i.e. borrowing).

23. Strictly speaking this happens if borrowers and lenders have different financial expectations, and if these beliefs differ sharply. With full information there is no immediate rationale for different beliefs and even

models with asymmetric information assume common beliefs of borrower and lender. Our model could still be easily reformulated with different values of p for borrower and lender: the basic intuition $\partial L/\partial p > 0$ would continue to hold. This is because the direction of the response of consumption to both sets of beliefs is identical: without default the lender's beliefs play no role since zero profit conditions in each period are trivially satisfied. Whilst with default, the borrower's beliefs play no role since there is full consumption smoothing between C_{2H} and C_{3H} and between C_1 and C_{2H}. See equations (3) and (12) for the no default case. A proof is available from the authors for the default case.

24. The proof is available from the authors on request.

25. A further assumption of a sufficiently high penalty on defaulting borrowers if they switch lenders could strengthen the framework as well as adequately represent the economic and legal reality.

26. The proof is available from the authors on request. We have also considered generalising our model to asymmetric information, but this would be beyond the scope of our study. In the case of personal debt it is unlikely that lenders have anything less than full information, given the credit scoring system on which lending is based. However, there exists a large literature on loan contracts with asymmetric information including Townsend (1979), Gale and Hellwig (1985), Mookherjee and Png (1989), Jost (1996) and Krasa and Villamil (2000). Lenders and borrowers have common beliefs over future income, but whilst borrowers have full information, lenders cannot observe income realisations unless they pay some positive, usually fixed observation cost. The optimal loan contract generally involves random monitoring by the lender and a sequential rationality constraint imposed on the contract. This makes the lender indifferent to monitoring - thus solving a commitment problem - while also imposing sufficient punishment on borrowers to deter them from cheating. These contracts also tend to be renegotiation proof. Essentially, this approach would mean the inclusion, in our equilibrium model, of the appropriate incentive constraints. We expect that in such a general case the direction of the changes originating from a larger probability of high income would be the same.

27. Furthermore, the mean of the natural logarithm of the mortgage amount is much larger than that of the amount of debt in each year. The log of the mortgage amount in 1995 (2000) is 6.84 (6.52), which can be compared to the corresponding figures for debt in Table 1.

28. For example, the *Family Resources Survey* contains information on mortgage repayments only whilst the *Family Expenditure Survey* contains information on personal loans only.

29. Debt is observed at two distinct points in time and so is potentially a stock accumulated over *n* periods.

30. Ideally, as pointed out by an anonymous referee, we would conduct separate analysis for the self-employed given that they may incur business as well as personal debt. Unfortunately, the self-employed account for only 14% of our sample. To control for differences between employees and self-employees, we do include a self-employment dummy variable in our econometric analysis.

31. Zero reported debt is included as zero in our dependent variable as there is no reported debt between zero and unity. Throughout the analysis we refer to debt as a logged variable following Gropp et al. (1997) due to the fact that the distribution of debt is highly skewed towards zero.

32. An alternative approach, if the underlying decision to accumulate debt differs from that determining the minimal amount of debt, e.g. if zero debt reflects credit constraints, would be to adopt a sample selection model. However, we adopt the Tobit estimator on the basis that we do not have information on credit constraints.

33. The dependent variable represents the log of the absolute value of debt growth, which is then signed to capture positive or negative growth. Since there is no growth between 0 and 1, zero growth is included as zero.

34. As pointed out by an anonymous referee, the relationship between secured and unsecured debt is somewhat complicated. Individuals with housing equity may take out secured rather than unsecured debt, which may explain our finding that home ownership is associated with lower debt.

35. This is due to the fact that debt is only observed in 1995 and 2000. Thus, there are no lagged values of debt to use in Granger causality tests for 1995. In 2000, we are constrained to just one lag on debt, 1995, i.e. t-5.

36. In addition to the covariates, given in Table 5, we control for those predicting that their financial situation is unchanged, leaving the omitted category as those with pessimistic financial expectations.

37. To interpret the results in terms of size we estimated our model separately for individuals with optimistic and pessimistic financial expectations, constructing predicted debt for each group and year. We then calculated the ratio between the two predicted values.

FIGURE 1

Distribution of Individual Log Debt in 1995

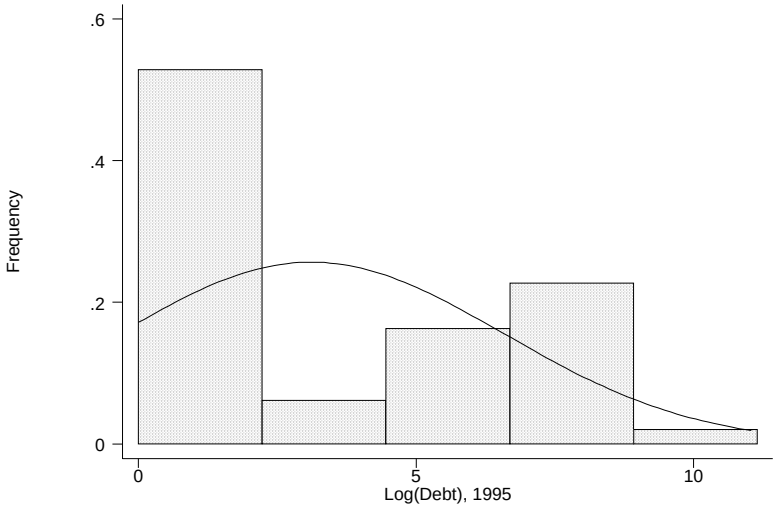

FIGURE 2

Distribution of Individual Log Debt in 2000

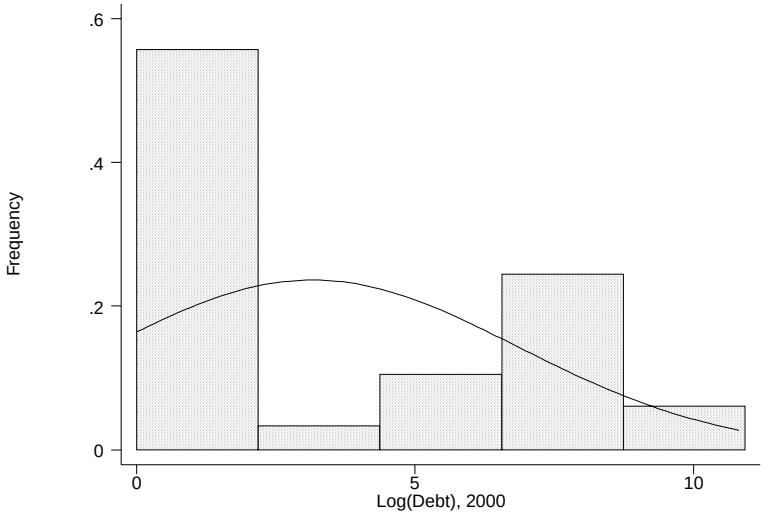

FIGURE 3

Distribution of Household Log Debt in 1995

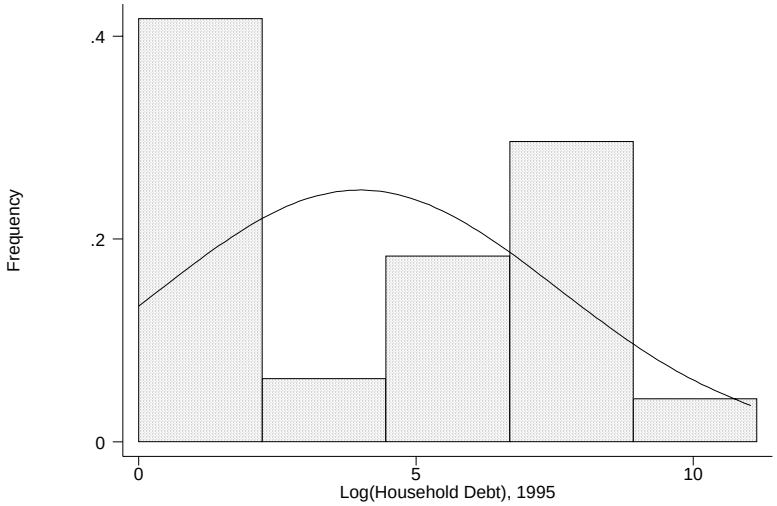

FIGURE 4

Distribution of Household Log Debt in 2000

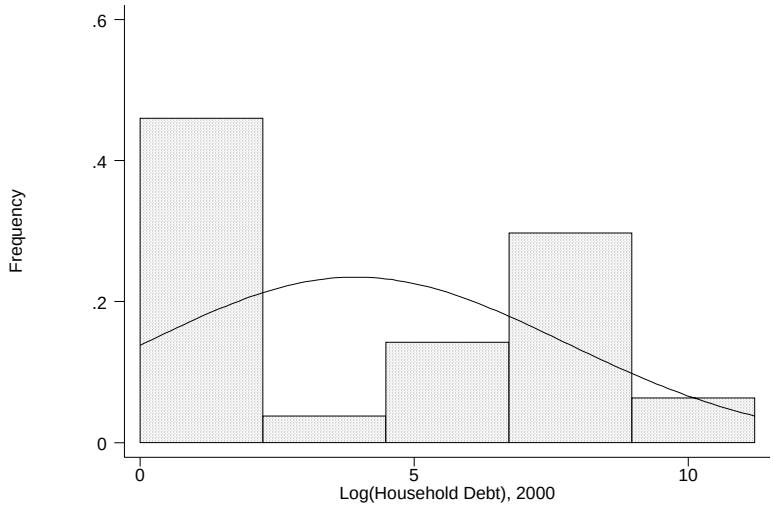

FIGURE 5

Distribution of the Growth in Individual Debt, over 1995-2000, Weighted by Period Income

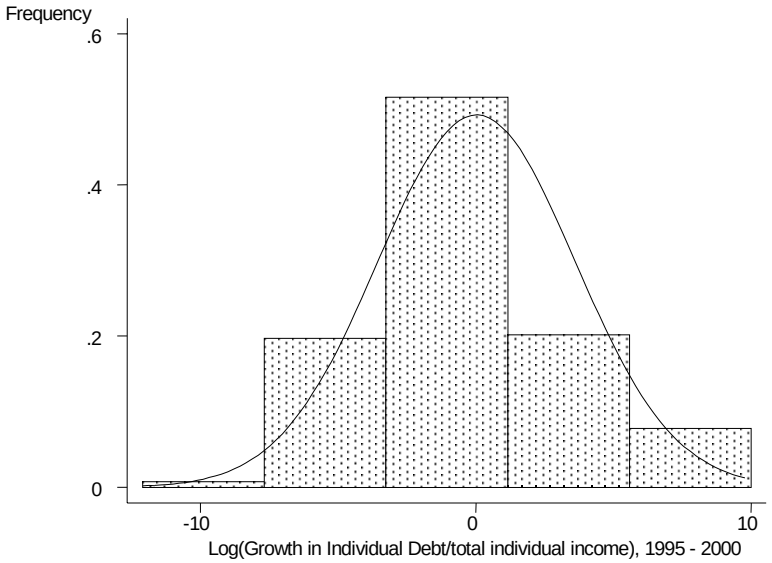

FIGURE 6

Distribution of the Growth in Household Debt, over 1995-2000, Weighted by Period Income

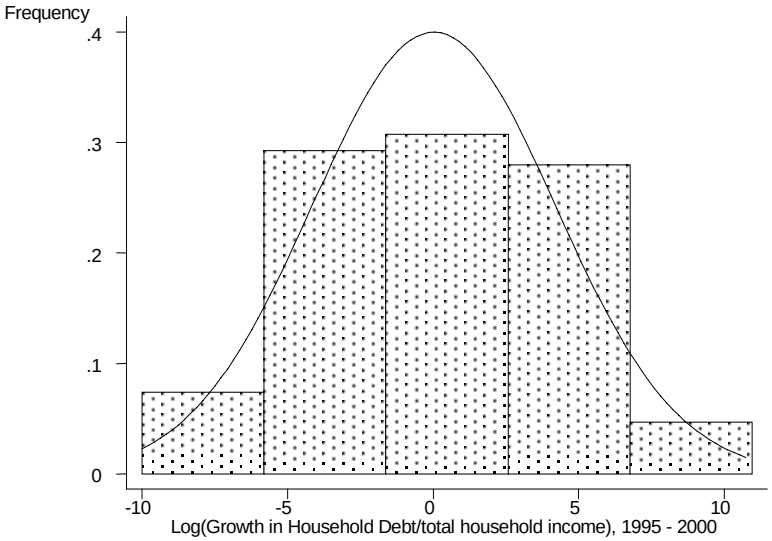

TABLE 1

Summary Statistics[a]

	ALL INDIVIDUALS (INDIVIDUALS WITH POSITIVE DEBT ONLY)							
	1995				2000			
	MEAN	**STD**	**MAX**	**MIN**	**MEAN**	**STD**	**MAX**	**MIN**
Ln (Debt)	3.18 (6.66)	3.50 (1.57)	11.15 (11.15)	0 (0.53)	3.11 (7.11)	3.69 (1.63)	10.92 (10.92)	0 (1.31)
$\mathbf{FEI}_t$	1.20 (1.25)	0.62 (0.63)	2 (2)	0 (0)	1.23 (1.30)	0.56 (0.58)	2 (2)	0 (0)
$\mathbf{FEI}_{t-1}$	1.19 (1.26)	0.62 (0.61)	2 (2)	0 (0)	1.26 (1.33)	0.59 (0.60)	2 (2)	0 (0)
Age	39.9 (38.2)	10.4 (9.9)	61 (60)	19 (20)	43.4 (40.9)	10.2 (9.6)	65 (65)	24 (24)
Age^2	1,707 (1,560)	838 (779)	3,721 (3,600)	361 (400)	1,989 (1,769)	895 (818)	4,225 (4,225)	576 (576)
Male	0.46 (0.45)	0.50 (0.50)	1 (1)	0 (0)	0.45 (0.46)	0.50 (0.50)	1 (1)	0 (0)
Married	0.69 (0.68)	0.46 (0.47)	1 (1)	0 (0)	0.69 (0.65)	0.46 (0.48)	1 (1)	0 (0)
No. Kids	0.72 (0.80)	0.99 (1.02)	5 (4)	0 (0)	0.67 (0.79)	0.96 (1.01)	6 (4)	0 (0)
White	0.97 (0.98)	0.18 (0.15)	1 (1)	0 (0)	0.96 (0.97)	0.19 (0.18)	1 (1)	0 (0)
Household size	1.83 (1.80)	0.77 (0.75)	5 (5)	1 (1)	1.64 (1.56)	0.65 (0.61)	4 (5)	1 (1)
$Unemployed_{t-1}$	0.01 (0.01)	0.10 (0.09)	1 (1)	0 (0)	0.01 (0.01)	0.07 (0.06)	1 (1)	0 (0)
Car in house	0.92 (0.91)	0.27 (0.29)	1 (1)	0 (0)	0.93 (0.92)	0.26 (0.26)	1 (1)	0 (0)
Self employed	0.14 (0.12)	0.35 (0.32)	1 (1)	0 (0)	0.14 (0.13)	0.35 (0.33)	1 (1)	0 (0)
Permanent contract	0.88 (0.90)	0.32 (0.31)	1 (1)	0 (0)	0.91 (0.93)	0.29 (0.25)	1 (1)	0 (0)
Joint debt	0.18 (0.35)	0.38 (0.48)	1 (1)	0 (0)	0.10 (0.19)	0.30 (0.39)	1 (1)	0 (0)
Wealth Controls								
Ln (SpouseIncome)	4.02 (4.06)	3.40 (3.40)	10.09 (8.72)	-2.30 (-2.30)	4.09 (4.13)	3.53 (3.52)	9.28 (9.21)	-2.30 (-2.30)
Ln (Savings+Invest)	3.40 (3.23)	3.37 (3.19)	13.65 (12.54)	-0.17 (-0.17)	3.55 (3.45)	3.43 (3.30)	12.82 (11.62)	-0.30 (-0.30)
Ln (Housevalue)	1.45 (0.89)	3.76 (3.02)	12.77 (12.04)	0 (0)	2.16 (1.06)	4.52 (3.35)	13.59 (13.16)	0 (0)
Mortgage/Income	0.14 (0.17)	0.68 (0.97)	31.7 (31.73)	0 (0)	0.13 (0.15)	0.53 (0.56)	27.16 (27.01)	0 (0)
Extra Mortgage	0.03 (0.04)	0.17 (0.20)	1 (1)	0 (0)	0.05 (0.05)	0.21 (0.23)	1 (1)	0 (0)
Second job	0.11 (0.13)	0.32 (0.33)	1 (1)	0 (0)	0.09 (0.11)	0.29 (0.32)	1 (1)	0 (0)
Windfall	0.48 (0.50)	0.50 (0.50)	1 (1)	0 (0)	0.29 (0.29)	0.45 (0.45)	1 (1)	0 (0)
Lifetime Income Controls								
Ln (Income)	6.41 (6.49)	1.02 (0.93)	9.70 (9.70)	-2.70 (0)	6.48 (6.59)	1.21 (1.13)	9.91 (9.91)	-2.83 (-2.83)
Ln ($Income_{t-1}$)	6.42 (6.48)	0.99 (0.90)	9.25 (9.25)	0 (0)	6.26 (6.27)	1.17 (1.14)	9.25 (9.26)	0 (0)
Ln ($Income_{t-2}$)	6.30 (6.35)	1.14 (1.04)	9.30 (8.65)	-2.64 (0)	6.17 (6.16)	1.27 (1.29)	9.30 (9.30)	-2.64 (0)
Ln ($Income_{t-3}$)	6.21 (6.24)	1.31 (1.26)	8.95 (8.41)	0 (0)	6.07 (6.03)	1.43 (1.49)	8.95 (8.74)	-1.93 (0)
Ln ($Income_{t-4}$)	6.13 (6.14)	1.40 (1.33)	9.04 (9.04)	0 (0)	5.99 (5.95)	1.50 (1.55)	9.04 (9.04)	0 (0)
Firm size 1-24	0.27 (0.27)	0.45 (0.44)	1 (1)	0 (0)	0.29 (0.29)	0.45 (0.45)	1 (1)	0 (0)
Firm size 25-99	0.22 (0.23)	0.41 (0.42)	1 (1)	0 (0)	0.20 (0.19)	0.40 (0.39)	1 (1)	0 (0)
Firm size 100-499	0.20 (0.22)	0.40 (0.41)	1 (1)	0 (0)	0.20 (0.22)	0.40 (0.41)	1 (1)	0 (0)
Degree	0.16 (0.15)	0.37 (0.36)	1 (1)	0 (0)	0.19 (0.20)	0.39 (0.40)	1 (1)	0 (0)
Further Education	0.23 (0.26)	0.42 (0.44)	1 (1)	0 (0)	0.32 (0.35)	0.46 (0.48)	1 (1)	0 (0)
A' Level	0.13 (0.12)	0.33 (0.33)	1 (1)	0 (0)	0.10 (0.10)	0.31 (0.30)	1 (1)	0 (0)
O' Level	0.22 (0.24)	0.42 (0.43)	1 (1)	0 (0)	0.18 (0.17)	0.39 (0.38)	1 (1)	0 (0)
CSE	0.04 (0.05)	0.20 (0.21)	1 (1)	0 (0)	0.03 (0.04)	018 (0.19)	1 (1)	0 (0)
Other Education	0.05 (0.05)	0.22 (0.22)	1 (1)	0 (0)	0.04 (0.04)	0.20 (0.29)	1 (1)	0 (0)
Manager	0.15 (0.14)	0.35 (0.35)	1 (1)	0 (0)	0.16 (0.17)	0.37 (0.37)	1 (1)	0 (0)
Professional	0.12 (0.13)	0.32 (0.33)	1 (1)	0 (0)	0.11 (0.13)	0.32 (0.34)	1 (1)	0 (0)
Associate Professional	0.11 (0.11)	0.31 (0.32)	1 (1)	0 (0)	0.12 (0.13)	0.32 (0.34)	1 (1)	0 (0)
Clerical	0.16 (0.17)	0.37 (0.38)	1 (1)	0 (0)	0.15 (0.15)	0.36 (0.36)	1 (1)	0 (0)
Craftsman	0.11 (0.11)	0.32 (0.31)	1 (1)	0 (0)	0.11 (0.11)	0.31 (0.31)	1 (1)	0 (0)
Personal	0.09 (0.10)	0.29 (0.30)	1 (1)	0 (0)	0.09 (0.09)	0.28 (0.28)	1 (1)	0 (0)
Sales	0.07 (0.06)	0.25 (0.25)	1 (1)	0 (0)	0.06 (0.04)	0.23 (0.21)	1 (1)	0 (0)
Energy	0.02 (0.02)	0.13 (0.14)	1 (1)	0 (0)	0.01 (0.02)	0.12 (0.13)	1 (1)	0 (0)
Extraction	0.03 (0.03)	0.16 (0.17)	1 (1)	0 (0)	0.03 (0.03)	0.17 (0.17)	1 (1)	0 (0)
Engineering	0.09 (0.10)	0.29 (0.29)	1 (1)	0 (0)	0.08 (0.09)	0.27 (0.28)	1 (1)	0 (0)
Manufacturing	0.09 (0.09)	0.28 (0.29)	1 (1)	0 (0)	0.08 (0.08)	0.27 (0.26)	1 (1)	0 (0)
Construction	0.05 (0.04)	0.22 (0.19)	1 (1)	0 (0)	0.05 (0.04)	0.21 (0.20)	1 (1)	0 (0)
Distribution	0.17 (0.17)	0.38 (0.38)	1 (1)	0 (0)	0.16 (0.16)	0.37 (0.36)	1 (1)	0 (0)
Transport	0.06 (0.05)	0.23 (0.23)	1 (1)	0 (0)	0.06 (0.07)	0.25 (0.25)	1 (1)	0 (0)
Finance	0.13 (0.14)	0.34 (0.35)	1 (1)	0 (0)	0.14 (0.14)	0.35 (0.35)	1 (1)	0 (0)
	2,700 (1,289)				2,705 (1,183)			

[a] For brevity we have omitted summary statistics on region and month of interview.

TABLE 2
The Amount of Debt and Current Financial Expectations[a]

	Sample=All Individuals Ln (Individual Debt) RE Tobit						**Sample=Head of Household Ln (Household Debt) Tobit**					
	1995			*2000*			*1995*			*2000*		
Intercept	-6.892	*(2.93)*	*	-3.256	*(1.00)*		-3.494	*(1.21)*		-1.647	*(0.49)*	
FEI$_t$[b]	**0.661**	***(3.36)***	*	**0.898**	***(3.34)***	*	**0.577**	***(2.56)***	*	**0.683**	***(2.51)***	*
Age	0.104	*(1.02)*		-0.041	*(0.30)*		0.031	*(0.25)*		-0.124	*(0.87)*	
Age^2	-0.002	*(1.50)*		-0.001	*(0.42)*		-0.001	*(0.52)*		0.001	*(0.18)*	
Male	-0.304	*(1.04)*		0.615	*(1.78)*	#	-0.815	*(2.13)*	*	-0.020	*(0.05)*	
Married	-1.009	*(2.78)*	*	-1.262	*(3.08)*	*	-0.664	*(1.56)*		-1.229	*(2.82)*	*
No. Kids	-0.064	*(0.44)*		0.202	*(1.16)*		0.072	*(0.42)*		0.021	*(0.11)*	
White	1.484	*(2.06)*	*	0.805	*(1.00)*		1.192	*(1.55)*		1.307	*(1.54)*	
Household size	-0.064	*(0.36)*		-0.592	*(2.20)*	*	1.517	*(5.96)*	*	2.446	*(7.09)*	*
Unemployed$_{t-1}$	-0.717	*(0.56)*		0.223	*(0.11)*		-1.707	*(1.10)*		1.094	*(0.51)*	
Car in house	-0.086	*(0.19)*		0.508	*(0.87)*		0.334	*(0.67)*		0.908	*(1.53)*	
Self employed	-0.699	*(1.70)*	#	0.085	*(0.18)*		-1.036	*(2.13)*	*	0.441	*(0.87)*	
Permanent contract	-0.032	*(0.07)*		1.536	*(2.46)*	*	0.030	*(0.06)*		1.284	*(1.90)*	#
Wealth Controls												
Ln (SpouseIncome)	-0.064	*(1.50)*		-0.032	*(0.67)*		0.004	*(0.10)*		0.016	*(0.31)*	
Ln (Savings+Invest)	-0.088	*(2.28)*	*	-0.011	*(0.25)*		-0.083	*(1.89)*	#	-0.032	*(0.66)*	
Ln (Housevalue)	-0.146	*(3.90)*	*	-0.265	*(6.77)*	*	-0.131	*(2.78)*	*	-0.265	*(6.09)*	*
Mortgage/Income	0.330	*(2.03)*	*	0.004	*(1.31)*		0.356	*(2.31)*	*	0.003	*(0.99)*	
Extra Mortgage	1.522	*(2.27)*	*	0.053	*(0.08)*		0.847	*(1.13)*		0.471	*(0.69)*	
Second job	0.700	*(1.89)*	#	1.308	*(2.72)*	*	0.973	*(2.24)*	*	1.114	*(2.12)*	*
Windfall	0.237	*(0.98)*		0.680	*(2.09)*	*	0.050	*(0.18)*		0.821	*(2.36)*	*
Lifetime Income Controls												
Ln (Income)	0.264	*(1.48)*		0.281	*(1.78)*	#	0.173	*(0.83)*		0.041	*(0.26)*	
Ln (Income$_{t-1}$)	0.203	*(1.13)*		0.083	*(0.52)*		-0.161	*(0.71)*		-0.119	*(0.67)*	
Ln (Income$_{t-2}$)	0.041	*(0.29)*		0.070	*(0.47)*		-0.002	*(0.01)*		0.014	*(0.08)*	
Ln (Income$_{t-3}$)	0.087	*(0.74)*		-0.058	*(0.44)*		0.080	*(0.60)*		-0.182	*(1.38)*	
Ln (Income$_{t-4}$)	-0.003	*(0.02)*		-0.063	*(0.53)*		-0.073	*(0.62)*		0.147	*(1.16)*	
Highest education					*yes (6)*							
Occupation					*yes (7)*							
Industry					*yes (8)*							
Firm size					*yes (3)*							
Other Controls												
Region					*yes (10)*							
Month of interview					*yes (8)*							
Joint responsibility					*yes*							
Observations	2,700			2,705			1,561			1,779		
$\chi^2(68)$	712.49 *p=[0.000]*			486.56 *p=[0.000]*			364.17 *p=[0.000]*			330.79 *p=[0.000]*		
Pseudo R squared	–			–			0.0526			0.0432		
ρ	0.085			0.057			–			–		
Left censored obs.	1,411			1,522			645			816		

[a] *, # denote 5 and 10 per cent levels of significance, respectively.

[b] **FEI**= Financial Expectations Index: (0) pessimistic financial expectations (1) expects same financial situation (2) optimistic financial expectations.

TABLE 3
Causality Tests and Dynamics (Selected Results)[a]

	Sample=All Individuals **Ln (Individual Debt) RE Tobit**				**Sample=Head of Household** **Ln (Household Debt) Tobit**			
	1995		*2000*		*1995*		*2000*	
Panel A[b]								
Intercept	-7.400	*(3.15)* *	-3.876	*(1.18)*	-3.944	*(2.36)* *	-2.127	*(0.63)*
FEI_{t-1}	0.732	*(3.69)* *	0.949	*(3.71)* *	0.705	*(3.12)* *	0.719	*(2.73)* *
$\chi^2(66)$	714.31 *p=[0.000]*		488.10 *p=[0.000]*		367.32 *p=[0.000]*		331.92 *p=[0.000]*	
ρ	0.084		0.056		–		–	
Panel B[b]								
Intercept	-8.090	*(3.42)* *	-4.533	*(1.38)*	-4.569	*(1.77)* #	-2.659	*(0.79)*
FEI_t	0.486	*(2.36)* *	0.673	*(2.47)* *	0.391	*(2.65)* *	0.502	*(1.76)* #
FEI_{t-1}	0.584	*(2.81)* *	0.757	*(2.84)* *	0.578	*(2.42)* *	0.569	*(2.06)* *
H_0: $FEI_t=FEI_{t-1} \Rightarrow \chi^2(1)$	0.09 *p=[0.7687]*		0.04 *p=[0.8459]*		–		–	
H_0: $FEI_t=FEI_{t-1} \Rightarrow$ *F(1, 1493)*	–		–		0.23 *p=[0.6291]*		0.02 *p=[0.8830]*	
$\chi^2(67)$	719.45 *p=[0.000]*		493.66 *p=[0.000]*		370.04 *p=[0.000]*		335.02 *p=[0.000]*	
ρ	0.083		0.056		–		–	
Observations	2,700		2,705		1,561		1,779	
Left censored obs.	1,411		1,522		645		816	

	Sample=All Individuals, Year t=2000				**Sample=Head of Household,** Year t=2000			
	FEI_t **RE Ordered Probit**		Ln ($Debt_t$) **RE Tobit**		FEI_t **Ordered Probit**		Ln ($Debt_t$) **Tobit (household debt)**	
Panel C[b]								
Intercept	–		-2.864	*(1.96)* #	–		-3.011	*(0.97)*
Ln ($Debt_{t-5}$)	0.013	*(1.53)*	0.554	*(13.40)* *	0.005	*(0.54)*	0.504	*(11.58)* *
FEI_{t-1}	0.723	*(12.27)* *	0.746	*(3.04)* *	0.646	*(12.68)* *	0.527	*(2.07)* *
$\chi^2(64)$	400.76 *p=[0.000]*		648.35 *p=[0.000]*		337.72 *p=[0.000]*		420.53 *p=[0.000]*	
ρ	0.346		0.047		–		–	
Observations	2,705				1,779			

[a] *, # denote 5 and 10 per cent levels of significance, respectively.
[b] We also include all the other explanatory variables as in Table 2.

TABLE 4
Financial Expectations Over the Growth Period 1995-2000[a]

	FINANCIAL EXPECTATIONS *(t)*			CORRECT FINANCIAL EXPECTATIONS *(t+1=t)*		
	BETTER OFF	*WORSE OFF*	*SAME*	*OPTIMISTIC*	*PESSIMISTIC*	*SAME*
2000 *(t)*	837	219	1,766	540	158	1,931
1999 *(t-1)*	922	240	1,658	659	158	1,781
1998 *(t-2)*	944	239	1,622	631	158	1,708
1997 *(t-3)*	909	250	1,657	626	159	1,688
1996 *(t-4)*	937	267	1,608	685	192	1,682
1995 *(t-5)*	928	334	1,556	628	246	1,556

[a] The sample size for each year is 2,906.

TABLE 5
Growth in Debt and Financial Expectations (Selected Results)[a b]

	Sample=All Individuals Ln (Growth Weighted Debt) RE			**Sample=Head of Household Ln (Growth Weighted Household Debt) OLS**		
Intercept	0.150	*(0.30)*		0.168	*(0.24)*	
FEI_t	0.237	*(2.81)*	*	0.579	*(3.31)*	*
FEI_{t-1}	0.314	*(2.39)*	*	-0.118	*(0.64)*	
FEI_{t-2}	0.030	*(0.23)*		0.204	*(1.14)*	
FEI_{t-3}	0.069	*(0.53)*		-0.052	*(0.30)*	
FEI_{t-4}	-0.155	*(1.22)*		0.368	*(2.15)*	*
FEI_{t-5}	-0.034	*(0.29)*		0.155	*(0.96)*	
H_0: All FEI Coef.=0 $\Rightarrow \chi^2(6)$	14.43 *p=[0.020]*			–		
H_0: All FEI Coef.=0 $\Rightarrow$ *F(6, 1586)*	–			3.08 *p=[0.005]*		
Observations	2,906			1,633		
Wald $\chi^2(46)$	74.50 *p=[0.005]*			–		
R squared	0.0254			0.0472		
ρ	0.112			–		

[a] Controls are the growth in: income; spouses' income; mortgage as a proportion of income; savings and investments, value of house. Always: joint debt; had car; had windfalls; married. New: car; windfalls; split & join a cohabiting relationship or marriage. Controls for male, white, educational controls, industry, occupation, whether moved region, different month of interview and self employed. *t=2000*.
[b] *, # denote 5 and 10 per cent levels of significance, respectively.

TABLE 6
Growth in Debt and Correct Financial Expectations (Selected Results)[a]

	Sample=All Individuals Ln (Growth Weighted Debt) RE			Sample=Head of Household Ln (Growth Weighted Household Debt) OLS		
Intercept	-0.243	*(0.37)*		0.164	*(0.17)*	
Correct Optimistic Financial Prediction$_t$	0.514	*(1.56)*		1.026	*(2.11)*	*
Correct Optimistic Financial Prediction$_{t-1}$	0.852	*(2.66)*	*	0.382	*(0.79)*	
Correct Optimistic Financial Prediction$_{t-2}$	-0.353	*(1.09)*		0.128	*(0.26)*	
Correct Optimistic Financial Prediction$_{t-3}$	-0.243	*(0.78)*		-0.384	*(0.83)*	
Correct Optimistic Financial Prediction$_{t-4}$	-0.213	*(0.62)*		-0.741	*(1.62)*	
Correct Optimistic Financial Prediction$_{t-5}$	0.073	*(0.26*		0.347	*(0.81)*	
Incorrect Optimistic Financial Prediction$_t$	0.373	*(1.18)*		0.906	*(1.94)*	#
Incorrect Optimistic Financial Prediction$_{t-1}$	0.558	*(2.77)*	*	0.177	*(0.38)*	
Incorrect Optimistic Financial Prediction$_{t-2}$	0.055	*(0.18)*		0.206	*(0.43)*	
Incorrect Optimistic Financial Prediction$_{t-3}$	-0.006	*(0.02)*		-0.166	*(0.36)*	
Incorrect Optimistic Financial Prediction$_{t-4}$	-0.310	*(1.02)*		-0.821	*(1.83)*	#
Incorrect Optimistic Financial Prediction$_{t-5}$	-0.245	*(0.87)*		0.036	*(0.09)*	
H_0: All Correct Coef.=0 $\Rightarrow \chi^2(6)$	11.73 *p=[0.068]*			–		
H_0: All Incorrect Coef.=0 $\Rightarrow \chi^2(6)$	6.83 *p=[0.337]*			–		
H_0: All Correct & Incorrect Coef.=0 $\Rightarrow \chi^2(12)$	16.39 *p=[0.174]*			–		
H_0: All Correct Coef.=0 $\Rightarrow$ *F(6, 1568)*	–			1.58 *p=[0.149]*		
H_0: All Incorrect Coef.=0 $\Rightarrow$ *F(6, 1568)*	–			1.30 *p=[0.252]*		
H_0: All Correct & Incorrect Coef.=0 $\Rightarrow$ *F(12, 1568)*	–			0.95 *p=[0.491]*		
Observations	2,906			1,633		
Wald $\chi^2(64)$	93.60 *p=[0.009]*			–		
R squared	0.032			0.047		
ρ	0.1187			–		

[a] We also include the other explanatory variables, as in Table 5, plus controls for correct and incorrect no change in financial situation – thus the base becomes pessimistic financial expectations. *t=2000*.
[b] *, # denote 5 and 10 per cent levels of significance, respectively.