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Financial literacy and over-indebtedness in low-income households☆

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ABSTRACT

Financial literacy can explain a significant proportion of wealth inequality. Among the key components of financial literacy are numeracy and money management skills. Our study examines the relative importance of these components in the determination of consumer debt and household net worth among credit union members in socially disadvantaged areas. The main finding from our analysis is that money management skills are important determinants of financial outcomes but that numeracy has almost no role to play. This result adds to a recent US-based behavioural finance literature on the role of attention and planning in consumer finance. Findings are found to be robust when the sample is reduced to only those who have a clear role in household financial decision-making and also when controlling for potential endogeneity. Our findings have policy implications in the UK and elsewhere as credit unions across the world are important players in national financial literacy strategies.

1. Introduction

Research suggests that there is a positive correlation between poor financial literacy and debt problems. A lack of financial literacy has been found to be correlated with higher debt burdens, incurring greater fees, loan defaults and loan delinquency. Efforts to identify survey instruments have highlighted a number of different dimensions of financial literacy. Among the key components are numeracy and the money management skills of attention, budgeting and organising bills.

Our research tests the effect on financial outcomes of money management skills versus numeracy using data on over-indebted members of credit unions in areas of social disadvantage. Our research demonstrates that, for this financially vulnerable cohort, money management and not numeracy ameliorates a range of adverse debt behaviours. More specifically, we find that those with superior money management skills have reduced debt-to-income levels; are less likely to borrow from high cost lenders such as internet money lenders and high street loan shops; and are likely to have used fewer lenders in the last three years. Additionally, our research highlights that money management skills positively contribute to household net worth. These results add to a recent US behavioural finance literature which highlights the importance of self-imposed non-binding constraints such as payment reminders, budgeting and forward planning for financial decision-making.

Financial literacy variously defined in terms of numeracy or understanding of risk diversification and inflation has been associated with less sub-prime mortgage delinquency (Gerardi, Goette, & Meier, 2010), lower credit card fees (Lusardi & Tufano, 2009a, 2009b), less high-cost borrowing (Disney & Gathergood, 2013), better planning for retirement (Van Rooij, Lusardi, & Alessie, 2012), stock market participation and asset portfolio diversification (Graham, Harvey, & Huang, 2009). The evidence for causation has been less forthcoming and other aspects of financial literacy captured by money management skills could be more salient (Collard, Finney, Hayes, & Davies, 2012, Zinman, 2014). The attention that consumers pay to their financial situation significantly affects financial outcomes. A behavioural finance literature shows how reminders reduce overdraft fees and improve saving (Karlan, McConnell, Mullainathan, & Zinman, 2012; Stango & Zinman, in press). Budgeting and organising bills should aid intertemporal allocations just as listing specific sub-components of tasks corrects the 'planning fallacy' of systematically underestimating the time required to complete tasks (Buehler, Griffin, & Ross, 1994; Forsyth & Burt, 2008).

To date, empirical testing of the role of money management skills has been confined to a literature focusing on the psychological determinants of debt. Avoidable failures of personal money management are found to lead to arrears in household bills and higher credit card debt (Elliot, 2005; Garðarsdóttir & Dittmar, 2012; Kim, Garman, & Sorhaindo, 2003; Lea, Webley, & Walker, 1995; Norvilitis et al., 2006). Our work demonstrates that, when compared with numeracy, money management skills have a significant effect on a range of financial outcomes. The finding that money management skills mitigate adverse

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financial outcomes for our socially disadvantaged group is important as these skills are behavioural rather than cognitive. It is easier to construct an intervention to encourage monitoring financial statements, being financially organised, repaying bills on time, making a detailed budget for expenses and financial planning than to teach this cohort how to understand interest rate calculations and Annual Percentage Rates. Furthermore, the behavioural finance literature suggests that these interventions can be simple and very cost-effective.

We use data from a survey of Northern Irish credit union members with either loans in arrears for >9 weeks or loans that had been rescheduled. This is a population for whom variations in financial literacy should really matter. The returns to financial know-how and skills should be high for this population and should make the difference between moderate and unsustainable levels of debt. Another strength of this work is that members were informed in advance that interviewers would know they were in debt and hence respondents should report the level and extent of their debts more honestly. These data were analysed using a variety of regression techniques. We control for potential endogeneity by using a novel IV strategy. The instrument used is the religion respondents were brought up in and its use is motivated by a recent literature on religion and economic outcomes (Guiso, Sapienza, & Zingales, 2003; Renneboog & Spaenjers, 2012).

These findings are timely because levels of deprivation are currently high in NI and imminent Welfare Reform can be expected to place more households under financial strain. This research also has implications for low-income households elsewhere. Credit unions work with financially vulnerable communities in many other countries, are homogenous in their organizational structure and have a core operating principle of financial education. In 2013, there were over 56,000 credit unions across 98 countries with >207 million members and approximately $1732 billion in assets. Worldwide, the population penetration of credit unions is 8.06% (World Council of Credit Unions, 2013). The impact of the recent financial crisis on socially disadvantaged communities has highlighted the need for national financial literacy strategies and credit unions have been identified as key players. In the UK, credit unions are being actively promoted as an alternative to payday lenders in socially disadvantaged areas. The European Network of Credit Unions is represented in the European Commission Expert Group on Financial Education. In the US, the Credit Union National Association is a core member of the Treasury Department's Financial Literacy and Education Commission and financial education is being encouraged through the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act.

The paper is structured as follows. Section 2 provides a tailored overview of the literature concentrating on the definition and measurement of financial literacy and the role of financial literacy in influencing self-beneficial financial behaviour. Section 3 details the data providing descriptive statistics for our sample of over-indebted credit union members and details the construction of the money management and numeracy measures. Section 4 presents the results. A description of the distribution of the levels of numeracy and money management among our respondents is provided; the nature of the relationship between these measures and financial outcomes is considered for all respondents and separately for only those people having a clear responsibility for their household finances; and checks of the sensitivity of results to possible reverse causation are presented. In Section 5 we discuss policy implications and in particular the scope for the implementation of a money management programme by credit unions to help over-indebted members better manage their financial affairs. Section 6 offers concluding comments.

2. Literature review

In this section we consider how financial literacy is defined and measured with particular emphasis placed on the definition and measurement of money management skills and numeracy. We also summarise the evidence that financial literacy positively affects financial behaviours and whether financial literacy can be improved through financial education programmes.

2.1. Definition and measurement of financial literacy

A number of definitions of financial literacy have been used in the academic literature. A definition now widely accepted is that provided by the OECD which characterises financial literacy as 'a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing' (OECD INFE, 2011). In this context 'knowledge' is the ability to understand personal and broader financial matters, 'skill' is the ability to apply that knowledge in everyday life, and 'attitude and behaviour' refers to having the self-confidence to make appropriate financial decisions.[1]

Our paper considers two aspects of financial literacy namely money management skills and numeracy. These we believe are most relevant for our study group. Recent research has tended to use three core questions to measure financial literacy (Lusardi & Mitchell, 2008, 2011a, 2011b). The questions capture knowledge and understanding of elements considered important in making savings and investment decisions. This includes numeracy and the capacity to do interest rate calculations; an understanding of inflation; and an understanding of portfolio diversification. These questions are now internationally recognised and utilised in surveys in the US and elsewhere.[2] A variant of these three questions has also been used to assess financial literacy focusing specifically on debt decisions. The questions assess respondents' knowledge about the power of interest compounding and the workings of credit card debt and their ability to choose the most advantageous means of payment (Disney & Gathergood, 2013; Lusardi & Tufano, 2009a, 2009b). Our measure of numeracy is drawn from this general body of work and is based on those questions which measure numeracy and the capacity to do interest rate calculations but does not include questions on portfolio diversification or financial knowledge.[3]

Assessment of money management skills has been confined to a literature focusing on the psychological determinants of debt. One of the few studies to measure money management skills was that by Lea et al. (1995). The authors used eight questions that covered general strategy for managing money; whether respondents had bank or building society accounts; preferred frequency of paying bills; putting money away in advance for bills; use of pre-commitment methods of bill payment (standing orders, direct debits, deduction at source from social security benefits); use and repayment of credit. A more recent study is that by Garðarsdóttir and Dittmar (2012) which uses a nine item scale to assess people's self-reported skills in managing money. Three of the questions used were taken directly from Lea et al. (1995) study with the others designed by the authors.

2.2. Does financial literacy matter?

Much of the available evidence suggests that financial literacy is directly correlated with self-beneficial financial behaviour. A variety of studies have considered how financial literacy affects debt. Weak financial literacy caused by failing to understand interest rate calculations are

[1] Hung, Parker, and Yoong (2009) provide a review of research which has considered the definition and measurement of financial literacy.

[2] In the US the three questions were added to the 2007–2008 National Longitudinal Survey of Youth for young respondents (ages 23–28); the RAND American Life Panel (ALP) covering all ages; and the 2009 and 2012 Financial Capability Study. The three questions have also been incorporated in national surveys in Australia, Chile, France, Germany, the Netherlands, India, Indonesia, Italy, Sweden, Switzerland, Russia, Japan, and New Zealand (see Arrondel et al., 2012; Brown & Graf, 2013; Hastings & Mitchell, 2011; Lusardi & Mitchell, 2011b).

[3] Gathergood (2012) also concluded that these questions were not relevant in a study of financial literacy and over-indebtedness for a more general sample of UK consumers.

correlated with higher debt burdens, incurring greater fees, and defaults and delinquency (Bucks & Pence, 2008; Campbell, 2006; Disney & Gathergood, 2013; Duca & Kumar, 2014; Gerardi et al., 2010).[4] Financial literacy also plays a role in explaining why so many individuals make use of high-cost borrowing methods. Numeracy and knowledge of basic financial concepts are strongly negatively correlated with high-cost borrowing, even after accounting for age, income, education, and many other variables that can proxy for financial vulnerability and being hit by shocks (Lusardi & de Bassa Scheresberg, 2013). Most payday borrowers cannot accurately recall Annual Percentage Rates (APRs) despite being able to report finance charges, suggesting that most borrowers consider charges rather than APRs in making borrowing decisions (Elliehausen, 2006). Debt illiteracy is also found to be particularly severe among certain demographic groups such as the elderly, the young, women, minorities, and the divorced or separated (Lusardi & Tufano, 2009a, 2009b).

A body of research has also found financial literacy to be correlated with saving and investment decisions. Financial literacy is positively correlated with planning for retirement, savings and wealth accumulation (Hastings & Mitchell, 2011; Lusardi & Mitchell, 2007; Van Rooij et al., 2012). Financial literacy is predictive of investment behaviours including stock market participation (Almenberg & Dreber, 2011; Arrondel, Debbich, & Savignac, 2012; Van Rooij, Lusardi, & Alessie, 2011), choosing a low fee investment portfolio (Choi, Laibson, & Madrian, 2009), and better diversification and more frequent stock trading (Graham et al., 2009). Researchers have highlighted that those without a college education are unlikely to understand investment concepts such as portfolio diversification (Christelis, Jappelli, & Padula, 2010; Lusardi & Mitchell, 2007, 2011b).[5] Additionally, the literature finds that those with superior financial literacy have higher household incomes and savings (Disney & Gathergood, 2012).

However, there is still a lack of evidence for causation from these aspects of financial literacy to financial outcomes and other aspects of financial literacy captured by money management skills could be more salient (Zinman, 2014). A behavioural finance literature emphasises the importance of consumers paying attention to their financial situation. Consumers have a limited resource of attention to pay to day-to-day household finance but even uninformative reminders significantly reduce overdraft fees (Stango & Zinman, in press). Reminders to save increase savings and are especially effective for time-inconsistent individuals (Karlan et al., 2012). Without reminders, individuals will maximize lifetime utility given the choice set they attend to and unexpected expenses or investment opportunities are met through immediate borrowing while the problem is 'top of mind' leading to over-indebtedness. A second component of money management skills is budgeting and organising bills. Self-imposed commitments such as making a budget or anticipating bills encourage consumers to consider 'lumpy' irregular expenditures they may otherwise overlook. Just as listing specific sub-components of tasks corrects the 'planning fallacy' of systematically underestimating the time required to complete tasks (Buehler et al., 1994; Forsyth & Burt, 2008), enumerating future income and expenditure should aid intertemporal allocations and facilitate consumption smoothing. Planning in this way may also help consumers with time inconsistent preferences and self-control problems to become more sophisticated and foresee their self-control problems in the future (O'Donoghue & Rabin, 1999).

Poor money management skills have been found to contribute to higher levels of indebtedness. Focusing on the psychological determinants of financial decision-making, Lea et al. (1995) found that people who were in arrears to utility providers were less likely to have bank or building society accounts, and they rated themselves as poorer money managers than the rest of the sample. They also found that those in arrears put money away for regular bills less often, were less likely to pay bills by standing orders or similar arrangements, and preferred to pay bills more frequently. These results suggest that avoidable failures of personal money management may be involved in some people's debt situation. A common finding in this study and related research is that higher debt can be attributed in part to poor money-management skills (Elliot, 2005; Kim et al., 2003; Norvilitis et al., 2006). In more recent research, Garðarsdóttir and Dittmar (2012) find that money management skills are a strong negative predictor of the tendency to overspend and to worry about financial affairs. Interestingly, however, they found money management skills not to be a significant predictor of debt.

The literature also addresses whether financial literacy programmes are effective in changing behaviour. While some assessments of financial literacy programmes report positive impacts, however, the effects are often small or non-existent when compared with valid comparison groups (Collins & O'Rourke, 2010; Gloukoviezoff, Atkinson, McKay, Collard, & Kempson, 2007; Hathaway & Khatiwada, 2008). Where effective financial literacy programmes are found to be effective they are targeted towards a specific audience and area of financial activity rather than one-size-fits-all financial education programmes (Lusardi & Mitchell, 2014; Martin, 2007). Examples of financial literacy programmes that meet these criteria are highlighted by Agarwal, Amromin, Ben-David, Chomsisengphet, and Evanoff (2009, 2010). Although financial education programmes struggle to improve individual's numeracy skills especially among those with low education they can significantly improve awareness of financial choices and attitudes toward financial decisions (Carpena et al., 2011). Collard et al. (2012) found that financial skills training for social housing tenants increased financial confidence, changed money behaviours and made people better-off.

An issue, however, with some studies is that of endogeneity. Causality may not be from financial literacy to financial behaviour but rather it may be reversed as people may gain financial literacy as they save, invest and accumulate wealth. To address this issue researchers have utilised instrumental variables or an experimental research to control for potential endogeneity issues (Bucher-Koenen & Lusardi, 2011; Klapper, Lusardi, & Panos, 2012; Lusardi & Mitchell, 2009; Song, 2011; Van Rooij et al., 2011). Studies which evaluate the impact of financial literacy using only self-reported measures are also considered problematic as participants tend to overestimate their financial knowledge relative to their actual knowledge (Collins & O'Rourke, 2010).

3. Data

Credit union members in NI tend to be on relatively lower incomes compared to the general population and live in more socioeconomically disadvantaged areas. Five Northern Irish credit unions located in Greater Belfast and Newry, Co. Down participated in our study. The common bonds for the credit unions in our sample cover the Antrim Road, Shankill Road and Markets areas of Belfast which were deeply affected by the recent period of civil war known locally as 'the Troubles' and are now among the most deprived areas of NI. They identified 1091 members with either loans in arrears for >9 weeks or loans that had been rescheduled. The relevant credit union wrote to these members explaining the study and highlighting that they had been chosen for interview on the basis of their arrears position. The rationale for this approach was to make respondents aware that the interviewers would know they were in debt and hence they would be less inclined to under-report the level and extent of their debts as in other studies (Karlan &

[4] Consumers have been found to display a tendency to underestimate a loan interest rate given a principal, monthly payment, and maturity. The biases vary asymmetrically with maturity in that future value bias increases with the time horizon, whereas payment/interest bias declines with maturity (Stango & Zinman, 2009).

[5] In an investigation of financial literacy around the world 34% of US respondents responded that they did not know the answer to the diversification question, as did 32% of respondents in Germany and 33% in the Netherlands. Consistent with expectations, the percentage of 'do not know' answers was very high in Russia and East Germany, where individuals had little exposure to stock markets, and lower in countries like Sweden, which implemented a vast privatization of its social security system (Lusardi, 2013).

Zinman, 2008; Zinman, 2009). They were also offered the opportunity at this stage to contact the credit union to opt out (25 declined to participate). Only one participant per household was interviewed. The survey was carried out from January to April 2014 by a local market research company until the sampling frame was exhausted resulting in 499 completed surveys giving a particularly high response rate of 47%.

The survey consisted of modules on household demographics, employment, income and benefits, debt, expenditure, savings and assets, financial literacy and financial characteristics as well as a number of health-related questions. The most substantial section focus of the survey was on consumer credit and unsecured debt (although the survey also asked for details of mortgage debt). For an exhaustive range of different types of credit and borrowing, respondents were asked for details of the current balance, arrears and an estimate of the APR. The amount of arrears on a list of typical household bills was also requested. A section on high-interest borrowing through internet moneylenders, high street loan shops, home collection agencies and unauthorised moneylenders dealt with the use of this method of borrowing in the last three years, the motivation for using this form of borrowing, the purpose of the loan and their experience of borrowing this way. The respondent was also asked for more summary details of partner debt. The survey was carried out face-to-face and lasted approximately one hour.

A nine-item scale taken from Garðarsdóttir and Dittmar (2012) was used to assess people's self-reported skills in managing money. Three items were sourced from an earlier study by Lea et al. (1995) while the remainder was developed by these authors. They found the items on this scale had excellent internal consistency (i.e. described the same construct). Numeracy was assessed using four numerical questions on simple interest, percentage, division and compound interest over two years. The first question was linked with borrowing behaviour in Disney and Gathergood (2013) while the remainder have been asked in two waves of the English Longitudinal Study of Ageing and have been shown to affect income and wealth life outcomes (Banks, O'Dea, & Oldfield, 2010). A series of questions based on Lusardi and Mitchell (2008, 2011a, 2011b) was rejected at the piloting stage as questions on portfolio diversification and knowledge of sophisticated financial products were not felt to be appropriate for our sample of low income and low education individuals.

Across studies, performance tests and self-assessment (financial confidence) methods have been employed to measure financial literacy. Performance tests are primarily knowledge-based, reflecting the components of the conceptual definitions of financial literacy. In contrast, self-assessment methods gauge perceived knowledge or confidence in knowledge (i.e. how much you think you know). Performance tests are found to be superior as respondents have a tendency to be over-confident about their financial knowledge (Agnew & Szykman, 2005; Lusardi & Mitchell, 2014; OECD, 2005).

Descriptive statistics for our sample of over-indebted credit union members are given in Table 1. Participants generally have low-levels of education—32% of respondents have no educational qualifications and only 10% of the sample has a university education. Incomes are low in our sample with an average household budget of just £290 a week. Comparable figures for the Northern Irish population are 24% with a university education, 29% with no educational qualifications (NISRA, 2012) and an average household budget of £454 a week (authors' calculations based on 2013–14 Continuous Household Survey). There is a greater proportion aged 25 to 49 in this sample (62%) than in NI (45%) and average sample household size (3.1) is larger than typical Northern Irish households (2.5).

Table 1
Descriptive statistics.

Variable	Mean
Demographics	
Female	0.58
Age 18–24	0.07
Age 25–34	0.28
Age 35–49	0.34
Age over 50	0.31
Has partner	0.38
Household size	3.14
Employment and education	
Employed	0.56
Unemployed	0.14
Work disabled	0.08
Retired	0.06
Partner employed	0.66
No educational qualifications	0.32
Highest qualification GCSEs	0.30
Highest qualification work-related	0.12
Highest qualification A-levels	0.16
Highest qualification degree level	0.10
Housing tenure	
Outright owner	0.11
Mortgaged owner	0.34
Private renter	0.18
Social renter	0.36
Income and assets	
Household weekly income	290
Household unsecured debt	4021
Household savings and assets	842
N	499

4. Results

In this section we first describe the distribution of the levels of numeracy and money management skills among our respondents. In the next subsection, we establish the nature of the relationship between these measures and financial outcomes. The last section restricts the analysis to only those people having a clear responsibility for their household finances and also checks the sensitivity of results to possible reverse causation.

4.1. Financial literacy

Numeracy is low among respondents to our survey and would appear to be substantially lower than the general population. Summary statistics for responses to our questions on *simple interest*, *percentage*, *division* and *compound interest* are given in Panel A of Table 2. The first question was '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, how

Table 2
Summary statistics for responses to numeracy questions.

Panel A: Distribution of responses by question

	1. Simple interest		2. Percentage		3. Division		4. Compound interest	
A	£850	1.0%	10	8.2%	£100,000	2.6%	**£242**	10.4%
B	£1000	0.6%	1000	1.6%	£200,000	16.2%	£240	35.5%
C	**£1150**	57.1%	**100**	67.3%	**£400,000**	51.5%	£220	16.8%
D	£1500	13.0%	1	0.8%	£40,000	3.2%	£210	4.4%
	Not sure	28.3%	Not sure	22.0%	Not sure	26.5%	Not sure	32.9%

Correct answers are emboldened.

Panel B: Distribution of total questions answered correctly

Total number of questions answered correctly	Proportion of sample
0 (all not sure)	23% (18%)
1	15%
2	23%
3	31%
4	8%

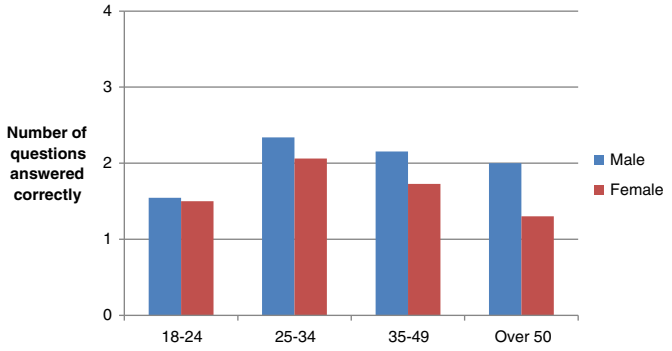

Fig. 1. Average of total numeracy questions answered correctly by age and sex.

much money would she owe on her overdraft after one year?' This question was asked identically in a 2010 UK internet survey by YouGov described in Disney and Gathergood (2012, 2013).The last three questions were asked with slightly different alternative incorrect choices in the 2008 wave of the English Longitudinal Study of Ageing (ELSA) which is a face-to-face interview conducted on the English population aged 50 and over. However, only the second question was asked of all respondents. The other two were asked on successful completion of earlier questions. The *percentage* question was 'If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?'. The *division* question was 'If 5 people all have the winning numbers in the lottery and the prize is two million pounds, how much will each of them get?'. The *compound interest* question was 'Let's say you have £200 in a savings account. The account earns 10% interest per year. How much would you have in the account at the end of two years?'

A very significant proportion of the sample did not attempt to answer the questions—around one-quarter for the *simple interest*, *percentage* and *division* questions rising to almost one-third for the *compound interest* question. Over one-half of respondents correctly calculated that £1000 accrues to £1150 after one year at 15% simple interest. Of those who answered incorrectly most tended to err towards the higher response. In YouGov's Debt Track survey, 85% of respondents chose the correct answer while only 7% said they did not know the answer (Disney & Gathergood, 2012).[6] The second question of the series which required computation of 10% of 1000 was answered correctly most often (67.3%) and had the least number of 'Not sures' (22.0%). As the mathematical skills required in this question are the same as in the first it would suggest that the financial context of the first question creates extra difficulties for some respondents. In ELSA 2008, a much higher proportion of respondents (85%) answered the *percentage* question correctly.[7] The third question requiring division of 2 million by 5 was answered surprisingly poorly with almost half either unsure or choosing incorrectly. Only just over one-tenth of the sample responded correctly that £200 accrues to £242 with two years' compound interest at 10%. The modal answer equates to two years' simple interest of 10% on £200.

Almost one-quarter of respondents did not answer any of the questions correctly (Panel B). The majority of these responded that they were 'not sure' to all four questions (18% out of 23%). Only 8% of the sample answered all four questions correctly although 31% answered three out of four questions correctly. The latter were generally incorrect on the *compound interest* question. Breaking down the numbers of questions answered correctly by age and sex (Fig. 1), we see an inverted u-shape with age and generally poorer scores of females at all ages.

Table 3
Responses to borrowing costs questions—'Approximately how much would you expect to repay at the end of the month if you borrowed £100 using ..'

Repayment	Credit union loan	Bank/building society loan	Credit card	Doorstep moneylender	Internet moneylender
£100	6	2	3	–	1
£101	37	7	1	–	–
£105	131	60	5	1	1
£110	96	89	14	4	2
£115	51	62	31	7	2
£120	28	61	54	27	19
£135	15	53	78	50	57
£150	6	21	79	115	90
£175	1	9	40	52	45
£200	1	3	16	71	129
Not sure	127 (25%)	132 (26%)	178 (36%)	172 (34%)	153 (31%)
Average	£111	£120	£140	£159	£167
Total	499	499	499	499	499

Minimum size of bank loan is typically 1000. Minimum term for loans from banks/building societies and credit unions is normally one year. Provident Personal Credit, the largest doorstep lender In Northern Ireland, has a minimum term of 14 weeks. Approximate borrowing costs in Northern Ireland—(a) Credit union Loan 101 (b) Bank/building society loan 101.25 (c) Credit card 101.87 (d) Doorstep moneylender 114.35 (e) Internet moneylender 137.15 Based on (a) Ormeau credit union standard loan APR of 12.6825% (b) Ulster Bank APR of 19.9% on personal loans <4000 (c) Ulster Bank Classic Mastercard used for cash advance (d) Provident Personal Credit APR of 399.7% (e) Wonga loan for 30 days.

These regularities have already been observed internationally for a more multi-dimensioned measure of financial literacy (Lusardi & Mitchell, 2014).

The research reviewed in the previous section indicates that low levels of financial literacy imply an inability to perform interest rate calculations resulting in a higher frequency of high-cost borrowing methods, higher debt burdens, greater fees, defaults and delinquency. We would therefore expect that respondents in our sample are generally unable to estimate loan repayments accurately and recognise relatively expensive sources of funds. This proves to be the case. Table 3 shows results to the question 'how much would you expect to repay at the end of the month if you borrowed £100 from various sources'. Loan providers are arranged from typically cheapest on the left to typically most expensive on the right. Indicative costs of borrowing from each of these sources are given in the footnote to the table. Between 25% and 36% were not sure how much they would repay in each case. The average responses for each loan provider are much higher than indicative rates. For example, borrowing cash with a credit card at a typical APR of 24.97% would mean a repayment of only £101.87 which is much lower than the average response given here (£140).[8] Interestingly, although the respondents generally calculated repayments incorrectly the averages would indicate that they recognised internet moneylenders (e.g. Wonga) or doorstep moneylenders (e.g. Provident Personal credit) as being more expensive than borrowing from banks or credit unions.

The money management skills of our sample are given in Table 4. Responses to each question are given separately although the survey instrument has been designed so that the various skills are aspects of the same underlying construct. Generally respondents tended to agree or strongly agree that they followed the indicated positive behaviour more often than they disagreed or strongly disagreed. This is particularly the case in relation to those skills which indicate paying attention to their financial situation (A,B and C)—for skills A and B, over 200 respondents more agreed or strongly agreed than disagreed or strongly disagreed while the difference for skill C was less substantial (125 respondents). However, many respondents did not tend to agree they followed the active behaviours associated with money management. Our sample tended to anticipate bills (D) and pay them on time (E)

[6] As this survey was conducted by internet, the proportion of correct answers is perhaps biased upwards compared to our face-to-face study.

[7] Authors' own calculations from ELSA dataset archived at UK Data Service SN 5050. Accessed 03/09/2014.

[8] Ulster Bank Classic Mastercard rate for cash advances. http://www.ulsterbank.co.uk/ni/personal/daily-banking/credit-cards/useful-information/rates.ashx.

Table 4
Money management skills: 'Indicate the extent to which you agree with each of the following statements ..'

	(1)&(2) Strongly disagree/ Disagree	(3) Neutral	(4)&(5) Agree/ Strongly agree	Not sure	Difference (4)&(5) - (1)&(2)	Total
(A) I keep an eye on how much money is coming in and how much is going out	120	43	336	0	216	499
(B) I always know exactly how much money I owe	119	47	333	0	214	499
(C) I monitor my financial statements	156	61	281	1	125	499
(D) I put money away in advance to be able to pay my bills	180	52	266	1	86	499
(E) I always repay my bills in time	170	80	248	1	78	499
(F) I make detailed budgets for my expenses	237	59	203	0	−34	499
(G) I stay within my budget(s)	185	70	244	0	59	499
(H) My finances are disorganised	269	76	153	1	−116	499
(I) I am good at handling money	161	96	242	0	81	499

but a substantial number of respondents disagreed with these statements. Budgeting appears to be a particular weakness (F and G)—more people did not make detailed budgets (F) while only a small majority adhered to their budgets (G). Despite this and despite their adverse financial situation, more respondents tended to summarise their money management skills positively (H and I)—more disagreed their finances were disorganised (H) and more respondents agreed they were good at handling money (I).

The average response across the nine skills with skill H reversed is given by age and sex in Fig. 2 and indicates that money management skills which are generally behavioural do not exhibit the same relationships as observed for financial literacy which require cognitive skills. There is a very slight improvement of skills with age for males. There is little appreciable change in skills with age for women and also little difference between men and women except for young women. Further analysis would indicate that the high level of skills among young women is due to their having young children.

4.2. Relationship with financial outcomes

The role of numeracy and money management skills in explaining a number of different financial outcomes is explored in Table 5. The *numeracy* variable is the total number of correct responses to *simple interest*, *percentage*, *division* and *compound interest* questions. The *money management* variable is the average response across the nine money management skills (accounting for the reverse scaling on skill H). Control variables used are individual demographics, household socioeconomic variables and the respondent's credit union.

From the first regression, we see that money management skills have a very clear statistically significant relationship with the ratio of debt to income. *The debt-to-income* ratio is calculated as the sum of all unsecured debt including household arrears, credit card debts, overdrafts and loans divided by weekly household income. Results show that increasing *money management* by one unit (e.g. moving to agreeing that they exhibit these skills from a position of neutrality) decreases the ratio of debt to income by 37%. At the mean level of debt and income, this would imply a reduction in household debt of almost £1500 from £4021 to £2573. The estimate for *numeracy* is not statistically significantly different from zero at the conventional 1% or 5% levels. At the 10% level, the estimate indicates that improving numeracy worsens the debt-to-income ratio. This perhaps is related to the systematic tendency of individuals to overestimate their levels of financial knowledge and take on excessive levels of debt (Lusardi, 2011; Van Rooij et al., 2011). Our finding that better money management skills significantly reduce debt is in keeping with Lea et al. (1995) who used a narrower definition of debt but is in contrast to Garðarsdóttir and Dittmar (2012) who found money management skills not to be a significant predictor of debt.

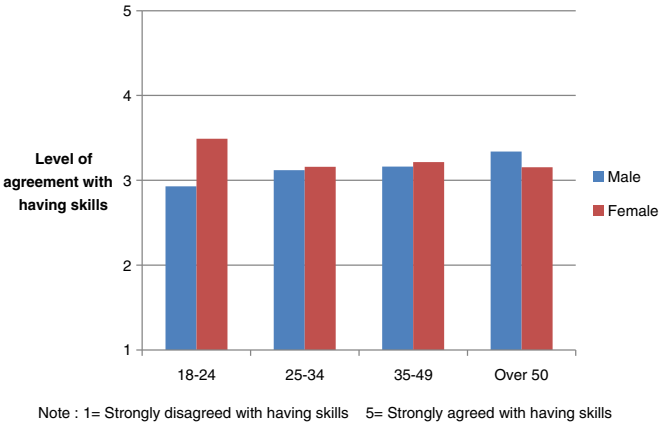

Fig. 2. Average money management skills by age and sex. Note: 1 = Strongly disagreed with having skills 5 = Strongly agreed with having skills

In the second regression, a probit model is estimated to explain whether the respondent borrowed from an internet moneylender, high street loan shop, home collection loan agency or from an unauthorised moneylender in the last three years. It would be rational to borrow from these sources if the individual was credit-constrained and access to cheaper forms of credit was unavailable. However, other evidence from this sample suggests the most common response to 'why did you use this type of loan' was 'convenience'.[9] For this reason, we regard this behaviour as indicative of sub-optimal financial decision-making.[10] The results show that better money management skills decrease the probability of taking out high-interest financing and this result is significant at the 1% level. Converting the estimated coefficient of −0.32 to a marginal effect means that, at the average level of money management skills, increasing *money management* by one unit decreases the probability of taking out high-interest financing by 8.7%. In contrast, *numeracy* is seen not to affect the propensity to borrow from these sources.

The next regression is an ordered probit model to explain the number of different lenders used in the last three years. This is regarded as being a poor financial outcome as having multiple loans means multiple repayment schedules, more paper work, greater chance of missing repayments and potentially higher interest rates. A minority of respondents had used multiple ways to borrow money over the previous 12 months. Only 18% had used two different ways to borrow money while 6% had used three or more ways. *Money management* has a statistically significant effect on the number of lenders while *numeracy* has no effect. The coefficient of −0.22 implies that a one unit increase in *money management* increases the probability of using no lenders by 6% and decreases the probability of having two or more lenders also by 6%.

[9] As opposed to 'Cost', 'No alternative source of finance (e.g. poor credit rating)', 'Recommended', 'Advertising' or 'Approached by moneylender'.

[10] Other studies have established that payday loan access leads to increased household finance difficulties Melzer (2011) and its use is often explained by poor financial literacy (Lusardi & de Bassa Scheresberg, 2013).

Table 5
Regressions explaining financial outcomes.

		Dependent variable			
Variables		log(debt/income)	Uses high-interest financing	Number of different lenders	log(net worth)
Female		0.05	−0.10	−0.07	0.23
		(0.14)	(0.15)	(0.11)	(0.75)
Age:	25–34	0.35	−0.05	−0.17	−0.64
		(0.25)	(0.29)	(0.23)	(1.26)
	35–49	0.65**	0.12	0.02	−0.87
		(0.26)	(0.28)	(0.23)	(1.24)
	Over 50	0.46	−0.36	−0.32	3.98***
		(0.29)	(0.31)	(0.24)	(1.31)
Has partner		−0.11	−0.10	−0.14	1.15
		(0.15)	(0.16)	(0.12)	(0.82)
Household size		0.04	0.03	0.03	0.12
		(0.05)	(0.05)	(0.04)	(0.28)
Homeowner		0.08	−0.67***	−0.19	4.62***
		(0.15)	(0.17)	(0.12)	(0.84)
log income		−0.34**	0.13	0.12	−0.71*
		(0.13)	(0.10)	(0.09)	(0.43)
Education:	GCSEs	−0.04	−0.29	−0.18	2.34**
		(0.18)	(0.19)	(0.15)	(0.95)
	Work-related	0.15	−0.10	0.16	0.78
		(0.22)	(0.27)	(0.17)	(1.14)
	A-levels	−0.18	−0.22	−0.30*	1.40
		(0.21)	(0.25)	(0.17)	(1.23)
	Degree level	0.22	0.41	0.54**	−0.05
		(0.23)	(0.27)	(0.22)	(1.46)
Numeracy		0.10*	−0.09	0.06	0.21
		(0.06)	(0.06)	(0.04)	(0.29)
Money management		−0.37***	−0.32***	−0.22***	1.80***
		(0.08)	(0.08)	(0.07)	(0.41)
Constant		4.08***	0.16	–	−7.60***
		(0.72)	(0.65)	–	(2.82)
Credit union dummies		Yes	Yes	Yes	Yes
Method		OLS	Probit	Ordered probit	OLS
Observations		477	474	477	477
R^2/Pseudo R^2		0.15	0.14	0.09	0.29

Standard errors in parentheses are heteroskedastic-consistent. The reference category is aged 18–24 with no educational qualifications. 'Debt/income' = sum of all arrears, credit card debts, overdrafts and loans divided by weekly household income, 'Uses high-interest financing' = whether borrowed from an internet moneylender, high street loan shop, home collection loan agency or from an unauthorised moneylender in the last 3 years. 'Number of different borrowers' = the number of different ways money was borrowed in the last 12 months. 'Net worth' = sum of household financial assets and property value(s) minus mortgage debt, unsecured debt and arrears. Where net worth was negative, −log(−net worth) was used in the dependent variable.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

The last regression explains variation in net worth among respondents. *Net worth* is defined as the sum of all assets (financial and housing) minus debts (unsecured and secured plus arrears). This variable then reflects the accumulation of financial decisions thus far over the lifecycle. The standard economic model of borrowing while young and saving when older is seen in the coefficients for the age variables in the regression which have those aged 18–24 as the reference category.[11] Homeowners naturally also have higher net worth. A one unit increase in *money management* increases net worth by 180% and this effect is statistically significant. The coefficient on numeracy is statistically insignificantly different to zero. This finding contrasts with Disney and Gathergood (2012) who find that their variant of numeracy significantly affects net worth in a general sample of UK households. Our interpretation is that numeracy affects the accumulation of wealth in the general population but not among those on low-income with low levels of education. In contrast, money management skills which were not a focus of Disney and Gathergood (2012) significantly increase net worth.

4.3. Sensitivity analysis

The previous subsection highlights how little numeracy affects financial outcomes in our sample whereas money management skills are very relevant in explaining all the outcomes considered. We undertake a number of robustness checks to test the validity of these conclusions.

In the first instance, the sample is restricted to those who take responsibility for their household finances. There are 308 respondents who do not have a partner (i.e. someone who lives in their household and with whom they share living expenses). Financial responsibility for those with a partner is elicited from responses to the question 'People organise their finances in different ways. Which of the methods on this card comes closest to the way you organise yours?' In Table 6, the analysis excludes all those who responded 'My partner looks after all the household money except my personal spending' (48 respondents) or 'I am given a housekeeping allowance. My partner looks after the rest of the money' (7 respondents).[12]

Results are seen to be very similar to those given in the previous table. The coefficients on *money management* are practically unchanged and differences to previous estimates are not statistically significant. *Numeracy* does not affect any of the financial outcomes in a beneficial

[11] There are too few respondents over 65 to also reflect dissaving in retirement.

[12] Other responses were: 'I look after all the household money except my partner's spending money' (49), 'My partner is given a housekeeping allowance. I look after the rest of the money' (5), 'We share and manage our household finances jointly' (64), 'We pool some of the money and keep the rest separate' (8), 'We keep our finances completely separate' (8), 'Other' (2).

Table 6
Regressions explaining financial outcomes (those with no household financial responsibility are excluded).

		Dependent variable			
Variables		log(debt/income)	Uses high-interest financing	Number of different lenders	log(net worth)
Female		0.08	−0.15	−0.10	0.76
		(0.15)	(0.16)	(0.12)	(0.79)
Age:	25–34	0.34	−0.09	−0.18	−0.62
		(0.26)	(0.29)	(0.23)	(1.27)
	35–49	0.61**	0.06	−0.01	−0.82
		(0.26)	(0.28)	(0.24)	(1.28)
	Over 50	0.47	−0.35	−0.35	4.45***
		(0.29)	(0.31)	(0.25)	(1.34)
Has partner		−0.07	−0.06	−0.16	0.73
		(0.17)	(0.18)	(0.13)	(0.92)
Household size		0.05	0.01	0.02	0.01
		(0.05)	(0.06)	(0.04)	(0.29)
Homeowner		0.10	−0.73***	−0.21	4.08***
		(0.16)	(0.18)	(0.13)	(0.88)
log income		−0.36**	0.198	0.14	−0.67
		(0.14)	(0.11)	(0.09)	(0.46)
Education:	GCSEs	−0.21	−0.21	−0.28*	3.10***
		(0.20)	(0.21)	(0.16)	(1.04)
	Work-related	0.12	0.00	0.01	2.42**
		(0.25)	(0.29)	(0.20)	(1.22)
	A-levels	−0.32	−0.20	−0.32*	2.84**
		(0.23)	(0.26)	(0.18)	(1.30)
	Degree level	0.05	0.43	0.59**	1.47
		(0.25)	(0.28)	(0.24)	(1.52)
Numeracy		0.14**	−0.09	0.04	0.11
		(0.06)	(0.06)	(0.05)	(0.31)
Money management		−0.38***	−0.31***	−0.23***	1.87***
		(0.09)	(0.08)	(0.07)	(0.42)
Constant		4.23***	−0.00	–	−8.43***
		(0.74)	(0.73)	–	(2.95)
Credit union dummies		Yes	Yes	Yes	Yes
Method		OLS	Probit	Ordered probit	OLS
Observations		425	424	425	425
R^2/Pseudo R^2		0.15	0.13	0.10	0.29

Standard errors in parentheses are heteroskedastic-consistent. The sample excludes those who responded 'My partner looks after all the household money except my personal spending' or 'I am given a housekeeping allowance. My partner looks after the rest of the money'. The reference category is aged 18–24 with no educational qualifications. 'debt/income' = sum of all arrears, credit card debts, overdrafts and loans divided by weekly household income, 'Uses high-interest financing' = whether borrowed from an internet moneylender, high street loan shop, home collection loan agency or from an unauthorised moneylender in the last 3 years. 'Number of different borrowers' = the number of different ways money was borrowed in the last 12 months. 'Net worth' = sum of household financial assets and property value(s) minus mortgage debt, unsecured debt and arrears. Where net worth was negative, −log(−net worth) was used in the dependent variable.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

way. The effect of education on net worth is more pronounced in the restricted sample.

It could plausibly be argued that variation in money management skills—awareness of financial situation, anticipating bills and budgeting—could be the result of different levels of financial difficulties as opposed to their cause. If this was the case then the models underlying previous estimates would be misspecified necessitating the use of instrumental variables. The chosen instrument should not have a direct effect on the outcome variable but only an indirect effect through money management skills. The instrument used in the next sensitivity analysis (Table 7) is the religion respondents were brought up in and its use is motivated by a recent literature on religion and economic outcomes. It has been found that Catholics, more so than Protestants, believe strongly that instilling the "virtue" of thriftiness in children is important and greater religiosity is associated with a greater emphasis on this importance (Guiso et al., 2003). Also, Catholic households attach significantly more importance to being careful with money (Renneboog & Spaenjers, 2012).[13]

In our sample, the variation of money management skills with religion can be seen in Fig. 3 with the Protestant religious classification further broken down into its various constituent denominations. Catholics have slightly better money management skills than Presbyterians who, in turn, have superior money management skills to those in the Church of Ireland. Methodists, Other Protestants and those not reared in any religious faith[14] all have better money management skills than the first three groupings.

Estimation is then carried out by two-stage least squares[15] and the second stage results are presented in Table 7. In all four regressions, coefficients for *money management* have the same sign as before but magnitudes are much larger than previous estimates. All results are statistically significant although this result is more marginal where net worth is the dependent variable. As before, *numeracy* does not affect any of the financial outcomes in a beneficial way but now also increases the number of lenders as well as increasing the debt-to-income ratio.

Renneboog and Spaenjers (2012) indicate that religion impacts on household finance not only through its indirect effect on thrift but also through its effect on other economic attitudes such as social trust, time discounting and risk preferences. As these variables are not included in the regression thus far then potentially our instrument is correlated with the error tem and is hence invalid. We first test the validity of using religion as an instrument using a statistical test. Where possible,

[13] See also the seminal work on religion and economic growth (Weber, 1905) as well as more recent studies (Arruñada, 2010; Keister, 2003).

[14] This group includes one non-Christian. Non-Christians make up a very small proportion of the NI population—only 0.9% in 2011.

[15] IV ordered probit was estimated using Roodman (2007).

Table 7
Instrumental variable regressions explaining financial outcomes (those with no household financial responsibility are excluded).

		Dependent variable			
Variables		log(debt/income)	Uses high-interest financing	Number of different lenders	log(net worth)
Female		0.10	−0.09	−0.06	0.72
		(0.18)	(0.14)	(0.12)	(0.82)
Age:	25–34	−0.19	−0.42	−0.48**	0.64
		(0.44)	(0.29)	(0.25)	(1.77)
	35–49	0.25	−0.20	−0.25	0.02
		(0.39)	(0.29)	(0.25)	(1.60)
	Over 50	0.18	−0.40	−0.44**	5.13***
		(0.39)	(0.25)	(0.22)	(1.55)
Has partner		0.03	0.03	−0.04	0.50
		(0.21)	(0.16)	(0.16)	(0.95)
Household size		0.00	−0.03	−0.03	0.14
		(0.07)	(0.05)	(0.05)	(0.32)
Homeowner		−0.07	−0.60*	−0.26**	4.48***
		(0.22)	(0.31)	(0.12)	(1.01)
log income		−0.15	0.26***	0.24***	−1.18
		(0.18)	(0.08)	(0.08)	(0.72)
Education:	GCSEs	−0.11	0.21	−0.12	2.86**
		(0.25)	(0.19)	(0.23)	(1.16)
	Work-related	0.04	0.10	0.11	2.05
		(0.33)	(0.26)	(0.22)	(1.33)
	A-levels	−0.09	0.04	−0.06	2.29
		(0.32)	(0.27)	(0.30)	(1.52)
	Degree level	−0.29	0.06	0.17	2.25
		(0.35)	(0.42)	(0.44)	(1.70)
Numeracy		0.23**	0.00	0.09*	−0.12
		(0.09)	(0.10)	(0.05)	(0.39)
Money management		−1.69**	−1.13***	−1.05**	4.94*
		(0.65)	(0.34)	(0.41)	(2.99)
Constant		7.73***	2.56*	–	−16.64**
		(1.89)	(1.43)	–	(8.38)
Credit union dummies		Yes	Yes	Yes	Yes
Method		2SLS	IV Probit	IV Ordered probit	2SLS
Observations		425	425	425	425
Over-identification test		1.66	2.07	–	4.60

Reported overidentification test statistics are (2SLS) Sargan–Hansen chi-square test of overidentifying restrictions. The joint null hypothesis is that the instruments are uncorrelated with the error term and are correctly excluded from the estimated equation. (IV Probit) Amemiya–Lee–Newey minimum chi-square test of overidentifying restrictions. Standard errors are heteroskedastic-consistent except IV Probit.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

a test for valid instruments is included in Table 7 to jointly test the instruments are uncorrelated with the error term and are correctly excluded from the estimated equation.[16] In all cases, the null hypothesis of valid instruments is accepted. Secondly, we rerun the regressions including variables capturing social trust, time discounting and risk preferences.[17] These variables generally were statistically insignificant and conclusions did not change. These results are not included here but are available on request.

5. Policy implications

For our sample of individuals with financial difficulties and from socially-disadvantaged areas, our results show that money management skills significantly positively affect a broad range of different financial outcomes—debt-to-income ratios, the use of high-interest financing, having multiple loans and financial net worth. The particular skills we have focused on—financial awareness, managing bills and budgeting—have all been identified as important skills in the literature. In an environment where individuals are under constant financial pressure, these basic skills reduce the tendency to make poor financial decisions and encourage better organisation of finances. On the other hand, numeracy does not influence financial outcomes for this cohort. Many authors have highlighted that low levels of numeracy imply an inability to perform interest rate calculations resulting in a higher frequency of high-cost borrowing methods, higher debt burdens, greater fees and defaults. In our sample, many lack the ability to correctly calculate interest repayments but have a more general sense of high versus

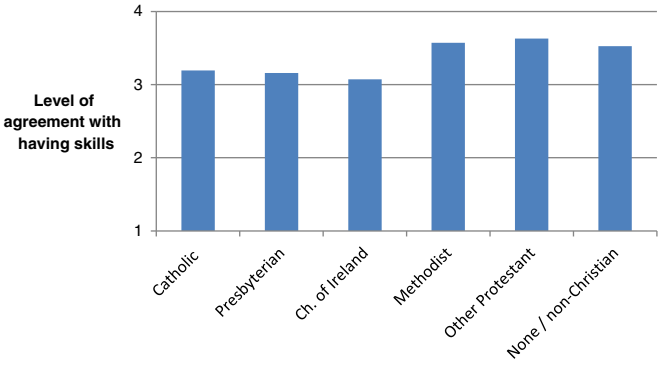

Fig. 3. Average money management skills by religion brought up in. Note: 1 = Strongly disagreed with having skills 5 = Strongly agreed with having skills

[16] The overidentification test for IV probit used is from Baum, Wiggins, Stillman, and Schaffer (2006).

[17] The variables were: Social trust ('Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?' Responses scaled 1 to 5), Time discounting factor (based on a series of seven questions asking 'Would you prefer £1500 now or XX one month from now') and Risk Preferences (' Are you a person that is fully prepared to take financial risks or do you try to avoid taking financial risks?' Responses scaled 1 to 5).

low cost sources of borrowing. Our interpretation is that combined with good money management skills, a general sense of borrowing costs rather than an ability to accurately calculate interest repayments is sufficient for better financial outcomes.

Reviews of financial literacy programmes conclude that their impacts tend to be small at best especially among those with low education. For those over-indebted at credit unions, we have shown that a financial intervention should focus particularly on money management skills. Financial education programmes focusing on money management skills have been shown elsewhere to be effective in reducing debt (Agarwal et al., 2010; Collard et al., 2012). Personal financial management software informed by findings in the behavioural finance literature could also be employed to encourage attention and budgeting (Zinman, 2014). On the other hand, improving numeracy would be more challenging among this group who have low education levels relative to the general population and, on the basis of our empirical results, would be ineffective.

A core operating principle of credit unions is financial education of their members in order to promote thrift and the wise use of credit. Although most British and Irish credit unions are engaged in some form of financial education in the community, the majority are restricted to low-commitment activities with marginal impact (Byrne, Power, McCarthy, & Ward, 2010). This study would indicate how an effective programme should be structured to maximise impact. A programme would promote awareness of finances, managing bills and budgeting and would target those in financial difficulties as programmes need to be targeted at specific audiences with needs that are currently pressing (Agarwal et al., 2009, 2010; Lusardi & Mitchell, 2014; Martin, 2007). Credit unions across the world are important players in national financial literacy strategies. For example, in Great Britain, the Archbishop of Canterbury has established a task group to promote credit unions as an alternative to payday lenders in socially disadvantaged areas. A key aim of the Church of England Task Group is to also have an impact on attitude to money through financial education. In Europe, the European Network of Credit Unions is represented in European Commission consultative groups such as the Expert Group on Financial Education. Enhancing members' financial literacy is a crucial part of the work of European credit unions with this to be achieved through member based programmes and through national partnership arrangements. In the US, the Credit Union National Association (CUNA), the trade association for the nation's 6500 credit unions, is a core member of the Treasury Department's Financial Literacy and Education Commission. Promoting access to affordable products and financial literacy for all Americans, especially in disadvantaged communities is a primary objective of CUNA and its member credit unions. The 2010 enactment of the Dodd-Frank Wall Street Reform and Consumer Protection Act in the US has put an even greater policy emphasis on the promotion of financial education.

6. Conclusions

Among the key components of financial literacy are numeracy and money management skills. Our study examines the relative importance of numeracy and money management skills in the determination of consumer debt and household net worth among credit union members in socially disadvantaged areas.

The main finding from our analysis is that, for this financially vulnerable group, money management skills are important determinants of consumer debt behaviour and household net worth but that numeracy has almost no role to play. In an environment where individuals are under constant financial pressure, these basic skills reduce debt-to-income ratios, the use of high-interest financing, the number of different lenders used and improve household net worth. These findings are found to be robust when the sample is reduced to only those who have a clear role in household financial decision-making and also when controlling for potential endogeneity. Other authors have highlighted the important role of numeracy in interest rate calculations and debt outcomes. We find in our sample that many cannot correctly calculate interest repayments but can distinguish between high and low cost sources of borrowing. Therefore we conclude that when combined with good money management skills, a general sense of borrowing costs rather than an ability to accurately calculate interest repayments is sufficient for better financial outcomes.

Credit unions are a significant provider of financial services to socially disadvantaged communities worldwide with one in twelve of the global population credit union members. They have a core operating principle of financial education but this is largely restricted to low-commitment activities with marginal impact. Credit unions are in a position to structure an effective programme targeted at their members in financial difficulties by promoting awareness of their financial situation, by encouraging them to manage bills more effectively and by improving budgeting skills. Recent studies suggest that such a programme could potentially utilise behaviourally-informed personal financial management software to provide a simple and cost-effective intervention.

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