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## **FINANCIAL LITERACY AND INDEBTEDNESS: NEW EVIDENCE FOR UK CONSUMERS**

by

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### **Abstract**

We utilise questions concerning individual ‘debt literacy’ incorporated into market research data on households’ unsecured debt positions to examine the association between consumer credit and individual financial literacy. We examine the relationship between individual responses to debt literacy questions and household net worth, consumer credit use and over-indebtedness. We find that financially illiterate households have lower net worth, use higher cost credit and are more likely to report credit arrears or difficulty paying their debts. However, financially literate households are more likely to co-hold liquid savings and revolving consumer credit, suggesting that the co-holding might arise as a result of rational financial behaviour. We consider the potential endogeneity of financial literacy.

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## **FINANCIAL LITERACY AND INDEBTEDNESS: NEW EVIDENCE FOR UK CONSUMERS**

### **1. Introduction**

This paper presents new evidence for the United Kingdom on what Lusardi and Tufano (2009) characterise as ‘debt literacy’ – the capacity of individuals to make simple financial calculations on matters directly pertaining to the cost of debt contracts. Using bespoke questions on individual debt literacy and on past financial education integrated into a well-established market research survey which itself focuses on debt issues, we examine the relationship between levels of financial literacy and use of consumer credit. For ease of comparison with the research by Lusardi and Tufano (2009) on the United States and by van Rooij, Lusardi and Alessie (2011) for the Netherlands, we use near-identical questions to those authors to examine relative levels of financial literacy in the three countries. Our results suggest higher levels of financial literacy in the United Kingdom than in the United States but lower than the Netherlands. We do not rule out that these discrepancies in part arise from the different methods used to collect responses within the surveys.

We then examine the impact of financial literacy on consumer credit use and over-indebtedness, in particular levels of indebtedness, use of high-cost vs low cost credit, the incidence of consumer credit arrears and self-reported repayment problems and the co-existence of liquid savings and consumer credit in household balance sheets. Our underlying hypothesis is that individuals with poorer levels of debt literacy underestimate the cost of consumer credit repayments and are more likely to use high-cost credit and more likely to over-borrow (and so are more likely to fall into arrears on their debt). We discuss this might be the case at somewhat greater length in the next section of the paper, where we also describe our measures of literacy, high vs. low-cost credit and debt arrears.

In the established literature on the relation between financial literacy and debt outcomes, and indeed in the parallel literature on financial literacy and retirement saving, debt outcome variables are often self-reported perceptions as to whether debt levels are ‘problematic’ or retirement saving levels ‘adequate’. One attraction of our data is that we have precise financial data on consumer credit arrears and portfolios whereas previous studies have tended to rely on rather general and subjective measures of debt ‘burdens’ and ‘repayment problems’ to underpin the analysis. As with much of the existing qualitative literature on personal and household ‘over-indebtedness’, subjective outcome measures suffer from the potential defect of lacking an objective benchmark as to what constitutes ‘normality’

or ‘adequacy’ in relation to debt levels and debt contracts.<sup>1</sup> Self-perceptions of ‘debt problems’ and as to whether personal debt is ‘too high’ or ‘too low’ should therefore be treated with caution. For example, Bridges and Disney (2010) show that respondents suffering from depression or other forms of psychological stress, emanating from such factors such as age, ethnicity and children’s health, are disproportionately more likely to perceive a given set of household financial circumstances as ‘problematic’ or as inducing concerns about debt levels within the household. This suggests the need, in the context of personal indebtedness, for precise outcome measures concerning debt contracts, as is the case in our study.

A familiar problem of inference that also arises in this context is that financial literacy may not be exogenous to debt outcomes. By way of example, van Rooij, Lusardi and Alessie (2011) examine the roles of what we might term ‘core’ financial literacy and also ‘advanced’ literacy concerning the operation of the stock market in order to examine the ‘stock-holding puzzle’ i.e. underinvestment by households in stocks (first noted by Haliassos and Bertaut, 1995). Interestingly, van Rooij *et al* find no evidence that levels of ‘basic’ financial literacy (that is, capacity to respond to questions concerning financial numeracy) ‘explain’ the probability of stock market participation. However, responses to questions concerning ‘advanced literacy’ in relation to comprehension of the stock market are highly correlated with individual stock market participation. It is easy to see that this latter correlation should not be surprising; indeed Jappelli and Padula (2011) formalise a model in which an individual invests in financial literacy in order to increase the return on his or her assets. Hence given this general concern as to the endogeneity of measures of ‘debt literacy’ among our sampled households, we follow van Rooij *et al* (and indeed Jappelli and Padula) in using time-dated financial education as an instrument for ‘debt literacy’. We show that the use of IV techniques does not radically alter our results.

The remainder of the paper is structured as follows. The next section pursues some of these issues in a little more detail; in particular the relationship of ‘debt literacy’ to related measures of cognition, and the evidence on household behaviour that in our view constitutes a departure from the ‘standard’ model of intertemporal optimisation. Section 3 discusses the data utilised in the present study in greater detail. Section 4 presents our key results. This is followed by a discussion of the key implications of the paper, and the conclusion.

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<sup>1</sup> For a survey of this literature, predominantly in the UK context, see Disney, Bridges and Gathergood (2008).

## 2. A Selective Literature Review

The economic and psychological literature on ‘cognition’ and on ‘financial literacy’ has used a variety of measures and definitions to characterise key concepts. At the most fundamental level, ability to make financial decisions hinges on cognitive function. Agarwal *et al* (2009) are among several authors that use the psychological distinction between ‘fluid intelligence’ (performance on novel tasks), which broadly decreases in age during the post-education life span, and ‘crystallised intelligence’ (experience) which broadly increases in age, albeit at a decreasing rate. These authors argue that performance, in terms of the sum of these attributes of intelligence, peaks on average in the early to mid-fifties, and can be measured by a battery of tests of cognition, memory, analytical reasoning and so on. Agarwal *et al* then show that this life cycle profile of cognitive performance is mirrored in the quality of decision-making in specific financial settings such as the willingness of individuals to engage in credit card balance transfers, and the relative use by individuals of high interest cost/charging credit arrangements versus low cost arrangements.

In similar vein, Banks, O’Dea and Oldfield (2010) suggest that cognitive abilities are a significant predictor of individual wealth trajectories, whilst Smith, McArdle and Willis (2010) examine cognition in a family context, suggesting that the family may select the ‘most cognitive’ member of the household to be the financial decision-maker. In this rapidly growing field of literature on the relation between measures of cognition and economic decision-making, a number of questions arise including the relationship between cognitive measures and other ‘personality traits’ that are traditionally linked to economic decision-making (such as the individual’s rate of time preference) and also as to the potential endogeneity of cognitive measures to financial decision-making and the self-selection of individuals over specific financial decisions (as in the intra-household case described above).

In this paper, we do not utilise general measures of ‘cognition’. Instead we examine the sub-set of cognitive abilities that relate to specific decisions which are intrinsic to the use of credit instruments. More precisely, we focus on individual comprehension of key numerical skills that are essential in order to determine debt levels and negotiate debt contracts at minimum cost. We do this in order to keep our measure of financial ability specific to the particular aspect of household finance we are considering – household use of consumer credit. We follow Lusardi and Tufano in describing these as issues of ‘debt literacy’. These include the ability to calculate percentages, to calculate compound interest, to understand repayment schedules and so on. Our work is therefore much closer in spirit to

those authors who focus on cognition problems that are specific to the issue of debt acquisition, as opposed to the broader financial literacy literature on retirement saving and stock market participation.

Stango and Zinman (2009, 2011) describe and measure the phenomenon of ‘payment/interest bias’ whereby consumers may misunderstand interest compounding (an exponential series) by interpreting interest accrual as an arithmetic series, thereby underestimating both the ‘true’ interest rate on a loan and the cost of paying it off. Crucially, as opposed to cognition failures that lead to two-sided mistakes relative to the ‘true’ cost of a loan, this form of cognition problem implies systematic bias in terms of both the interpretation of loan terms and in the financial behaviour consequent upon such misunderstandings; notably over-indebtedness and use of excessively high-cost credit instruments such as ‘pay-day’ loans (on the latter see, for example, Laibson., Repetto, and Tobacman, 2003).

But does everyone suffer from these biases? Although Stango and Zinman argue that there is an average bias among household financial decision-makers, it is clear from their empirical work that the extent of this bias varies from zero to a significant and large effect (*ibid*, 2009, Figure 2) and that the degree of individual bias, if any, correlates with observables (*ibid*, 2009, Table IV). The inference to be drawn from this work (and in contradistinction to some models of behavioural finance which infer universal behavioural characterisations that contrast with the standard model of ‘rationality’) is that some household financial decision makers act in a manner that is more or less consistent with the standard canonical model of consumption, saving and borrowing in which households as assumed to make these financial-mathematical choices correctly, while others do not. Therefore our (testable) hypothesis in the present paper is that the likelihood that the individual behaves in a manner consistent with optimising behaviour depends on the financial literacy of that consumer.<sup>2</sup>

The starting point in our analysis is to document levels of debt literacy in our sample. We show that households vary greatly in their levels of literacy and that a significant fraction

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<sup>2</sup> Some authors have argued that measured ‘deviations’ in behaviour from the standard canonical model of consumption, saving and borrowing simply arise from transaction costs (Brito and Hartley, 1995). A weaker statement of the proposition is that ‘near-rationality’ as an approximation is sufficient when the costs involved from departing from rationality are second-order (the classic statement is by Akerlof and Yellen, 1985; the argument has recently been restated in an empirical setting by Chetty, 2009). An interesting implication arises concerning the profit-maximising strategy of providers of credit instruments when the market is composed of ‘rational’ and ‘irrational’ (e.g. myopic) consumers: see Gabaix and Laibson (2006).

of households in our sample underestimate the cost of consumer credit repayments, as found in Lusardi and Tufano (2009) and Stango and Zinman (2009, 2011). Based on this finding, we expect that, conditioned on observables, a less ‘debt literate’ household – that is one which fails to answer correctly a number of questions on financial numeracy, notably concerning the comprehension of interest compounding – is likely to over-borrow (typically when young) and enter later life with lower wealth. We estimate the impact of debt literacy on household net worth and show that households in our sample with lower levels of literacy accrue less wealth and interpret this as indicating that household with less debt literacy may have over-borrowed when young.<sup>3</sup>

Following this, we expect that households with lower ‘debt literacy’ will tend to use high cost credit instruments and find this to be the case. However, since less educated individuals may both be less ‘debt literate’ and have restricted access to low cost credit instruments, we also test this hypothesis *within* classes of instruments such as credit cards and find that lower levels of debt literacy are associated with use of high-cost credit. We also test whether less debt literate individuals pay more on loans as a ratio of outstanding balances, and find that they do. We also examine how debt literacy relates to simultaneously having low interest savings co-existing with arrears on debt and also high levels of debt. We find that more literate individuals are more-likely to co-hold in this manner. Finally, we examine whether households with lower levels of debt literacy are more likely to exhibit arrears and/or self-reported repayment difficulties on their debts and find that poor literacy is positively correlated with arrears and late-payment on debt.

Our analysis is designed to link ‘debt literacy’ to debt outcomes under the assumption that underestimating the cost of credit leads households to over-borrow and this should be observable in financial data, in contrast to studies that compare outcomes with self-reported perceptions of whether the individual has ‘too much’ or ‘too little’ debt, or self-reported ‘debt problems’. The range of tests of the effect of financial literacy on various debt outcomes and contracts also differentiates our paper from those that focus on any one ‘anomaly’ in behaviour in isolation. We now turn to our data, and to our estimation strategy, to illustrate these ideas in practice.

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<sup>3</sup> In the standard optimising life-cycle model of saving and debt, two households (as represented by a financial decision-maker) with identical lifetime incomes, preferences, expectations in the same economic environment should exhibit, on average, the same level of indebtedness at a given point in the life-cycle, but if one household were to underestimate the cost of credit repayments they would over-borrow when young and so have less wealth later in life.

### 3. Data and Summary Statistics

#### *The Yougov Sample*

The dataset used in this study is the September 2010 release of the quarterly Yougov Debt Track Survey.<sup>4</sup> Each quarter, a representative sample of the U.K. population comprising approximately 2,500 non-retired individuals from among Yougov's panel of 350,000 members is interviewed for the survey. The survey is conducted online and panellists are paid a small fee for participating. In order to generate a representative sample of the U.K. population, Yougov make provision for individuals recruited to their sample base via a telephone invitation who do not have access to the internet to make use of internet facilities in a local library or web cafe in return for an additional fee. The survey is conducted every quarter on a fresh cross-section sample. There is evidence to suggest that this method of using an internet based survey generates less bias in responses compared with using telephone interviews (Chang and Krosnick, 2008).

The survey itself is comprised of approximately 85 questions, with the option for subscribers to the survey to add additional questions in return for a fee. The core of 85 questions covers household demographics, labour market status, household income, assets, mortgage and non-mortgage debts together with a range of attitudinal questions. For questions pertaining to the household, individual respondents are asked to respond on behalf of their household unit. The data on household indebtedness are particularly detailed. Respondents are asked in detail about their mortgage (type, balance, duration, monthly payment, and provider) and also recent mortgage refinancing activity. Respondents are also asked in detail about their consumer credit (type, number of each type, balance, monthly payment, whether they are one month in arrears on payments, and whether they are three months in arrears on payments). For credit cards, respondents are asked to provide a value for their existing credit card debt excluding 'balances not repaid in full each month'. Respondents are asked to give a total value for their financial investments and also asked to give a value for their 'liquid savings', where liquid savings is defined as 'savings that could easily be used in an emergency and are not tied up in a pension or long term savings product'.

Summary statistics for the Yougov sample are provided in Table 1. There is an even balance between male and female respondents. The typical respondent is married, without children, in employment, a homeowner via a mortgage and left full-time education aged 18.5

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<sup>4</sup> Yougov is the world's leading market research company and opinion pollster with operations in the US, Europe, Scandinavia and the Middle East.

years (in the U.K. this is approximately the age of leaving education after completing A-levels). Nearly 50% of respondents have an employed spouse and a relatively small proportion have children. By way of comparison, the most recent available wave of the British Household Panel Survey (2008) has equivalent mean values for the demographic variables listed in Table 1 of 49% male respondents, 70% married, 33% with respondent children, 49% with spouse employed, 5% with spouse retired, 68% in employment, 5% unemployed, and 75% homeowners. On the basis of this comparison, for many characteristics the sample means in the Yougov data are representative of the population a whole within this age range – the main difference arising in a smaller percentage of married households with children in the Yougov sample.

Summary statistics for financial variables provided at the bottom of Table 1 show that average household income is approximately £40,000 with average household non-pension savings at a little over £8,000. The value for mean household income is very close to the Office for National Statistics estimate of mean UK household income. Among mortgage holders, average debt is over £60,000 against an average estimated house value over £200,000. The average balance on unsecured debts is a little below £4,000. For those with a positive balance on at least one consumer credit item, the average consumer credit balance is just below £8,000 with the average monthly payment made on that balance at £330. 9.5% of respondents reported they were at least 1 month of arrears on at least one consumer credit product, 5.4% of respondents reported they were at least 3 months in arrears on at least one product<sup>5</sup>.

To examine financial literacy, we introduced the following questions into the survey, in return for a fixed fee per question, to measure each respondent's 'debt literacy'. We term them respectively the 'simple interest question', the 'interest compounding question' and the 'fixed fee vs APR question'. The second and third questions were also asked by Lusardi and Tufano (2009), though in their case the questions were phrased in the first person and those authors used telephone interviews. Our questions were accompanied by multiple choice answers from which the respondent could choose one:

#### 1. Simple Interest Question

*Cheryl owes £1,000 on her bank overdraft and the interest rate she is charged is 15% per year. If she didn't pay anything off, at this interest rate, how much money would she owe on her overdraft after one year?*

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<sup>5</sup> In our data, 'arrears' is defined as a missed contractual payment in the previous month or, for credit cards, a failure to meet the minimum payment (typically 5%) in the previous month.



- £ 850
- £1,000
- £1,150
- £1,500
- Do not know

## 2. Interest Compounding Question

*Sarah owes £1,000 on her credit card and the interest rate she is charged is 20% per year compounded annually. If she didn't pay anything off, at this interest rate, how many years would it take for the amount she owes to double?*

- Less than 5 years
- Between 5 and 10 years
- More than 10 years
- Do not know

## 3. Fixed fee vs APR Question

*David has a credit card debt of £3,000 at an Annual Percentage Rate of 12% (or 1% per month). He makes payments of £30 per month and does not gain any charges or additional spending on the card. How long will it take him to pay off this debt?*

- Less than 5 years
- Between 5 and 10 years
- More than 10 years
- None of the above, he will continue to be in debt
- Do not know

In addition to these three financial literacy questions we also introduced a question on the age at which the respondent left full-time education and also the following two questions, which we term the 'financial confidence question' and the 'financial education question', which were also asked in Lusardi and Tufano (2009).

### Financial Confidence Question

*'When you are shown information about a financial product such as a loan, credit card or store card, on a scale of 1 to 7, how confident are you that you understand the total amount you would need to repay?'*

### Financial Education Question

*'When you were in full time education (school, college or university) how much of your education was devoted to finance, economics and business?'*

- A lot
- Some
- A little
- Hardly at all

### *Responses to Financial Literacy Questions*

Responses to these financial literacy questions are presented in Table 2. As described in the previous section, the financial literacy questions are based very closely on those used in Lusardi and Tufano (2009). The vast majority of respondents answered the ‘Simple Interest Question’ correctly, with very few respondents underestimating the true value and a little over 6% of respondents mistakenly calculating that 15% of £1,000 is £500. A minority of respondents, 7.2%, answered ‘Do not know’ to this straightforward question. For the ‘Interest Compounding Question’ 55.8% of respondents answered correctly, with the most popular incorrect choice being ‘between 5 and 10 years’ for the balance to double. For the ‘Monthly Payments Question’ 45.7% of respondents answered correctly, with a similar number of respondents making the error of choosing the options ‘Between 5 and 10 years’ and ‘More than 10 years’ in the belief that the balance would be paid off at some point. Over the three questions there is an increase in the proportion of respondents who report ‘Do not know’ from 7.2% on the first question to 20.4%, indicating that there is an increase in non-response for the more difficult questions.

In total, 35% of respondents answered all three questions correctly. A minority, 11%, answered all questions incorrectly, with approximately equal proportions of respondents answered 1 or 2 questions correctly. The mean number of questions answered correctly was 1.86 with a standard deviation of 1.02. Examination of the correlation in correct answers across questions reveals that those respondents who answered only one question correctly in nearly all cases answered only the first question correctly. Respondents who answered two questions correctly in the majority of cases answered questions 1 and 2 correctly. This pattern suggests that respondents found the second and third questions more difficult than the first question.

In comparison Lusardi and Tufano (2009) found 35.9% of respondents among their U.S. sample answered the interest compounding question correctly and 35.4% of respondents answered the monthly payments question correctly, compared with 55.8% and 45.7% for our U.K. sample. So respondents in our U.K. sample appear, on average, to do much better than in the U.S. sample. However, this difference might in part be attributable to the means of interview: internet surveys present the respondent with more time to provide an answer and a clearer menu of choices on screen instead of a list of choices being read over the telephone.

In contrast, when compared with the sample of Dutch respondents who were asked a very similar interest compounding question also using an internet survey, our U.K. sample do much worse. van Rooij, Lusardi and Alessie (2011) present results from a survey of a

representative sample of Dutch consumers conducted by the Dutch National Bank (the DHS) in which respondents were asked a broad range of financial literacy questions ranging from basic financial literacy questions to questions which tested their knowledge of the functioning of the stock market, portfolio diversification and related 'advanced financial literacy' topics. They found 76.2% of respondents answered an interest compounding question correctly. Arguably, however, respondents to the long-standing DHS Survey in the Netherlands used by van Rooij *et al* have greater familiarity with financial and quasi-experimental questions. So cross-county comparisons based on these data must be made with caution.

Responses to three questions on respondent 'financial behaviour' introduced to the survey by Yougov are also summarised in Table 3. These financial behaviour questions ask the respondents to self-assess their behaviour against a series of first-person statements using Likert scales. The statements are provided in Table 3. For the 'Financial Services Question' and the 'Read Financial Press Questions' there is a wide dispersal of responses across the range of the Likert scale used. For the 'Organised Finances Question' there are only a very few respondents who choose 'disagree strongly' or 'don't know'. 65% of respondents choose that they 'agree strongly' or 'tend to agree' with the statement that they are organised in their money management. The majority of respondents rated their financial confidence above 5 on the 1-7 scale with 66.7% choosing 5, 6 or 7. In terms of financial education, a relatively small proportion reported they had received 'a lot' of financial education while in full time education, but most respondents reporting they has received at least 'at little', only 28.4% reported hardly any of their education included finance, economics and business.

We sum the number of correct answers to the three financial literacy questions to generate a financial literacy score which ranges from 0 to 3. The relationship between financial literacy score, age and gender is shown in Figure 1. In general male respondents do better than female respondents and literacy scores decline with age, a pattern found in Lusardi and Tufano (2009), Lusardi and Mitchell (2008) and also corroborated by a wider study of the older U.S. population using the Health and Retirement Study reported in Lusardi and Mitchell (2007). Figure 2 illustrates average financial confidence scores across age and gender groups. Again, in general males report higher confidence than females (as shown in previous studies) but financial confidence generally increases into middle-age with a slight deterioration near retirement. Taking Figures 1 and 2 together, younger respondents typically have higher literacy scores but lower levels of financial confidence, consistent with the idea that confidence is also based on experience (Agarwal *et al*, 2009).

*Financial Literacy, Household Characteristics and Consumer Credit Use*

In Table 4 our calculated financial literacy scores are related to financial behaviour scores and characteristics of households. The table shows summary statistics across a range of variables with the sample split into four groups by the number of financial literacy questions answered correctly. The first four columns reveal that respondents who answered more financial literacy questions correctly were, in general, less likely to consider financial services as being complicated, more likely to read personal finance pages in the press, more likely to agree that they are organised when managing money and more confident about their ability to understand the cost of borrowing. Better financial literacy scores are also positively correlated with more financial education at school. Therefore, in general, higher financial literacy scores are associated with greater confidence, self-reported financial understanding, acquisition of financial information and personal financial organisation.

There are also differences across the groups in demographic and financial characteristics. Respondents achieving higher financial literacy scores were typically more likely to be married, in employment and had a higher full-time education leaving age. Those with higher literacy scores were more likely to be mortgage holders and less likely to be social renters. Better performers on the literacy questions exhibited higher household incomes and savings, greater levels of mortgage debt (among those with mortgages), higher house values and higher balances on unsecured credit. Together, these translate into higher values of net worth for both renters and homeowners among those performing better on the financial literacy score. Therefore, in terms of financial characteristics, better performers were typically more likely to be employed with higher earnings and more wealth though with higher balances of unsecured credit. In the unconditional comparison, higher financial literacy scores are associated with more use of credit, not less.

More detailed statistics on usage of consumer credit related to financial literacy scores across the sample is provided in Table 5. Although those respondents with higher financial literacy scores typically reported higher balances on consumer credit, they also reported lower monthly payments on their consumer credit as a proportion of the balance. This statistic is obtained by summing the total value of monthly payments across all consumer credit items used by the respondent's household and dividing this by the total sum of outstanding balances on all consumer credit items. Whereas those households answering all questions correctly were, on average, making monthly payments on their consumer credit which constituted 19% of the outstanding balance, those households answering all questions

correctly had a ratio of 5%. Hence greater literacy scores are related to more credit use but at lower cost.

This pattern is corroborated by the more detailed statistics on use of particular types of consumer credit product also provided in the table. Higher financial literacy scores are associated with increased prevalence of the use of low-cost consumer credit products such as credit cards and overdrafts. Conversely, low literacy score groups display greater use of higher-cost forms of consumer credit such as mail order catalogues and customs unions. Higher literacy scores are also associated with greater holding of student debt.

Finally, in the bottom section of the table, consumer credit items are grouped into 'low cost credit' and 'high cost credit' groups, with 'low cost credit' items defined as credit cards, overdrafts and personal loans and 'high cost credit' items defined as hire purchase agreements, store cards, mail order catalogues, customs union loans and payday loans (very few households reported making use of payday loans). By these groupings, higher literacy scores are associated with more use of low cost credit (plus higher balances on low cost credit) and less use of high cost credit (and lower balances on high cost credit). The general pattern in these summary statistics on consumer credit use, therefore, is that greater numeracy scores are correlated with more use of credit, but particularly more use of low-cost credit items and less use of expensive credit items.

#### *Determinants of financial literacy*

To better understand the relationship between household characteristics and our calculated financial literacy scores, Table 6 reports results from multivariate regressions in which the financial literacy score enters as the dependent variable and a set of household characteristics and financial behaviour responses are included as covariates. In this analysis we omit the financial characteristics of the households and investigate only non-financial characteristics. The dependent variable takes a value between 0 and 3. Two models are estimated: firstly an ordinary least squares regression and secondly an ordered probit model.

Results from the OLS regression show that (conditional on the additional covariates described at the foot of the table) employment status, marital status, whether the household includes dependent children and some homeownership status variables are statistically insignificant in explaining the financial literacy score. Among the statistically significant results, the following relationships emerge: relative to households in the 35-44 age groups, households in the 18-24 age group exhibit higher literacy scores and households in the 55+ age group exhibit lower literacy scores. Homeowners with mortgages exhibit higher scores

compared to social renters, though there is no statistically significant role for homeownership per se or being a private renter, relative to being a social renter. Years of full-time education have a positive impact on literacy score.

Among the financial behaviour variables, finding financial services less complicated is associated with a higher literacy score, as is ‘reading financial pages in the press’, although there is no association between financial literacy and being ‘organised’ in one’s finances. Financial confidence and financial education are both positively related to the financial literacy score. Table 7 presents marginal effects from the ordered probit model and shows that the age effects profile and education effects profile is consistent across the distribution of outcomes. These results cannot be taken as indicative as demonstrating causality between household characteristics and financial literacy scores, but establish patterns in the literacy score data.

#### **4. Results on financial literacy, net worth and consumer credit**

##### *Financial literacy variables and financial net worth*

We first examine the relationship between financial literacy scores on household and financial net worth. We do this for two reasons: firstly, to establish that financial literacy scores impact upon the household’s general financial position as captured by a measure of financial net worth and, secondly, to examine the importance of using instruments for financial literacy when household net worth and literacy are co-determined, as suggested by Jappelli and Padula (2011). As discussed in Section 2, our null hypothesis is that poor financial literacy results in lower household net worth because such households underestimate the cost of borrowing (with borrowing more likely to occur when the household is young) and so enter later life with less wealth than expected. On this basis, we expect a positive association between financial literacy score and household financial net worth. Financial net worth in our data is the sum of household financial assets and the primary residence minus mortgage debt secured on the primary residence and unsecured debt. Our measure of household net worth is incomplete as it does not include accrued rights in the social security system, public pension provision, occupational pensions or private pensions.

Table 8 presents results from OLS regressions in which the dependent variable is the household’s financial net worth and the financial literacy score enters as the dependent variable in the 0-3 index. We include as covariates in the regression dummy variables for age groups, homeownership status, employment status, whether the household includes

dependent children plus household income (in £0,000s), age left full-time education (in years) and also the financial behaviour scores in Likert scales.

Results in Column 1 show that household financial net worth increases with age, years of education and current income. Some additional variables included in the models are not shown in the table but detailed in the footnotes to the table. There is also a positive relationship between financial literacy score and net worth. A one point increase in the financial literacy score is associated with an increase in financial net worth of £6,500. Average net worth in the sample is £98,000. So an increase of £6,500 represents a 6.6% increase against the sample average. In contrast, the qualitative ‘financial behaviour’ variables have little or no effect on financial net worth. Column 2 present results from the same model estimate for only those households with current positive values on at least one item of debt (secured or unsecured), and shows a very similar pattern across all coefficients.

No direct comparison of these estimates with other studies on financial literacy is possible since the studies of samples of U.S. and Dutch consumers have not examined the impact of literacy on net worth directly.<sup>6</sup> However, Lusardi and Mitchell (2007) include a financial literacy question in their index of the extent to which an individual is a ‘financial planner’ and find that propensity to plan is positively related to household net worth (including rights in retirement saving schemes) in the Health and Retirement Survey (HRS) sample. Jappelli and Padula (2011) find that an index of financial literacy comprised of questions on simple percentages and interest compounding is positively related to financial net worth among individuals in the European SHARE survey (the design for which is based upon the HRS). So our findings are in line with results from previous studies.

In Columns 3 and 4 we further investigate how the relationship between financial literacy and net worth varies over the literacy score. To do this we include dummy variables for the number of questions answered correctly. Three 1/0 dummy variables are included separately for whether the individual answered no questions correctly, one question correctly, or two questions correctly. The default (omitted) group is those who answered 3 questions correctly. As shown earlier, individuals who answer less than 3 questions typically answer only the easier first and second questions in the literacy section of the survey.

Results show that, relative to answering all three questions correctly, the coefficient on answering two questions correctly is negative, but statistically insignificant at the 10%

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<sup>6</sup> Although Stango and Zinman (2009) show a positive (bivariate) association between net worth and the degree of positive payment/interest bias (Table III). This would be consistent with our findings if it held true in a multivariate setting.

level, and for answering only one question correctly is also negative but statistically significantly different at the 5% level from the omitted group. The variable for answering no questions correctly is statistically more robust, and the magnitude of the coefficient indicates that answering no questions correctly is associated with reduced household financial net worth of approximately £22,000, or 23% evaluated against mean household financial net worth, relative to answering all the questions successfully. This result suggests, therefore, that the relationship between household net worth and financial literacy scores is driven primarily by that minority of households who answer no financial literacy questions correctly (11% of the sample).

Table 9 presents the instrumental variable estimates. Jappelli and Padula (2011) show that the ideal instrument for financial literacy is the pre-labour market entry endowment of literacy. They use self-reported mathematical ability in school as a proxy for pre-labour market entry endowment of literacy. We use the measure of financial education whilst in full-time education (school, college or university) as a proxy for pre-labour market entry endowment of literacy. The key attraction of using this as a proxy for initial ‘literacy endowment’ is that the question asked specifically about education devoted to finance, economics and business which directly impacts on an individual’s financial literacy (as opposed to more general forms of education) and that it specified the relevant time period as ‘when you were in full time education’, which pre-dates labour market entry.

In the first-stage equation, the coefficient on the financial education variable is 0.26 and has a t-statistic of 9.51. The coefficient on the instrumented financial literacy variable is larger than in the non-IV specification and has a similar level of statistical significance. Hence, despite the theoretical argument for the coefficient on the financial literacy score in the OLS regressions being biased, there is little evidence of any significant bias in the finding of a negative relationship between underlying financial literacy and financial net worth. As we only have one instrument for financial literacy, it is not possible to test the robustness of the instrument. However, Jappelli and Padula (2011) also use early life education as an instrument for current financial literacy and find this instrument is robust to a variety of specifications including other measures of early life education and welfare.

#### *Financial literacy and high cost / low cost credit use*

This section presents results on the relationship between financial numeracy scores and usage of consumer credit. In all models our measure of early-life financial education is used as the instrument for the financial literacy score and all models are estimated using two-



stage IV methods. Table 10 presents estimates from models for the value of consumer credit outstanding and the value of consumer credit as a proportion of household annual income. Results in Column 1 for the value of consumer credit show no statistically significant association between financial literacy scores and the dependent variable either in models estimated over the entire sample or estimated over the subset of households with positive outstanding consumer credit balances. Column 2 shows a weak negative relationship between the financial literacy score and value of consumer credit measured in proportion to household income. The coefficients on the models estimated using the entire sample and using the subset of households with positive consumer credit balances imply that a one-point decrease in the financial literacy score is associated with a 0.04 point decrease in the consumer credit ratio (against a mean of 0.11) in the first model and a 0.06 point decrease in the consumer credit ratio (against a mean of 0.28) in the second model. These results, therefore, indicate that poor financial literacy is associated with higher levels of consumer credit use relative to income.

We now examine the hypothesis that households with worse financial literacy will be more likely to use higher cost credit. To make the distinction between use of 'high cost' and 'low cost' credit, we use the 'high cost' and 'low cost' categories presented in Table 5. Secondly, we calculate the value of the household's monthly payment as a proportion of the outstanding credit balance and use this as a measure of the cost of credit used by the household. In both models we instrument the financial literacy score using the financial education variable.

From the first approach, Table 11 presents estimates from probit models where the dependent variable in the first model is a 1/0 dummy for whether the household uses at least one low cost credit item and in the second model a 1/0 dummy for whether the household uses at least one high cost credit item. These models are estimated on the whole sample. Turning to the results for low cost credit usage presented in Column 1 first: the coefficient on the financial literacy score variable is positive and significant at the 10% level. The marginal effect of 0.02 evaluated against the sample average of 0.77 implies a small effect of financial literacy on use of low cost credit. Aside from the financial literacy variables, younger households make less use of low cost credit, low cost credit use is increasing in income but decreasing in household savings and increases with the respondent's level of education and with financial confidence.

Results for use of high cost credit presented in Column 2 show that there is a clearer relationship between age and use of high cost credit, with younger households less likely to

use high cost credit compared with household in mid-age. Use of high cost credit is also negatively related to household saving but unrelated to the number of years in full-time education or the financial confidence score. The variable measuring self-reported financial organisation is again positive, showing households who are less organised are more likely to use high cost credit (as well as low cost credit).

The coefficient on the financial literacy variable is in this case negative and statistically significant at the 1% level. The marginal effect of  $-0.04$  evaluated against a sample average of  $0.24$  implies a 1-point decrease in the financial literacy score is associated with a 17% increase in the probability of using high cost credit. This effect is much stronger than the impact on financial literacy on low cost credit use.

For the second approach, results are presented in Table 12. In Column 1 the dependent variable is the proportion of consumer credit outstanding which is incurred on high-cost products (using the earlier definitions of high and low-cost). The coefficient of  $-0.02$  on the financial literacy variable implies that households with worse financial literacy scores hold more high-cost credit in their overall credit portfolios. In Column 2 the dependent variable is the self-reported monthly payment on all consumer credit products divided by the outstanding balance. This ratio might be misleading where credit contracts differ in their durations, so in the specification shown in Column 3 the dependent variable is this ratio calculated for credit card debts only for which the duration is identical across credit card types and borrower types. Both models are estimated on the sub-sample of households who have positive balances on at least one consumer credit item.

Results in Column 2 show that the coefficient on the financial literacy score is negative and statistically significant at the 1% level. A higher financial literacy score is associated with borrowing at lower cost. This result is also obtained in Column 3, with a slightly smaller coefficient on the financial literacy variable. Therefore, among households who make some use of consumer credit, higher financial literacy is associated with lower cost credit use, by either of our cost measures.

### *Financial literacy and over-indebtedness*

Next, the relationship between financial literacy and over-indebtedness is examined. To do so, we use two measures of 'over-indebtedness'. The first measure is arrears on credit repayments on at least one consumer credit item. The second measure is self-reported over-commitment on credit combined with 'real financial problems'. We use both measures because of the possibility that the first measure might capture some households who have

chosen to strategically default on their debts. This second measure is similar to that used in Lusardi and Tufano (2009). Our null hypothesis is that individuals with poor financial literacy are more likely to become over-indebted. As described earlier, the most common mistakes in answering literacy questions involved underestimating the cost of consumer credit.

Column 1, Table 13 presents results for credit arrears. The dependent variable is a 1/0 dummy variable for whether the household in at least 1 month arrears on at least one credit item. In total 9.5% of households falls into this category. One month arrears is defined as missed contractual payments on a loan for the previous month, or in the case of credit cards, missing the minimum monthly payment in the previous month. The model includes a range of controls, as before, including the value of outstanding consumer credit for the household. Results indicate that credit arrears are less likely among the young and those with more education. The coefficient on the financial literacy scores is negative and statistically significant at the 5% level. The marginal effect on this coefficient of 0.02, evaluated against a baseline probability of arrears on 12.1%, implies that a one-unit increase in the literacy score lowers the likelihood of credit arrears by 15%.

Column 2, Table 13 presents results for self-reported difficulty meeting credit commitments combined with ‘real financial problems’. Our measure of difficulty meeting credit commitments is constructed from the following survey question:

*‘Which one of the following statements best describes how well you [and your partner ] are keeping up with your bills and credit commitments at the moment?’*

- 1. am/we are keeping up with all bills and commitments without any difficulties*
- 2. I am/we are keeping up with all bills and commitments, but it is a struggle from time to time*
- 3. I am/we are keeping all bills and commitments, but it is a constant struggle*
- 4. I am/we are falling behind with some bills or credit commitments*
- 5. I am/we are having real financial problems and have fallen behind with many bills or credit commitments*
- 6. I/we don’t have any bills or credit commitments*
- 7. Don’t know*

From these responses we construct a 1/0 dummy variable for difficulty meeting credit commitments, where the variable takes a value of 1 if the respondent chose answer 5 and a value of 0 otherwise. By this measure only 6.1% of households self-reported over-

indebtedness (57 households in the entire sample). In this model the coefficient on the financial literacy score is  $-0.13$  with a marginal effect of  $-0.08$ . The baseline probability for the dependent variable is 0.058, hence the marginal effect is 138% of the baseline probability in this specification. Financial literacy, therefore, has a very strong effect on self-reported financial over-indebtedness.

#### *Financial literacy and co-holding credit and liquid savings*

In this final sub-section, we investigate whether financial literacy is related to the co-holding of liquid assets and unsecured debt. As mentioned earlier, one advantage of our survey data is that the survey included an explicit question on the amount of liquid savings available to the household and the questions on consumer credit balances asked individuals not to report ‘balances repaid in full each month’. Therefore, we can observe individuals who co-hold liquid savings and unsecured debt being sure that the savings are indeed liquid and available to the household and that the unsecured debts are costly to the household. This is important because co-holding may be considered to be rational if there is a cost to accessing savings, or alternatively if the unsecured debt is costless (such as transactions balances on credit cards).

To implement this analysis, we construct a 1/0 dummy variable which takes a value of 1 if the household holds at least £250 of liquid savings while also holding at least £250 of unsecured debt. In total 7.4% of the sample co-hold liquid savings as well as costly unsecured debts. Table 14 presents estimates from an IV probit model in which the dependent variable is the 1/0 dummy for co-holding and the right-side variables are the same as those in the previous models. The coefficient on the financial literacy score in this model is actually positive and significant at the 5% level. Therefore, the likelihood of a household co-holding is actually increasing with the financial literacy score. The marginal effect of 0.02 implies a 1 unit increase in the literacy score is associated with a 27% increase in the likelihood of co-holding. This result casts doubt upon the idea that co-holding is an irrational behaviour as, in our sample; more financially literate individuals are more likely to co-hold.

## **5. Discussion and conclusions**

This paper has examined the extent of ‘financial literacy in the context of household indebtedness in the United Kingdom – what Lusardi and Tufano (2009) term ‘debt literacy’. We used specific questions on numerical skills and other background characteristics added to a large regular survey of the debt position of a representative group of households of working

age. As in other studies, we find differences in ‘debt literacy’ across respondents, and that these differences are associated with household characteristics such as level of education, but also with access to and use of the credit market. In particular, we find evidence of what Stango and Zinman (2009) term ‘payment/interest bias’ – a tendency for a significant sub-set of households to underestimate the real cost of loans and therefore to understate the value of outstanding debts. This in turn suggests not just that people err in understanding debt contracts, but that these errors are systematically biased in one direction. However, unlike some behavioural finance models, we also show that a significant fraction of households do understand issues such as compound interest and (implicitly) APRs, so that not all households depart radically in their behaviour from the standard model of life-cycle optimisation, at least in the context of managing their debts.

Unlike many existing studies which focus either at one extreme on one example of ‘anomalous’ behaviour to motivate a particular theory, or at the other extreme on rather general qualitative self-perceptions of ‘over-indebtedness’, we utilise a range measurable tests concerning debt outcomes to examine the relationship between ‘debt literacy’ and household behaviour. We show that, conditioned on observables, less literate households are more likely to hold higher levels of debt relative to their underlying wealth (and this result holds up when we instrument literacy by financial education). We also show that less literate households disproportionately use higher cost credit lines, make higher debt payments ratios to given levels of debt (even controlling for heterogeneity of credit instruments) and have higher arrears. However the relationship with co-holding of assets and debts tends to go in the opposite direction. Measures of debt literacy are therefore powerful indicators and predictors of household behaviour towards debt levels and debt contracts. Conversely financial literacy scores do not strongly correlate with other qualitative indicators of ‘financial behaviour’ such as reading the financial pages of newspapers and self-perceptions of familiarity with financial concepts. Quantitative, rather than qualitative, measures of ‘financial literacy’ seem to be superior predictors of behaviour.

The recent expansion of the literature on the relationship between measures of cognition (of which our measures of ‘debt literacy’ are a sub-set, focused on the very specific issue of indebtedness) and economic behaviour of households has proved exciting and a powerful new development in our understanding of household and consumer behaviour. However, our results also suggest some caution before rejecting the standard models of household behaviour. Some existing studies that have led commentators (often not the original authors) to conclude that large sections of the population are ‘debt-illiterate’ even

though these studies are based on measures of debt-related outcomes that are either rather qualitative or potentially rather quirky tests of ‘rationality’. We have utilised a battery of measures of household behaviour in relation to debts and financial literacy and concluded, perhaps less controversially, that some households reasonably comprehend debt contracts whereas others are not. Moreover, this comprehension is closely linked to a basic understanding of some specific financial concepts, such as interest compounding. It is noticeable how few of our households report that they have received any form of formal financial training. Whilst the question of the nature, scope and efficacy of financial education lies beyond the scope of this particular paper, we should surely not therefore rule out appropriate initiatives of this kind if we are to tackle problems associated with household debt.

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**Table 1: Characteristics of Yougov Debt Tracker Sample**

N	2439
<i>Age</i>	
Age 18-24	0.11
Age 25-34	0.24
Age 35-44	0.23
Age 45-54	0.21
Age 55 and over (non-retired)	0.20
<i>Demographics</i>	
Male	0.48
Married	0.63
Has Children Under 16 Years of Age	0.24
Spouse Employed	0.48
Spouse Retired	0.04
<i>Employment and Education</i>	
Employed or Self-Employed	0.71
Unemployed	0.05
Age Left Full-Time Education	18.5
<i>Housing Tenure</i>	
Outright Homeowner	0.17
Mortgaged Homeowner	0.52
Private Renter	0.20
Social Renter	0.11
<i>Household Finances</i>	
Total Household (Pre-Tax) Annual Income	£39,700
Total Non-Pension Savings	£8,200
Total Mortgage Debt (mortgage holders)	£62,800
Estimated House Value (home owners)	£204,000
Total Value Unsecured Credit	£3,700
<i>Among Those with Positive Consumer Credit Balances (N=1072)</i>	
Average Total Balance Consumer Credit	£7900
Average Monthly Payment Consumer Credit	£330
Average Monthly Payment as % Balance	16.4%
1 Month in Arrears on at least one product	9.5%
3 Months in Arrears on at least one product	5.4%

**Table 2: Financial Literacy Question Responses***Simple Interest Question*

“Cheryl owes £1,000 on her bank overdraft and the interest rate she is charged is 15% per year. If she didn’t pay anything off, at this interest rate, how much money would she owe on her overdraft after one year?”

£850	0.9%
£1,000	0.6%
£1,150	85.1%
£1,500	6.3%
Do not know	7.2%

*Interest Compounding Question*

“Sarah owes £1,000 on her credit card and the interest rate she is charged is 20% per year compounded annually. If she didn’t pay anything off, at this interest rate, how many years would it take for the amount she owes to double?”

Less than 5 years	55.8%
Between 5 and 10 years	25.1%
More than 10 years	5.1%
Do not know	14.1%

*Monthly Payments Question*

“David has a credit card debt of £3,000 at an Annual Percentage Rate of 12% (or 1% per month). He makes payments of £30 per month and does not gain any charges or additional spending on the card. How long will it take him to pay off this debt?”

Less than 5 years	3.7%
Between 5 and 10 years	13.4%
More than 10 years	16.8%
None of the above, he will continue to be in debt	45.7%
Do not know	20.4%

Total Number of Questions Answered Correctly	
0	11.0%
1	26.5%
2	27.5%
3	35.0%
Mean Number of Questions Answered Correctly	1.86
Std. Dev.	1.02
Question 1 Correct Only	23%
Question 2 Correct Only	2%
Question 3 Correct Only	1.3%
Question 1 and 2 Correct Only	18%
Question 1 and 3 Correct Only	8.7%
Question 2 and 3 Correct Only	0.6%

**Table 3: Financial Confidence and Education Question Responses***Financial Services Question*

‘Financial services are complicated and confusing to me’	
Agree strongly	7.8%
Tend to agree	29.1%
Neither agree nor disagree	26.8%
Tend to disagree	21.6%
Disagree strongly	10.5%
Do not know	4.2%

*Reads Financial Press Question*

‘I regularly read the personal finance pages in the press’	
Agree strongly	8.8%
Tend to agree	20.7%
Neither agree nor disagree	17.0%
Tend to disagree	23.4%
Disagree strongly	25.8%
Do not know	4.4%

*Organised Finances Question*

‘I am organised when it comes to managing my money’	
Agree strongly	23.5%
Tend to agree	41.0%
Neither agree nor disagree	18.9%
Tend to disagree	10.3%
Disagree strongly	2.4%
Do not know	4.0%

*Financial Literacy Confidence Question*

‘When you are shown information about a financial product such as a loan, credit card or store card, on a scale of 1 to 7, how confident are you that you understand the total amount you would need to repay?’

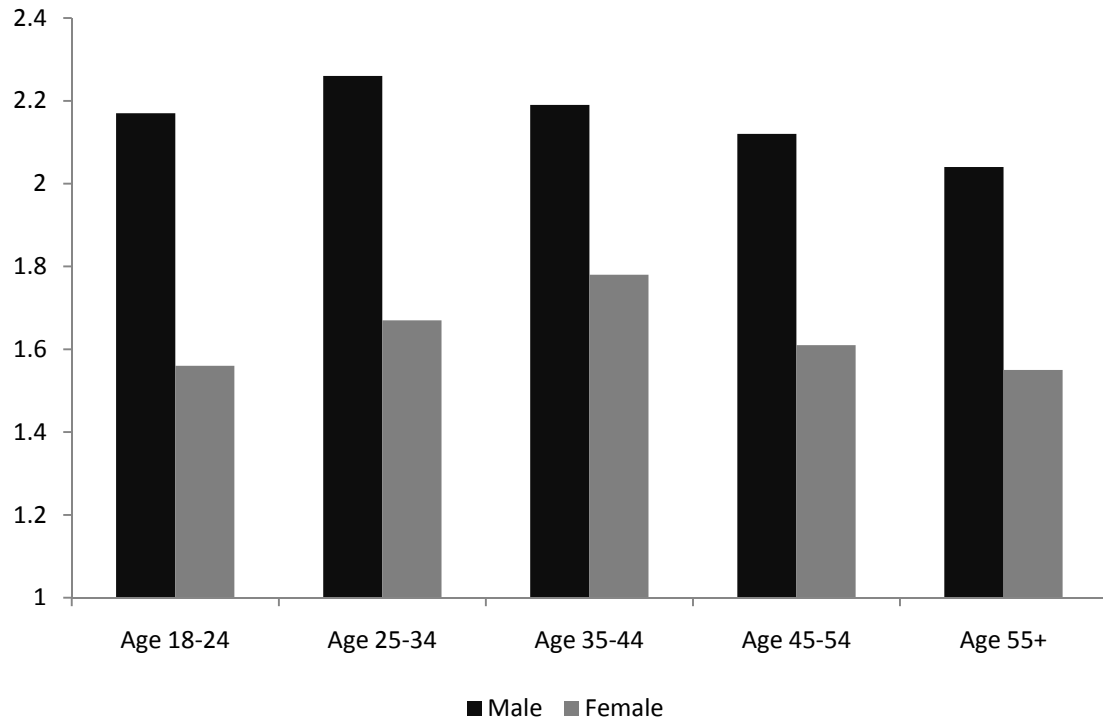
1	5.0%
2	3.9%
3	7.7%
4	16.7%
5	19.3%
6	22.3%
7	25.1%

*Financial Education Question*

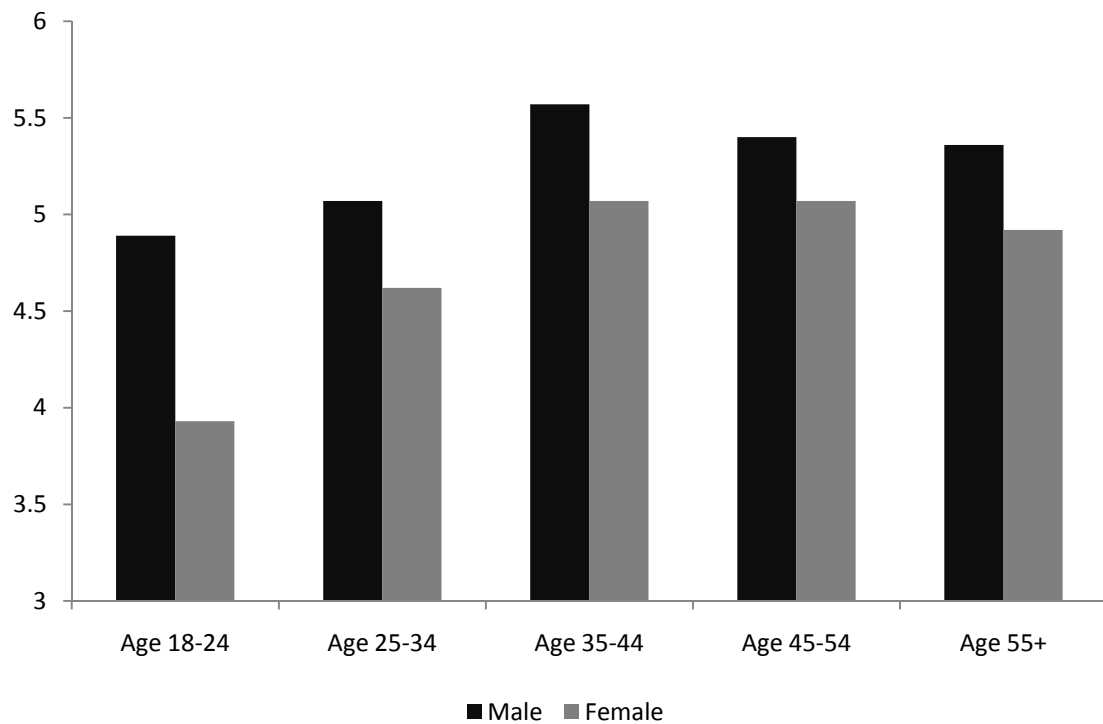
‘When you were in full time education (school, college or university) how much of your education was devoted to finance, economics and business?’

A lot	15.1%
Some	20.4%
A little	33.1%
Hardly at all	28.4%
Do not know	3.0%

**Figure 1: Number of Financial Literacy Questions Answered Correctly by Age, Gender**



**Figure 2: Self-Reported Financial Confidence (1=lowest, 7=highest) by Age, Gender**



**Table 4: Characteristics by Financial Literacy Score**

<i>Mean value for group</i>	<i>Financial Literacy Questions Answered Correctly</i>			
	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>
'Financial services are complicated and confusing to me' (1= agree strongly / 5=disagree strongly)	2.59 (1.18)	2.70 (1.09)	2.97 (1.09)	3.28 (1.12)
'I regularly read the personal finance pages in the press' (1= agree strongly / 5=disagree strongly)	3.77 (1.27)	3.60 (1.28)	3.37 (1.31)	3.13 (1.34)
'I am organised when it comes to managing my money' (1= agree strongly / 5=disagree strongly)	2.45 (1.09)	2.36 (1.06)	2.21 (0.96)	2.12 (0.99)
Financial Literacy Confidence Scale 1-7	4.03 (1.78)	4.65 (1.83)	5.16 (1.56)	5.68 (1.37)
Level of School Finance Education (1=hardly at all / 4=a lot)	1.39 (0.76)	1.45 (0.84)	1.52 (0.90)	1.58 (0.94)
Married = 1	0.58	0.63	0.63	0.65
Dependent Children = 1	0.21	0.24	0.23	0.24
Employed = 1	0.59	0.69	0.71	0.76
Unemployed = 1	0.052	0.049	0.052	0.060
Age Left Full-Time Education	16.5	17.9	18.7	19.5
Homeowner (Outright) = 1	0.17	0.16	0.18	0.17
Homeowner (Mortgaged) = 1	0.33	0.38	0.42	0.48
Private Renter = 1	0.15	0.21	0.20	0.19
Social Renter = 1	0.17	0.12	0.09	0.04
Total Household (Pre-Tax) Annual Income	£29,500	£36,800	£40,800	£57,300
Total Non-Pension Savings	£4,100	£5,200	£8,500	£11,500
Total Mortgage Debt – Mortgage Holders Only	£33,100	£45,600	£63,600	£77,900
Estimated House Value – Owners Only	£140,300	£181,800	£203,900	£233,000
Total Value Unsecured Credit	£2,900	£3,500	£3,600	£4,200
Net worth (Savings + House Value – Mortgage Debt – Unsecured Debt)	£60,500	£82,200	£100,700	£120,500
Net worth – Renters Only	-£900	-£1,500	-£300	£2,800
Net worth – Homeowners Only	£120,100	£151,900	£168,000	£185,300
Mortgage Debt-to-Income Ratio (Mortgage Holders Only)	0.66	0.91	1.01	1.19
Unsecured Debt as % Income (Unsecured Debt Users Only)	0.18	0.17	0.16	0.19

**Table 5: Consumer Credit Use and Financial Literacy**

Variable	<i>Total Financial Literacy Score</i>			
	0	1	2	3
Total Consumer Credit (£)	2900	3500	3600	4200
Total Monthly Payments as % Balance	19%	8%	6%	5%
<i>Percentage Holding Consumer Credit Products</i>				
Credit Card	48.3%	60.8%	65.5%	66.7%
Overdraft	28.8%	38.6%	42.3%	38.2%
Store Card	13.4%	15.6%	15.7%	12.8%
Personal Loan	11.6%	14.2%	13.1%	12.7%
Mail Order Cat.	16.1%	16.0%	9.4%	5.6%
Car Loan	10.0%	9.6%	9.5%	7.7%
Hire Purchase	3.4%	4.0%	4.1%	3.3%
Customs Union	1.9%	1.8%	0.2%	0.1%
Payday Loan	0.5%	0.3%	0.1%	0.1%
<i>Percentage Holding OtherLoans</i>				
Family/Friends	7.8%	11.1%	10.7%	8.4%
Student Loan	11.2%	20.8%	20.1%	25.8%
Use Low Cost Credit	56.6%	71.8%	76.1%	76.2%
Balance on Low Cost Credit (£)	947	1365	1662	1586
Payment on Low Cost Credit (£)	54	110	116	103
Use High Cost Credit (£)	29.2%	30.7%	26.1%	19.2%
Balance on High Cost Credit (£)	292	122	159	100
Payment on High Cost Credit (£)	38	18	14	7

*Note: Low cost credit items defined as Credit Card, Overdraft and Personal Loan.*

*High cost credit items defined as Hire Purchase, Store Card, Mail Order Catalogue, Customs Union Loan, Pay-Day Lender Loan.*

**Table 6: Financial Literacy Scores**

<i>Specification: OLS</i>	<i>(1)</i>	<i>(2)</i>
<i>Dependent Variable: Financial Literacy Score</i>	<i>OLS</i>	<i>Ordered Probit</i> <i>(coefficients)</i>
Age 18-24	0.31** (3.95)	0.37** (3.85)
Age 25-34	-0.29 (-0.52)	-0.04 (-0.63)
Age 45-54	-0.07 (-1.28)	-0.10 (-1.41)
Age 55+	-0.15* (-2.41)	-0.19* (2.48)
Age Left Full-Time Education	0.05** (8.07)	0.06** (7.98)
<i>Financial Behaviour Questions (1=agree, 5=disagree)</i>		
‘Financial services are complicated and confusing to me’	0.06** (3.38)	0.09** (3.58)
‘I regularly read the personal finance pages in the press’	-0.03* (-2.20)	-0.04* (-2.24)
‘I am organised when it comes to managing my money’	-0.03 (1.38)	-0.03 (-1.14)
Financial Literacy Confidence Scale 1-7	0.12** (9.57)	0.15** (9.21)
Financial Education	0.22** (8.54)	0.25** (8.23)
N	2439	2349
R <sup>2</sup> / Pseudo R <sup>2</sup>	0.19	0.08
F / LR	30.27	462.00
Prob > F / LR	0.0000	0.0000
Baseline Numeracy Score	1.86	1.86

Statistical significance at \*\*1%, \*5%. Sample size 2272 excludes individuals who answered ‘don’t know’ to questions 4-7. Additional control variables: 1/0 dummy variables for employment status (employed, unemployed, self-employed), housing status (homeowners, private renter, social renter), marital status and whether household includes dependent children.

**Table 7: Financial Literacy Scores Regression Analysis –  
Marginal Effects After Ordered Probit (Selected Variables)**

	Outcome = 0	Outcome = 1	Outcome =2	Outcome =3
Age 18-24	0.03** (4.22)	0.008** (3.54)	0.02 (1.86)	0.13** (3.36)
Age 25-34	0.01 (0.94)	0.02 (0.97)	0.00 (0.45)	-0.03 (-0.98)
Age 45-54	0.01 (1.60)	0.03 (1.70)	0.00 (0.45)	-0.04 (-1.72)
Age 55+	-0.03** (2.60)	0.06** (2.95)	0.01 (1.60)	-0.08** (-3.01)
Age Left Full- Time Education	0.01** (7.33)	0.01** (7.65)	0.01 (1.21)	0.02** (7.96)



**Table 8: Financial Literacy Scores and Household Net worth**

<i>Specification: OLS</i>	(1)	(2)	(3)	(4)
<i>Dependent Variable:</i>	<i>OLS</i>	<i>OLS – Only</i>	<i>OLS</i>	<i>OLS –</i>
<i>Net worth (£0,000s)</i>		<i>Those With</i>		<i>Only Those</i>
		<i>Debt</i>		<i>With Debt</i>
Financial Literacy Score	0.65** (2.59)	0.71* (2.28)	-	-
Two Questions Correct	-	-	-0.82 (-1.44)	-0.97 (-1.41)
One Question Correct	-	-	-1.16* (-1.91)	-1.40* (-1.90)
No Questions Correct	-	-	-2.28** (-2.47)	-2.20* (-1.89)
Age 18-24	-2.71** (-2.90)	-3.88** (-3.10)	-2.71** (-2.90)	-3.88** (-3.10)
Age 25-34	-2.38** (-3.53)	-3.06** (-3.89)	-2.38** (-3.53)	-3.06** (-3.89)
Age 45-54	2.61** (3.89)	4.09** (5.13)	2.61** (3.89)	4.09** (5.13)
Age 55+	4.24** (5.82)	7.14** (7.49)	4.24** (5.82)	7.14** (7.49)
Household Income (£0,000s)	0.89** (11.28)	0.71** (7.42)	0.89** (11.28)	0.71** (7.42)
Age Left Full-Time Education	0.27** (4.02)	0.42** (0.09)	0.27** (4.02)	0.42** (0.09)
N	2439	1298	2439	1298
R <sup>2</sup> / Pseudo R <sup>2</sup>	0.44	0.43	0.44	0.43
F / LR	89.99	48.59	81.77	44.12
Prob > F / LR	0.0000	0.0000	0.0000	0.0000
Baseline Net worth (£0,000s)	9.83	8.92	9.83	8.92

Statistical significance at \*\*1%, \*5%. Sample size 2272 excludes individuals who answered 'don't know' to questions 4-7. Additional control variables: 1/0 dummy variables for employment status (employed, unemployed, self-employed), housing status (homeowners, private renter, social renter), marital status and whether household includes dependent children. IV uses financial education as the instrument.

**Table 9: Financial Literacy Scores Household Net worth**

<i>Specification: IV</i>	<i>IVREG</i>	<i>IVREG – Only</i>
<i>Dependent Variable: Net worth</i>		<i>Those With Debt</i>
Financial Literacy Score	0.69** (4.04)	0.74** (4.04)
Age 18-24	-1.82 (-1.61)	-1.83 (-1.27)
Age 25-34	-1.87* (-2.42)	-2.48** (-2.74)
Age 45-54	3.32** (4.17)	4.51** (4.76)
Age 55+	5.65** (5.96)	7.78** (6.82)
Household Income (£0,000s)	0.75** (7.48)	0.64** (5.51)
N	2439	1298
R <sup>2</sup> / Pseudo R <sup>2</sup>	0.29	0.43
F / LR	77.97	48.59
Prob > F / LR	0.0000	0.0000

Statistical significance at \*\*1%, \*5%. Additional note as in Table 8.

**Table 10: Financial Literacy and Consumer Credit Balances**

<i>Specification: IV Regression</i> <i>Sample: All households / only</i> <i>households with positive balances</i> <i>on consumer credit</i>	(1) Dependent Variable: Outstanding Credit (£0,000s)		(2) Dependent Variable: Credit As % Annual Income	
	All households	Balance >£0	All households	Balance >£0
Financial Literacy Score	-0.01 (-0.06)	0.03 (1.01)	-0.04 (-1.95)	-0.06* (-2.08)
Age 18-24	-0.18 (-1.39)	-0.23 (-1.78)	0.03 (1.07)	0.03* (2.16)
Age 25-34	0.07 (0.72)	-0.20 (-2.25)*	0.03 (1.71)	0.01 (0.60)
Age 45-54	0.11 (1.20)	-0.01 (-0.03)	0.05* (2.30)	0.09 (0.44)
Age 55+	-0.16 (-1.47)	-0.24 (-2.20)*	0.04 (1.83)	0.04 (1.53)
Household Income (£0,000s)	0.10** (8.23)	0.05** (3.83)	0.03** (12.26)	0.02** (6.23)
Age Left Full-Time Education	0.01 (1.35)	0.03* (2.38)	0.01 (0.06)	-0.03 (-0.13)
N	2439	1072	2439	1072
R <sup>2</sup> / Pseudo R <sup>2</sup>	0.10	0.07	0.02	0.06
F / LR	348.59	4.06	298.85	3.44
Prob > F / LR	0.0000	0.0000	0.0000	0.0000
Baseline	0.36	0.79	0.11	0.28

Notes: Significant at \*\*1%, \*5%. Additional note as in Table 8.

**Table 11: Financial Literacy and Use of High/Low Cost Credit**

<i>Specification: IV Probit</i> <i>Sample: All Households</i>	(1)		(2)	
	Dependent Variable: Uses At Least One Low Cost Credit Product (1/0)		Dependent Variable: Uses At Least One High Cost Credit Product (1/0)	
	Coeff.	Mfx	Coeff.	Mfx
Financial Literacy Score	0.06 (1.76)	0.02	-0.13** (-3.82)	-0.04
Age 18-24	-0.38** (-3.22)	-0.13	-0.66** (-3.60)	-0.17
Age 25-34	0.02 (0.25)	0.01	-0.23** (-2.61)	-0.07
Age 45-54	0.01 (0.16)	0.001	0.11 (1.25)	0.03
Age 55+	-0.02 (-0.21)	-0.01	0.14 (1.44)	0.04
Household Income (£0,000s)	0.50** (3.85)	0.02	-0.01 (-0.46)	-0.001
Age Left Full-Time Education	0.19** (2.23)	0.01	-0.01 (-1.55)	-0.004
N	2439		2439	
Pseudo R <sup>2</sup>	0.09		0.06	
LR	225.16		163.00	
Prob > F / LR	0.0000		0.0000	
Baseline	0.77		0.24	

Notes: Significant at \*\*1%, \*5%. Additional note as in Table 8.

**Table 12: Financial Literacy and Cost of Credit Repayments**

<i>Specification: IV Regressions</i> <i>Sample: Households with</i> <i>Positive Balances on Consumer</i> <i>Credit / Credit Cards.</i>	(1) Dependent Variable: % of High Cost Credit in Total Outstanding Credit	(2) Dependent Variable: Monthly Payment on Credit as % Outstanding Balance – All Products	(3) Dependent Variable: Monthly Payment on Credit as % Outstanding Balance – Credit Card Only
	Consumer Credit Balance >£0	Consumer Credit Balance > £0	Credit Card Balance >£0
Financial Literacy Score	-0.02** (2.62)	-0.09** (-3.47)	-0.06* (-2.21)
Age 18-24	-0.05** (3.98)	-0.24* (-2.35)	0.54** (3.91)
Age 25-34	-0.02** (-3.19)	-0.04 (-0.59)	-0.05 (-0.75)
Age 45-54	0.08 (0.62)	-0.02 (-0.26)	0.02 (0.24)
Age 55+	-0.02 (-0.79)	-0.03 (-0.31)	0.02 (0.18)
Household Income (£0,000s)	-0.01 (-0.70)	-0.01 (-0.57)	-0.01 (-0.50)
Age Left Full-Time Education (Years)	-0.01* (-2.49)	0.01 (1.21)	0.02 (1.68)
R <sup>2</sup>	1072 0.08	1072 0.02	410 0.07
F	4.56	5.26	4.52
Prob > F	0.0000	0.0000	0.0000
Baseline	0.07	0.16	0.15

Notes: Significant at \*\*1%, \*5%. Additional note as in Table 8.

**Table 13: Financial Literacy and Credit Arrears**

<i>Specification: IV Probit</i> <i>Sample: All households with</i> <i>positive balance on consumer</i> <i>credit (any type)</i>	Dependent Variable: 1 Month in Arrears on Any Product		Dependent Variable: Self- Reported Credit Arrears Plus 'Real Financial Problems'	
	Coeff.	Mfx	Coeff.	Mfx.
Financial Literacy Score	-0.11* (-1.96)	-0.06	-0.13** (-3.18)	-0.02
Age 18-24	-0.74** (-3.60)	-0.12	-0.68** (-3.25)	-0.16
Age 25-34	-0.26* (-1.87)	-0.05	-0.46* (-2.01)	-0.04
Age 45-54	-0.21 (-1.41)	-0.04	-0.31 (-1.40)	-0.03
Age 55+	-0.05 (-0.38)	-0.01	-0.10 (-0.76)	-0.02
Household Income (£0,000s)	-0.02 (-0.89)	-0.01	-0.02 (-0.89)	-0.01
Total Value Outstanding Credit (£0,000s)	0.23** (4.70)	0.05	0.26** (4.50)	0.04
Age Left Full-Time Education (Years)	-0.03 (-1.71)	-0.01	-0.02* (-1.82)	-0.01
N	1072		1072	
Pseudo R <sup>2</sup>	0.17		0.22	
LR	176.02		185.25	
Prob > LR	0.0000		0.0000	
Baseline	0.12		0.06	

Notes: Significant at \*\*1%, \*5%. Additional note as in Table 8.

**Table 14: Financial Literacy and Co-Holding ‘Liquid Savings’ and Unsecured Debt**

<i>Specification: IV Probit</i> <i>Sample: All Households</i>	Dependent Variable: Whether Individual Has Both Liquid Savings (>£250) and Unsecured Debts (>£250)	
	Coeff.	Mfx
Financial Literacy Score	0.07* (2.04)	0.02
Age 18-24	0.11 (0.89)	0.03
Age 25-34	0.22* (2.51)	0.07
Age 45-54	0.11 (1.22)	0.03
Age 55+	0.14 (1.38)	0.04
Household Income (£0,000s)	0.06** (5.68)	0.02
Age Left Full-Time Education	0.02* (1.87)	0.01
<hr/>		
N	2439	
Pseudo R <sup>2</sup>	0.06	
LR	163.16	
Prob > LR	0.0000	
Baseline	0.07	

Notes: Significant at \*\*1%, \*5%. Additional note as in Table 8.