Research findings

Modelling the impact of numeracy on financial capability

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Chapter 1: Executive Summary

Background

This report details the findings from statistical modelling applied to the 2017 Numeracy Survey dataset, conducted by Harris Interactive on behalf of the Money Advice Service. The research was required to fill evidence gaps around the role of numeracy skills in influencing financial capability. The overarching objective was to ***"To better understand the relationship between financial numeracy and financial capability amongst working age adults in the UK"***

A survey was designed to test numeracy skills alongside financial capability levels. Three dependent financial capability factors were used as the dependent variables. A series of regression models were then run to test the influence of numeracy on financial capability outcomes, alongside a number of other 'control' variables. The control variables comprised the key components of financial capability established, from previous research: demographics, income, mindset and connection.

The three dependent variables used were:

- Keeping up with bills and credit commitments
- Regular savings behaviour
- Amount held in savings

An overall composite score for numeracy was created as an input into the models. Additional models were run where numeracy was categorised into three different aspects of numeracy, determined by the questions asked. The three aspects tested were:

- Money calculations
- Finding numbers on payslips and bank statements
- Financial concept calculations

Control variables were added to the models in different combinations, with 14 models produced in total for each dependent variable, and for numeracy in two ways (overall numeracy and divided into the three aspects). This led to total of 84 different models, with the influence of numeracy assessed within each.

Key findings

Overall numeracy is a significant predictor of keeping up day to day but the influence weakens as more control variables are added

- The explanatory power of the models (Nagelkerke R^2) increases as further variables are added to the model, as would be expected.
- However, numeracy is insignificant in the models with greater explanatory power that include tenure, income and demographics as the control variables
- Including confidence and attitudes in the models also reduces the influence of numeracy.
- Numeracy remains statistically significant when perseverance is included, as it does when connection, connectivity and savings goals are added to the model, individually or all together. This suggests that good numeracy drives keeping up behaviours regardless of other control components for example perseverance and connection.

Overall numeracy is a significant driver of saving regularly, and remains so when a range of variables are included in the models.

- Explanatory power of the models improves as further variables are included, most notably with demographics and savings goals.
- However, attitudes combine with confidence to push out the significance of numeracy (p=0.93).
- When numeracy is broken down into different aspects, only financial concept calculations remain significant when control variables are included in the model. This indicates that a higher ability in applying financial concepts impacts savings frequency, regardless of socio demographics.

Overall Numeracy is a significant predictor of savings amounts in all models

- The models for 'amount in savings' have consistently the greatest explanatory power when compared to the other financial capability dependent variables examined (R^2>0.2).
- Overall numeracy is a significant driver of amount in savings, regardless of tenure, income, demographics and all other financial capability components tested.
- Financial concept calculations is consistently significant in the modelling.
- Only a very low score for money calculations was significant against high scores. This suggests only those with very low scores have lower outcomes and that basic ability to do money calculations has a positive impact on amount held in savings. This holds true when other factors are added as control variables to the model, including income.

Ability to do financial concept calculations has the strongest impact in driving overall numeracy to predict financial capability

- Financial concept calculations questions consistently predict good financially capable outcomes - keeping up, savings regularly and amount in savings.
- These questions are therefore considered the key aspect of numeracy in driving financially capability.
- This aspect of numeracy remains a consistently significant driver for amount in savings when the full range of control variables are included in the modelling. This produced the most perfect model.

Chapter 2: Introduction

Background to Research

The Money Advice Service (MAS) is committed to supporting the vision to improve the management of money by the UK population as set out in the Financial Capability Strategy for the UK in 2015. For MAS, this involves **producing and publishing a 'deep dive' to establish the importance of numeracy on financial capability**.

MAS commissioned Harris Interactive to undertake quantitative research to investigate the relationship between numeracy and financial capability. This was to reduce the existing knowledge gaps and explore key themes identified by earlier work related to financial numeracy. This earlier work consisted of

- evidence from a comprehensive review of the available literature[1],
- interviews with stakeholder and numeracy experts[2]; and
- a 'Deep Dive' secondary analysis of other existing data sources[3].

The results of the quantitative research are ultimately required to:

"To better understand the *relationship* between financial numeracy and financial capability amongst working age adults in the UK"

The findings from this work feed into an overall Money Advice Service summary report Numeracy and Financial Capability – Exploring the links.[4]

Research Objectives

The key objectives of the research were to understand:

- what the relationship is between numeracy and financial capability
- what aspects of numeracy are most important for financial capability
- if it is possible to be functionally innumerate yet financially capable
- whether it is reasonable to hypothesise a causal relationship between financial numeracy and financial capability
- whether numeracy (and by extension financial capability) differs by factors such as;
  - Gender
  - Confidence
  - Level of education
  - Personal attitudes and motivations
  - Ethnicity
  - MAS Segments.

Findings from this quantitative research will feed into MAS's broader work related to numeracy and financial capability. Together they will help explain the relationship between numeracy and financial capability, and will help to establish the implications for stakeholders such as government, educators, employers, financial services providers and the third sector.

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[1] Numeracy Literature Review LINK TO ADD

[2] Stakeholder Research: Numeracy and Financial Capability LINK TO ADD

[3] Numeracy Deep Dive LINK TO ADD

[4] Numeracy and Financial Capability – Exploring the links LINK TO ADD

Research Hypotheses

Analysis of existing datasets[5] identified some hypotheses that could benefit from further exploration.

These were:

- Less educated individuals are associated with greater financial distress
- In general, females are more likely to have lower numeracy skills than males
- Lower numeracy skills are associated with greater worries for basic costs of living
- Lower numeracy skills are associated with lower confidence in managing money
- Lower numeracy skills are associated with lower levels of progression within education
- Higher numeracy skills are associated with a greater knowledge of financial matters.

The hypotheses accepted by MAS include:

- **Managing day to day:** lower numeracy is linked to lower effectiveness in keeping track of finances
- **Planning ahead:** higher numeracy is associated with setting financial goals
- **Confidence**: lower numeracy is linked to lower confidence in managing money
- **Choosing products**: higher numeracy is linked to using best-buy literature when choosing products.

In order to fully assess the impact of numeracy skills on financial capability and deliver on these objectives, it is necessary to model the survey data, which allows us to control for a range of influencing factors, such as income demographics, and attitudes. The purpose of this report is to detail the modelling delivered by Harris Interactive. This report details the design and methodology used to deliver the Adult Numeracy and Financial Capability Survey 2017, the accompanying modelling and provides technical appendices.

This report does not examine the implications for stakeholders such as government, educators, employers, financial services providers and the third sector. These implications are discussed in the Numeracy and Financial Capability – Exploring the links.[6]

[5] MAS Numeracy Deep Dive LINK TO ADD

[6] Numeracy and Financial Capability – Exploring the links

Chapter 3: Methodology

Fieldwork & Sampling

Fieldwork dates for the research were 28th March to 10th April 2017.

Harris Interactive delivered an online quantitative self-completion questionnaire using the Toluna access panel, supplemented by face to face interviews conducted in street. Toluna has 400,000 online panellists in the UK across a spectrum of demographics, but there were some segments of the population that were particularly important for this research, that would be under-represented for an online only approach. In street interviewing allowed us to cover key demographic groups where online access panel sample is more limited: Northern Ireland residents and Black, Asian and Minority Ethnics (BAME) across the UK.

Combining two data collection modes provided greater balance to the overall project. Widening the sampling population beyond online panels exclusively increased the chance of any individual appearing in our sample thereby improving the statistical robustness of results. The sample for each mode was balanced (by age, gender, social grade and employment status) to enable any modal effects to be assessed. As the vast majority of working age people regularly access the internet, it was accepted that the majority of interviews should derive from the more cost effective online access panel.

2,086 completed questionnaires were achieved in total, comprising 1,839 online panel interviews 247 completed face to face with randomly intercepted members of the public in the regions and locations listed below.

Table 3.1

REGION	LOCATION
North East	Darlington
North West	Manchester & Stockport
Yorkshire & Humberside	Leeds
East Midlands	Nottingham
West Midlands	Lichfield
East	Cambridge
London	Islington
South East	Brighton
South West	Taunton
Northern Ireland	Belfast & Ballymena
Scotland	Glasgow & Berwickshire
Wales	Cardiff & Newport

- The interviewers undertaking the face to face interviews varied their positioning throughout the days in the above locations in areas of high footfall (e.g. shopping centres) to ensure that the correct mix of respondents were achieved and quotas were adhered to, limiting over sampling of groups and reducing the likelihood of biases being introduced.
- Minimum quota requirements were set to ensure representation by age, gender, social grade, ethnicity and working status within each region (see technical appendix for example quota requirements for the face to face fieldwork).
- For online fieldwork, interlocking quotas were set by age and region, with additional rim quotas by government region aligned to the face to face quota requirements.

The following number of interviews were achieved by region:

Table 3.2

REGION	ONLINE	FACE TO FACE	TOTAL
North East	85	12	97
North West	197	22	219
Yorks & Humberside	144	16	160
East Midlands	130	15	145
West Midlands	155	17	172
East	159	16	175
London	223	25	248
South East	241	23	264
South West	143	15	158
Northern Ireland	65	39	104
Scotland	186	27	213
Wales	111	20	131
Total	1,839	247	2,086

Weighting

The data was weighted to be representative of the UK working age population (18-65yrs), by age, gender and region, based on government data (ONS). Interlocking weighting was used for age and gender and rim weighting was used for region. Minimal weighting was required for age and gender due to the quota controls.

Two further variables were identified as important to be controlled for:

Housing tenure – to correct for a slightly higher socio-economic status in the data set. This was also used in the weighting of the Financial Capability Survey 2015[7]; and

Maths GCSE attainment – to correct for the notably higher educational attainment seen in the research sample. This bias was present in both modes of research, but was notably higher for the online sample.

The final weighting efficiency was 58.2%. The weighting profiles used were as follows:

Table 3.3

	MALE	FEMALE
18-24	7.4%	7.1%
25-34	11.2%	11.2%
35-49	16.1%	16.4%
50-64	15.1%	15.6%

Table 3.4

NET REGIONS	
North	23.1%
Middle	24.9%
South	36.2%
Wales	4.6%
Scotland	8.4%
Northern Ireland	2.8%

NB: North is a net of 'North East', 'North West' and 'Yorkshire & Humberside'. Middle is a net of 'East of England', 'East Midlands' and 'West Midlands'. South is a net of 'London', 'South East' and 'South West'.

[7] https://www.fincap.org.uk/financial-capability-survey

Table 3.5

MATHS GCSE ATTAINMENT	
Yes	46%
No/Don't know	54%

NB: Maths attainment is based on an extrapolation of the 2011 Skills for Life amongst working age people in England – where 44% of 16-65 year olds claimed to have Maths GCSE grade C or above. Between 2011 and 2017 the % of 16 year olds achieving Maths GCSE grade C or above increased from 59% to 61%. A proportional estimate for 2017 was calculated, by considering that the 2017 population includes a greater proportion of the younger cohort who are much more likely to have the qualification.

Table 3.6

TENURE	
Own net	49.9%
Rent net	36.1%
Other	14%
D/K & Not Ans	1%

NB: Own is a net of 'Own outright' and 'Own with a mortgage'. Net is a net of 'Rent from a private landlord' and 'Rent from a local authority and Housing Association'. Other is a net of all other codes.

Data Imputation

MAS identified from the outset that a key requirement for this project was to be able to analyse results by income and savings, integral variables when assessing financial capability but that tend to result in higher refusals or non-response. Respondents could give an actual amount, or select from a range of bands, to answer these questions. Harris Interactive applied the multiple imputation[8] technique to impute the missing responses for those that still said 'don't know' or refused to answer the band prompts.

The amount of income and savings data which needed to be imputed was 13% and 22% respectively. This is in line with levels of missing data in other large scale surveys[9] and is, within acceptable bounds to ensure reliability of the predicted values.

The following table details the variables used in the income and savings data imputation. The approach used was broadly similar to that used for the UK Financial Capability Survey 2015.[10]

Table 3.7

SAVINGS IMPUTATION VARIABLES	INCOME IMPUTATION VARIABLES
Which, if any, of the following is the highest educational or professional qualification you have obtained.	Which, if any, of the following is the highest educational or professional qualification you have obtained.
Which one of the following best describes your current situation? (work status)	Which one of the following best describes your current situation? (work status)
Age & Gender	Age & Gender
I am too busy to sort out my finances at the moment	
When it comes to money I prefer to live for today rather than plan for tomorrow	
Nothing I do will make a difference to my financial situation	
It is important to shop around in order to make your money go further	
I often buy things on impulse	
People save money for different reasons. What are the main reasons why you have saved money in the last two years?	
Which of these best describes how often you save money? By 'saving money', we mean putting money aside into a savings account.	

[8] A Proportional Odds Model was applied in the Multiple Imputation Chained Equations model

[9] For example, Jenkins (2010) gives the example of the 15.1% missing income data in wave 1 of the British Household Panel survey. Similar levels were seen in the labour Force Survey in 2016 (ONS 2016)

[10] https://www.fincap.org.uk/financial-capability-survey

Quality Control Checks

Prior to starting analysis, Harris Interactive undertook a series of quality control checks on the data to ensure the online data had been collected in an acceptable manner. Any cases which failed two or more of the following check criteria were examined and where necessary, removed from the dataset.

The criteria used as part of the quality control checks were:

- length of the overall interviews being too quick (more than 40% less than the average length of interview);
- length of time taken to undertake the numeracy question sections being too quick (12 questions being completed in less than 1 minute);
- flatlining responses to the attitudinal statements at ME20 (savings behaviour);
- giving contradictory responses (e.g. being social grade A, in full time employment but earning £8,000 pa); and nonsense in verbatim responses.

Alongside the above checking criteria, digital fingerprinting was in place to prevent duplication of completions from the same IP address.

Chapter 4: Measuring Numeracy

Survey design

The survey was designed to be an average length of 15 minutes, considered the optimum length to cover the content required whilst minimising survey abandons. The financial capability framework for adults was reviewed to ensure that each construct of financial capability (well-being, mindset, connection) alongside ability, would be covered in the survey design.

The key outcomes of financial capability were divided into two core areas:

- Managing money day to day
- Long term savings

Questions that would provide appropriate measures for the modelling were selected from the Money Advice Service's 'Financial

Capability in the UK 2015' survey. The Measuring Financial Capability – Identifying the Building Blocks[11] study was also consulted to identify the key components that best explained these financially capable outcomes.

The topics and questions to be used were also informed by MAS's wider work related to numeracy, specifically:

- evidence from a comprehensive review of the available literature[12];
- interviews with stakeholder and numeracy experts[13]; and
- a 'Deep Dive' secondary analysis of other existing data sources[14].

Designing the Numeracy Questions

Our starting point for measuring numeracy was a definition of numeracy developed in collaboration with National Numeracy. This and the definition of financial capability are shown below.

The following past surveys were consulted when considering the questions to measure numeracy:

- MAS Financial Capability in the UK Survey 2015[15]
- MAS Financial Capability of Children and Young People and their parents Survey 2016[16]
- OECD/INFE 2015 Survey of Adult Financial Literacy and Capability[17]
- National Numeracy Skills Check

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[11] *Measuring financial capability – identifying the building blocks* (Money Advice Service, 2016).

[12] Numeracy Literature Review LINK TO ADD

[13] Stakeholder Research: Numeracy and Financial Capability LINK TO ADD

[14] Numeracy Deep Dive LINK TO ADD

[15] https://www.fincap.org.uk/financial-capability-survey

[16] https://www.fincap.org.uk/document/WDW-uiYAAKhFIOBr/young-adults-financial-capability

[17] *OECD/INFE International Survey of Adult Financial Literacy Competencies,* OECD (2016)

Questions were selected that incorporated different aspects of numeracy. One challenge of research in this area is that terminology varies between different studies. For the purposes of this research we considered that there was a difference between understanding financial concepts (which we considered as "financial literacy") and being able to make calculations that also involved the use of financial concepts (which we considered to be one aspect of numeracy).

It was agreed in the initial stages of project development that financial literacy would not be under scope. Although some questions were included to test reading of numbers and applying concepts such as interest rate and inflation terminology, financial literacy was not covered in detail as numeracy was the core focus.

It was also important that the questions covered a spread of easy to more difficult, as previous numeracy studies tended to result in high rates of correct answers. One new question was therefore designed by Harris Interactive to test a higher level of numeric ability.

12 questions were included in the final survey, which could be divided into 4 groups:

1. Reading a bus timetable
2. Money calculations
3. Finding numbers on statements & payslips
4. Financial concept calculations

The table below shows how each question included in the survey was sourced and grouped.

Table 4.1

SURVEY NUMBERING	QUESTION WORDING	SOURCE	GROUP
MB8a	What time is the last bus Susie can catch to get to work on time?	National Numeracy Skills Check	Bus timetable (BT)
Mb8b	What time will Susie arrive at work?		
MB9	Susie is paid £9.00 an hour. She works four and a half hours each day. How much does Susie earn each day?		Money Calculations (MC)
MB10	Susie gets a 5% pay increase. What is her new pay per hour?		
MB11	Susie buys a laptop costing EUR144 from a company in Germany, at an exchange rate of £1 = EUR1.20. What is the cost in pounds?		
MC11	A mobile phone in Shop A is £140 and is currently reduced by 20%, whereas the same phone is £160 online, with a 30% reduction and no delivery cost. Which one is cheaper?	Harris Interactive	
MD13	Looking at this example of a bank statement, how much money was in the account at the end of February?	Fincap Survey (N1)	Finding numbers on statements & payslips (FN)
MD13b	How much has Sally paid towards her retirement so far this year?	CYP Fincap Survey (YP23)	
MD13c	How much was Sally paid this month before any tax or deductions were taken?	CYP Fincap Survey (YP24)	
MD15a	Suppose you put £100 into a savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made?	Fincap Survey (N3)	Financial Concept Calculations (FCC)
MD15b	And how much would be in the account at the end of five years (remembering there are no fees or tax deductions). Would it be..?	OECD (QK6)	
MD14	If the inflation rate is 5% and the interest rate you get on your savings is 3%, will your savings have more, less or the same amount of buying power in a year's time?	Fincap Survey (N2)	

**MB8a & MB8b were not used as part of any index because in the early stages of the modelling, a high degree of correlation was found between the questions and it was found that if a respondent got MB8a correct, then they would almost certainly get MB8b correct therefore it was causing multi-collinearity, so they were removed from the modelling and to ensure complete comparability, they were removed from the subsequent indices in the analysis. Principle Components Analysis (PCA) was conducted to validate the groupings of the original 12 numeracy questions and showed that the bus timetable questions split out from the other 10 questions.*

Allocation of numeracy scores

For the purposes of the statistical modelling, a points-based system was established. This awarded scores based on the perceived difficulty of each of the ten questions. Perceived difficulty was defined by the 'pass rate' for each question. For example, if 90% of respondents answered a question correctly, then that question would be perceived to be a relatively easy question, while if only 20% of respondents answered another question correctly then that question would be perceived to be a relatively difficult question to answer.

Points were awarded using an inverse scoring method. For example, if 87% of respondents answered a question correctly, they were given a score of 1.3 /10 for their answer. If on another question only 25% of respondents answered correctly, then a respondent answering that question correctly was rewarded with a score of 7.5/10.

An overall numeracy score was calculated as follows and represented as a continuous variable, with a range of 0-30.

Overall Numeracy = ∑ (MC_Score, FN_Score, FCC_Score)

In addition, the overall scores for each of the three groups - Money Calculations (MC), Finding numbers on statements & payslips (FN) and Financial Concept Calculations (FCC) were calculated by adding up the respective scores for the questions contained within each group.

For example, **Money Calculations (MC) =** ∑ (Q1_Score, Q2_Score, Q3_Score, Q4_Score)

For the purpose of the three numeracy groups, the different levels of scores were divided into four categories, The distribution of scores within each group of questions were assessed to deliver robust bases and a broad spread across each category.

Table 4.2

MONEY CALCULATIONS (MC)	FINDING NUMBERS ON STATEMENTS & PAYSLIPS (FN)	FINANCIAL CONCEPT CALCULATIONS (FCC)
Scores 0 to 5 -> Very Low	Scores 0 to 4 -> Low	Scores 0 to 4 -> Very Low
Scores 5.1 to 8 -> Low	Scores 4.1 to 6.5 -> Medium	Scores 4.1 to 5.5 -> Low
Scores 8.1 to 11 -> Medium	Scores 6.6 to 10 -> High	Scores 5.6 to 9 -> Medium
Scores 11.1 to 16 -> High		Scores 9.1 to 14 -> High

Chapter 5: Modelling Approach

Regression Analysis

Regression analysis was conducted to determine whether the predictor variable of Overall Numeracy, and the index scores for the three numeracy groups of Money Calculations (MC), Finding numbers on statements & payslips (FN) and Financial Concept Calculations (FCC), all had an impact on Financial Capability.

The table below shows the three questions which were, individually, used to represent Financial Capability – the dependent variables in the models.

Table 5.1

QUESTIONS USED TO REPRESENT FINANCIAL CAPABILITY		
KEEPING UP MF29. Which of the following statements best describes how well you are keeping up with your bills and credit commitments at the moment?	SAVING FREQUENTLY ME23. Which of these describes how often you save money?	AMOUNT IN SAVINGS ME25. Could you estimate the total (savings and investments)?
I am keeping up with all bills and commitments without any difficulties I am keeping up with all bills and commitments, but it is a struggle from time to time I am keeping up with all bills and commitments, but it is a constant struggle I am falling behind with some bills or credit commitments I am having real financial problems and have fallen behind with many bills or credit commitments I don't have any bills or credit commitments Don't know Prefer not to say	Every month Most months Some months, but not others Rarely/never Don't know	Nothing £100 or less £100 - £499 £500 - £999 £1000 - £4999 £5000 - £9999 £10,000 - £14,999 £15,000 - £19,999 £20,000 - £29,999 £30,000 - £39,999 £40,000 - £49,999 £50,000+
The representation of these dependent variables in the modelling was…		
An ordinal variable where: I am having real financial problems and have fallen behind with many bills or credit commitments I am falling behind with some bills or credit commitments I am keeping up with all bills and commitments, but it is a constant struggle I am keeping up with all bills and commitments, but it is a struggle from time to time I am keeping up with all bills and commitments without any difficulties Note: Respondents who stated anything else were excluded from this model.	A binary variable where: 1 = Every month, 0 = All other answers	An ordinal variable where: Nothing £1-£499 £500-£999 £1,000-£4,999 £5,000-£9,999 £10,000+

Two forms of Regression models were run for this study, depending on the type of dependent variable:

- Binary logistic regression - Frequency of saving
- Ordinal logistic regression – Keeping up with bills and Amount in savings and investments

The categorical variables used as the dependent variables in the regression modelling are detailed in the Appendices.

In addition to the predictor variables of numeracy there was a range of further predictor variables included in the models, in different combinations, to see if the impacts of numeracy still held when further variables were included. These are our 'Control variables': Tenure (TEN), Income (INC), Demographics (DEM), Confidence (CONF), Attitudes (ATT), Perseverance (PER), Connection (INF), Savings Goals (SAV) and Connectivity (CTN).

Tenure is a useful indicator of broad socio economic status and life stage, and was included in all models. Additional control groups were then added in sequence, in different pairings that encompassed the wellbeing; mindset and connection components of financial capability. This ensured that each component was assessed, alongside numeric ability and our socio demographic proxy 'tenure' during the modelling analysis.

The full range of models run, for each dependent variable, is summarised below, with explanations and which questions are included in each group of control variables detailed in the appendices.

Table 5.2

CONTROL VARIABLES INCLUDED IN MODELS	DEPENDENT FINANCIAL CAPABILITY (FC) VARIABLE		
	Keeping Up	Saving frequently	Amount in Savings
None		FC = Overall numeracy FC = MC + FN + FCC	
Tenure		FC = Overall Numeracy + TEN FC = MC + FN + FCC + TEN	
Tenure & Income		FC = Overall Numeracy + TEN + INC FC = MN + FN + FCC + TEN + INC	
Tenure & Demographics		FC = Overall Numeracy + TEN + DEM FC = MN + FN + FCC + TEN + DEM	
Tenure & Income & Demographics		FC = Overall Numeracy + TEN + INC + DEM FC = MN + FN + FCC + TEN + INC + DEM	
Tenure & Confidence		FC = Overall Numeracy + TEN + CONF FC = MN + FN + FCC + TEN + CONF	
Tenure & Attitudes		FC = Overall Numeracy + TEN + ATT FC = MN + FN + FCC + TEN + ATT	
Tenure & Confidence & Attitudes		FC = Overall Numeracy + TEN + CONF + ATT FC = MN + FN + FCC + TEN + CONF + ATT	
Tenure & Perseverance		FC = Overall Numeracy + TEN + PER FC = MN + FN + FCC + TEN + PER	
Tenure & Connection (info sources)		FC = Overall Numeracy + TEN + INF FC = MN + FN + FCC + TEN + INF	
Tenure & Connectivity (digital devices)		FC = Overall Numeracy + TEN + CTN FC = MN + FN + FCC + TEN + CTN	
Tenure & Savings goals		FC = Overall Numeracy + TEN + SAV FC = MN + FN + FCC + TEN + SAV	
Tenure & Perseverance & Savings Goals & Connection & Connectivity		FC = Overall Numeracy + TEN + PER + SAV + INF + CTN FC = MN + FN + FCC + TEN + PER + SAV + INF + CTN	
All control variables		FC = Overall Numeracy + TEN + INC + DEM + CONF + ATT + PER + SAV + INF + CTN FC = MN + FN + FCC + TEN + INC + DEM + CONF + ATT + PER + SAV + INF + CTN	

The equations describe the two models that were run for each of the three dependent variables and 14 control groupings for 1) Overall numeracy and 2) Three numeracy groups.

The scores for the individual groups were used to highlight which aspects of numeracy most strongly contribute to good financial capability outcomes. In total, 84 models were run which comprise the focus of this report.

Predictor/control variables used in the modelling

For categorical predictors, it is necessary to select one category as a reference point. For gender, for example, we compare the effect of being male vs being female.

The B coefficients for categorical variables displayed in the logistic regression tables are in relation to the reference category. For Gender, as an example, where Male = 0 and Female = 1, if we set Female as the reference category only the Male 'B' coefficient will be displayed. In the Frequency for Savings logistic regression table controlled for Tenure and Demographics the following Male 'B' coefficient was displayed:

	B Coefficient	P Value
Male	0.179	0.097

The negative Male B coefficient suggests that Males are less likely to be saving on a regular basis compared to Females.

For variables with more than two categories, for instance Money Calculations (MC) has four categories:

Very Low, Low, Medium and High.

For each MC category we assign a code 0 (Not in this category) or code 1 (in this category) for each respondent:

	Not in this Category	In this Category
Very Low	0	1
Low	0	1
Medium	0	1

Note that the MC category 'High' is not listed, because in this example we have decided to choose 'High' as the reference variable. That is, if a respondent is code 0 (Not in this category) at Very Low, Low and Medium, then they must be in MC category 'High'.

The full questions and variables used in the modelling are detailed in the appendices.

All regression models were developed based on weighted data.

Interpreting linear regression models

The models provide a range of statistics which can be observed to identify the impacts of the independent driving variables, and the extent to which the overall model provides a good explanatory power. The statistics discussed in this report are introduced below.

Nagelkerke's Pseudo R Squared

The Nagelkerke Pseudo R Squared[18] statistic measures the explanatory power of each regression model.

When analysing data with a logistic regression, an equivalent statistic to the R-Squared reported in Ordinary Least Squares (OLS) Regression does not exist. The model estimates from a logistic regression are maximum likelihood estimates arrived at through an iterative process.

To evaluate the goodness of fit of logistic models, several pseudo R^2 have been developed. Most pseudo R^2 (including Nagelkerke's) report a range of values between 0 and 1 with higher values indicating better model fit. The pseudo R^2 provides an indication of the improvement of the model fit when controls are added. In the below example, we present the differences in the Nagelkerke R Squared from the tenure only model. With tenure included in all models, these differences help to indicate how much the introduced control variables increase that explanatory power of the model.

Table 5.3

REGRESSION MODEL	NAGELKERKE R SQUARE	DIFFERENCE FROM TENURE ONLY MODEL
No controls	0.03	
Tenure	0.12	0
Tenure & Income	0.16	0.04
Tenure & Demographics	0.18	0.06
Tenure & Income & Demographics	0.20	0.08
Tenure & Confidence	0.18	0.07
Tenure & Attitude	0.15	0.04
Tenure & Confidence & Attitude	0.21	0.10

Here, we can see that introducing confidence increases the model's explanatory power more than the inclusion of income.

It is important to note that bigger models will always have a larger R2 value but what is important is the scale of the change when variables are added.

NB: The full Nagelkerke model used is detailed in the Technical Appendices.

Beta (B) coefficients

These are values indicating the change in the likelihood (measured in log-odds) of the dependent variable occurring when a particular predictor is increased, holding any other variables in the model constant.

For categorical variables the B coefficient represents the difference in likelihood between the labelled group and a reference category (for example men compared to women), again holding constant any other variables in the model. These coefficients are said to be statistically significant when there is sufficient evidence to suggest they do not equal 0.

In this report, we present the beta coefficients for the numeracy variable in the equation for each model.

For overall numeracy which is included as a continuous variable, we are looking to check that the coefficients are positive, which indicates that the predictor variable of numeracy is having a positive impact on financial capability.

[18] Nagelkerke, N.J.D. (1991) "A note on a general definition of the coefficient of determination." *Biometrika* 78: 691-692.

Table 5.4

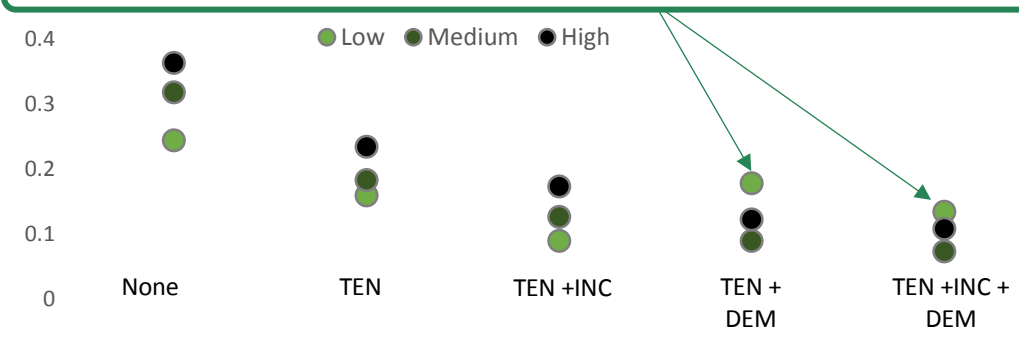
REGRESSION MODEL	BETA COEFFICIENTS
No controls	0.033
Tenure	0.022
Tenure & Income	0.013
Tenure & Demographics	0.015
Tenure & Income & Demographics	0.088
Tenure & Confidence	0.007
Tenure & Attitude	0.009
Tenure & Confidence & Attitude	-0.004

A negative value of -0.004 would indicate a model where numeracy is potentially moving in an unexpected direction, or there is high multi-collinearity

As further variables are added to the model the value of the numeracy group beta coefficients may change. In some instances, they will decline in value to a point (close to zero) suggesting that numeracy is no longer having an impact on Financial Capability after controlling for certain criteria.

For analysis of modelling including the numeracy groups, we look at the direction of the coefficients.

In the example below, the first 3 models appear in the expected pattern, but when demographics are introduced, the coefficients in the equations creating this model are no longer in order, with high in between medium and low.



Reference category: Very low

As we are comparing low, medium and high with **very low** numeracy, it is expected that the model should display positive coefficients.

Significance Level and P-Value

To conduct any statistical hypothesis test, a level of significance is set at which to accept or reject the null hypothesis. The level of significance is the probability of rejecting H_0 (null hypothesis) when it is actually true. This is commonly called a Type 1 error.

The choice of significance level is somewhat arbitrary, values of 0.1 (10%), 0.05 (5%) and 0.01 (1%) are common. In this report any coefficients that result in a P Value (Probability Value) that is less than or equal to 0.1 (10% Level of significance) have been highlighted. At this level, coefficients are of less statistical significance but their impact is still of notable interest can be identified.

The P Value, which is displayed in the regression tables, is a measure of how rare the survey result would be if H_0 was true.

- If the P Value is less than or equal to the level of significance that we are working to, there is enough evidence from the survey to reject H_0.

In this report, we present the p values for the numeracy variables in the model, with values below 0.1 indicating that the null hypothesis can be rejected and this variable has an impact on financial capability.

Table 5.5

REGRESSION MODEL	P VALUES
No controls	0.00
Tenure	0.00
Tenure & Income	0.00
Tenure & Demographics	0.00
Tenure & Income & Demographics	0.00
Tenure & Confidence	0.14
Tenure & Attitude	0.07
Tenure & Confidence & Attitude	0.40

This is an example of an output of the modelling of overall numeracy as a continuous variable. A single p value is displayed for overall numeracy.

Models where numeracy is insignificant are highlighted in red, such as 'tenure and confidence' (0.14) and 'tenure, confidence and attitudes' (0.40).

When assessing the numeracy groups, as with the beta coefficients, there are 2-3 sets of p values. These represent the variables as categorised for each numeracy group on page 12. A significant p value indicates where that category is different from the reference category. Models that include consistently significant p values (P<0.1) shows where numeracy results are significantly different from each other.

In the below example (where numeracy has been divided into four skill levels) significant p values indicate whether low, medium and high are significantly different from very low, which is the reference category.

	None	TEN	TEN + INC
Low	0.09	0.28	0.55
Medium	0.03	0.23	0.42
High	0.02	0.13	0.27

It is only the first model, with no controls, where numeracy is consistently significant.

(Reference category= Very low)

In each model presented in this report, we assess the p values in tandem with the pattern in the beta coefficients for the numeracy variables, alongside explanatory power (R squared) for the overall model.

Chapter 6: Numeracy and Keeping up day to day

Chapter Summary

Overall Numeracy is a significant predictor of keeping up day to day, until you control for Confidence

- The explanatory power of the models (Nagelkerke R^2) increases as further variables are added to the model, as would be expected.
- However, numeracy is insignificant in the models with greater explanatory power (tenure, income + demographics).
- Including confidence and attitudes in the models also reduces the influence of numeracy.
- Financial Concept Calculations have the strongest impact in driving numeracy to predict ability to 'keep up will bills and credit commitments'.

Modelling overall numeracy – key findings

- Overall numeracy is a significant driver when no control variables are included in the model (P=0.00), and remains significant ($p < 0.1$) when tenure, income, and demographics are all phased into the model.
- The confidence composite makes the greatest difference when added as an individual control variable, after tenure, but at this point, the impact of numeracy becomes insignificant (P>0.1) and the numeracy beta coefficient moves closer to zero.

Table 6.1

REGRESSION MODEL	NAGELKERKE R SQUARE	DIFFERENCE FROM TENURE ONLY MODEL	P VALUES	BETA COEFFICIENTS
Note on interpretation	$R^2 > 0.2$ indicates model has good explanatory power	A greater difference indicates greater explanatory power	Values below 0.1 show numeracy is significant	Values close to 0 mean numeracy has less impact in the model. Negative can indicate multi-collinearity
No controls	0.03		0.00	0.033
Tenure	0.12		0.00	0.022
Tenure & Income	0.16	0.04	0.00	0.013
Tenure & Demographics	0.18	0.06	0.01	0.012
Tenure & Income & Demographics	0.20	0.08	0.21	0.006
Tenure & Confidence	0.18	0.07	0.14	0.007
Tenure & Attitude	0.15	0.04	0.07	0.009
Tenure & Confidence & Attitude	0.21	0.10	0.40	-0.004
Tenure & Perseverance	0.13	0.01	0.00	0.016
Tenure & Connection	0.12	0.00	0.00	0.021
Tenure & Connectivity	0.12	0.01	0.00	0.019
Tenure & Saving goals	0.15	0.04	0.00	0.020
Tenure & Perseverance & Connection & Connectivity & Saving goals	0.17	0.06	0.01	0.013
All variables in the model	0.29	0.18	0.00	-0.017

Numeracy remains statistically significant when perseverance is included, as it does when connection, connectivity and savings goals are added to the model, individually or all together. This all suggests that good numeracy drives keeping up behaviours regardless of other control components for example perseverance and connection.

The strongest model appears when attitudes and confidence are included (R2 = 0.21), but this turns the overall numeracy score into a highly insignificant driver (p=0.4), and the coefficient is negative (B=-0.004). When controlling for level of confidence the influence of Numeracy is minimal suggesting that confidence influences keeping up behaviours.

Similarly, the 'all variables model' has high explanatory power (R2=0.29), but this model should be treated with caution because numeracy is moving in the wrong direction, with a negative coefficient (B=-0.017). It is important to note that when more variables enter the model, the coefficients can become unstable, particularly when there are highly correlated variables.

This suggests that numeracy is highly correlated with something else in the model. The p values and B coefficients from the results above suggests this to be confidence and attitudes (mindset).

Modelling aspects of numeracy – key findings

- Each of the three aspects of numeracy predict 'keeping up' to a statistically significant degree, but only when comparing those with the poorest scores (very low) with the highest numeracy scorers (the reference category in this model), and before any control variables are introduced into the model.
- Once control variables are introduced, the impact of 'Money calculations' and 'Finding numbers on bank statements and pay-slips' is no longer significant (P>0.1). Further, the coefficients for numeracy level in these groups show an unexpected pattern, mixing between negative and positive coefficients as control variables enter.

Money Calculations

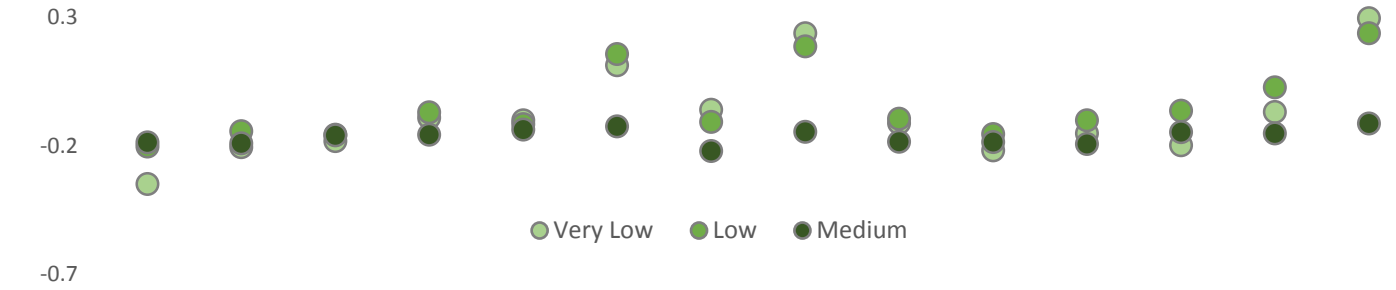
The p values in the tables displayed below, are rarely significant (p>0.1) and beta coefficients often in the wrong direction. This suggests that the ability to do money calculations does not have an impact on ability to keep track over and above other influencing factors such as income, demographics and the other key financial components of connection and mindset.

Table 6.2

P values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CONF + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Very Low	0.01	0.15	0.21	0.55	0.51	0.43	0.69	0.11	0.45	0.13	0.3	0.17	0.65	0.06
Low	0.11	0.27	0.23	0.61	0.39	0.23	0.41	0.16	0.47	0.23	0.44	0.63	0.83	0.09
Medium	0.12	0.12	0.2	0.22	0.29	0.32	0.08	0.25	0.14	0.13	0.12	0.24	0.23	0.38

Beta Coefficients



(Reference category= High)

Note on interpretation:

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'high' negative coefficients are expected, increasing from very low to medium. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

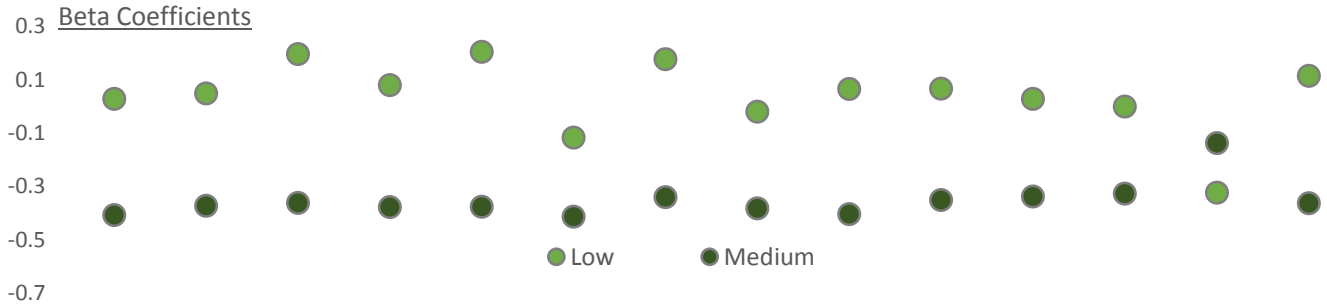
Finding Numbers on bank statements & payslips

The p values below are significant when comparing medium with the reference category 'high' but there is no significant difference in driving keeping up behaviour between low and high scorers, where some beta coefficients are positive (negative should be expected). This appears unintuitive and suggests that a basic ability to 'find numbers on bank statements and payslips' is not a key and consistent driver of keeping up behaviour.

Table 6.3

P Values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CONF + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Low	0.82	0.70	0.13	0.55	0.13	0.38	0.18	0.89	0.61	0.60	0.81	0.99	0.01	0.43
Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00



Reference category: High

Note on interpretation:

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'high' negative coefficients are expected, increasing from low to medium. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

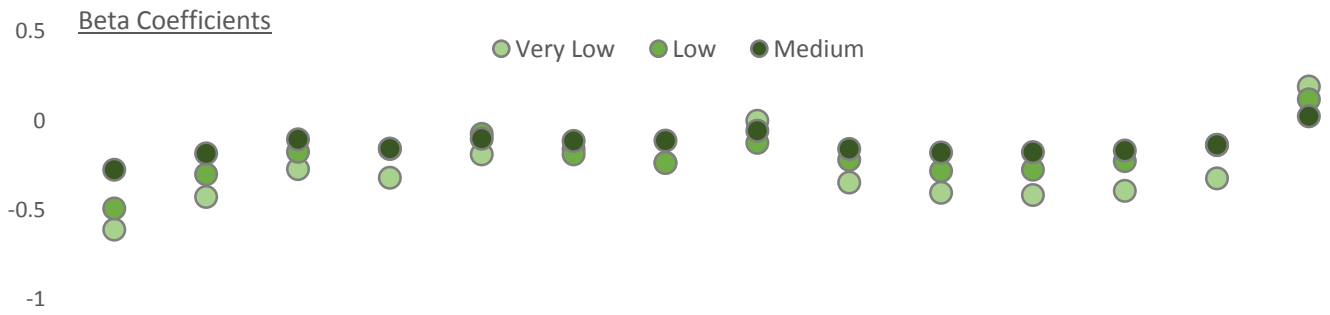
Financial concept calculations

Financial concept calculation questions have the greatest impact on keeping up day to day. Numeracy remains a significant driver (P<0.1) when comparing very low to high scorers, that holds when a range of control variables are introduced into the model.

Table 6.4

P values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CON + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Very Low	0	0	0.03	0.02	0.17	0.22	0.07	1	0.01	0	0	0	0.01	0.18
Low	0	0.07	0.29	0.36	0.67	0.25	0.15	0.46	0.18	0.08	0.09	0.17	0.41	0.5
Medium	0.02	0.12	0.38	0.2	0.41	0.35	0.35	0.65	0.18	0.13	0.14	0.16	0.26	0.84



Reference category: High

Note on interpretation:

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'high' negative coefficients are expected, increasing from very low to low to medium. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

The coefficients appear in the expected order for the majority of these models. However, the larger models that included 'tenure, confidence and attitudes', 'tenure, income and demographics' and all variables, negated the impact of financial concept skills (p>0.1) and placed coefficients in an unexpected pattern.

In particular, mindset factors appear to disrupt the models. Introducing confidence and tenure into the model reduced the significance of financial concept calculations from p=0.00 in the tenure only model, to p=0.22 in the confidence + tenure model. Adding in attitudes moved the p value out towards 1.0 and sent the coefficients into a reverse pattern. Controlling for attitudes (mindset) in addition reduces the influence of numeracy further.

The pseudo R2 values for the modelling of numeracy groups on 'Keeping up', that accompany these charts, is shown in the technical appendices. The values follow a similar pattern to the R2 values for the overall numeracy models displayed on page 20, with the models including 'tenure, income & demographics' and 'tenure, confidence & attitudes' having greater explanatory power.

Chapter 7: Numeracy & Saving regularly

Chapter Summary

Overall numeracy is a significant driver of saving regularly, and remains so when a range of variables are included in the models.

Explanatory power of the models improves as further variables are included, most notably with demographics and savings goals.

However, attitudes combine with confidence to push out the significance of numeracy (p=0.93)

When numeracy is broken down, only financial concept calculations remain significant when control variables are included in the model, and only between medium or high and very low. This indicates that a higher ability in applying financial concepts impacts savings frequency, regardless of socio demographics.

Modelling overall numeracy – key findings

There is good explanatory power for the models that include demographics and savings goals (R^2>0.2).

Overall numeracy is significant and works in the expected direction except in the model when confidence and attitudes combine (p=0.93, B=0.000)

The strongest model appears to be with 'all variables' but numeracy becomes insignificant and has a negative coefficient. This suggests that numeracy is highly correlated with other factors.

Table 7.1

REGRESSION MODEL	NAGELKERKE R SQUARE	DIFFERENCE FROM TENURE ONLY MODEL	P VALUES	BETA COEFFICIENTS
Note on interpretation	R^2 > 0.2 indicates model has good explanatory power	A greater difference indicates greater explanatory power	Values below 0.1 show numeracy is significant	Values close to 0 mean numeracy has less impact in the model.
No controls	0.04		0.00	0.037
Tenure	0.10		0.00	0.026
Tenure & Income	0.14	0.05	0.00	0.016
Tenure & Demographics	0.21	0.11	0.00	0.024
Tenure & Income & Demographics	0.22	0.12	0.00	0.019
Tenure & Confidence	0.11	0.01	0.00	0.015
Tenure & Attitude	0.15	0.05	0.05	0.010
Tenure & Confidence & Attitude	0.19	0.09	0.93	0.000
Tenure & Perseverance	0.12	0.02	0.00	0.020
Tenure & Connection	0.11	0.01	0.00	0.025
Tenure & Connectivity	0.10	0.01	0.00	0.025
Tenure & Saving goals	0.22	0.12	0.00	0.025
Tenure & Perseverance & Connection & Connectivity & Saving goals	0.24	0.15	0.00	0.017
All variables in the model	0.36	0.27	0.68	-0.003

Overall numeracy is significant (p<0.1) and remains so when tenure, income and demographics are included as control variables, suggesting numeracy skills drive frequent savings behaviour. To some extent this occurs regardless of socio demographics, but the explanatory power of the models notably improves when the demographic variables are included. Inclusion of savings goals also increases the explanatory power of the models (R=0.22).

The model that includes all control variables shows greater explanatory power (R^2=0.36) but overall numeracy is insignificant (p=0.68) and has a negative beta coefficient (B=-0.003), suggesting that numeracy is highly correlated with other factors.

Modelling attitudes and confidence considerably reduces the significance of numeracy in driving savings behaviour (p=0.93) and pushes its beta coefficient to zero. The particular attitudes that override numeracy drive or restrain savings behaviour can be determined from their respective p values and beta coefficients in the models:

Table 7.2

VARIABLE	P VALUES	BETA COEFFICIENTS
Note on interpretation	Values below 0.1 show numeracy is significant	Values close to 0 mean numeracy has less impact in the model.
Overall numeracy	0.93	0.000
Confidence	0.00	0.086
Too busy to sort finances	0.02	0.263
Live for today	0.00	0.401
Nothing I do will make a difference to finances	0.00	0.486
Important to shop around	0.13	0.153
Buy on impulse	0.14	-0.156

High confidence and **disagreeing** with the following attitudinal statements appears to play a stronger role in driving savings behaviour than overall numeracy:

- I am too busy to sort out my finances
- I prefer to live for today than plan for tomorrow
- Nothing I do will make a difference to my financial situation

Strongly agreeing that 'it is important to shop around', or disagreeing that 'I like to buy on impulse' is insignificant ($p>0.1$). 'Buy on impulse' has a negative beta coefficient ($B=-0.156$) which will be where those that can afford to buy on impulse can also afford to save regularly.

Modelling aspects of numeracy – key findings

Money Calculations

Money calculation questions are consistently significant ($p<0.1$) but only when no control variables are included alongside the three numeracy groups. There is a statistically significant difference between medium and high with the reference category 'very low' in the models with savings goals, but the inclusion of all other control variables appear to reduce money calculations to being statistically insignificant.

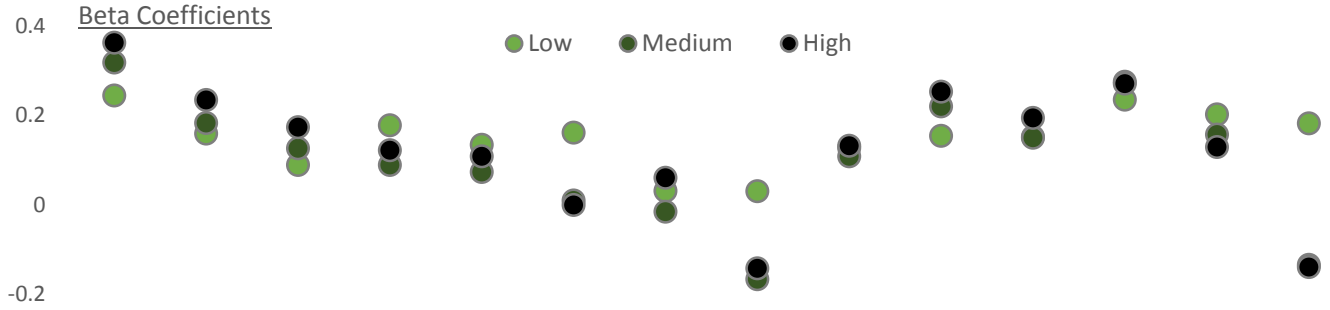
The beta coefficients appear in the expected direction for the first three models (no controls; income; demographics) but then move around. Confidence especially places the money calculation beta coefficients into an unexpected pattern (beta coefficient for 'high' becomes negative).

Therefore, in the majority of the models where savings frequency is the dependent variable and the numeracy groups are independent variables, the money calculations questions are not a predictor of savings frequency when other financial capability components are controlled for.

Table 7.3

P values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CON + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Low	0.09	0.28	0.55	0.26	0.40	0.29	0.83	0.84	0.40	0.30	0.30	0.13	0.20	0.30
Medium	0.03	0.23	0.42	0.58	0.65	0.95	0.93	0.31	0.49	0.16	0.33	0.09	0.34	0.46
High	0.02	0.13	0.27	0.45	0.51	1.00	0.70	0.38	0.40	0.10	0.21	0.09	0.43	0.44



Reference category: Very low

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'very low' positive coefficients are expected, increasing from low to high. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

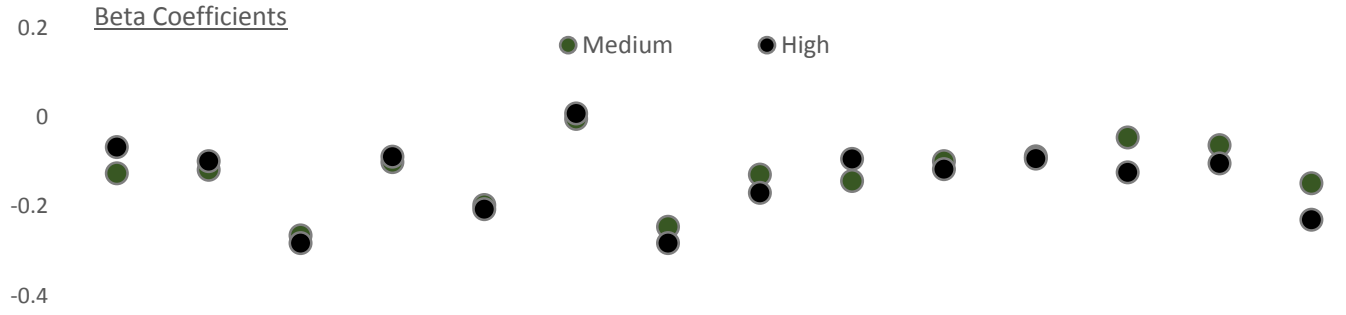
Finding numbers on bank statements & payslips

In the vast majority of the models tested, there is no evidence of a relationship between finding numbers on bank statements/payslips and frequency of savings. The beta coefficients do not appear in the expected pattern (positive and increasing from medium to high) and are largely negative, with the most negative coefficients occurring in the models where the p values are above 0.1. We therefore accept the null hypothesis that a person's ability to find numbers on bank statements and payslips has no relationship to savings frequency.

Table 7.4

P values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CON + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Medium	0.38	0.42	0.08	0.52	0.22	0.98	0.10	0.40	0.33	0.50	0.55	0.76	0.69	0.40
High	0.62	0.48	0.05	0.55	0.18	0.95	0.05	0.25	0.51	0.40	0.50	0.39	0.48	0.17



Reference category: Low

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'low' positive coefficients are expected, increasing from medium to high. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

Financial concept calculations

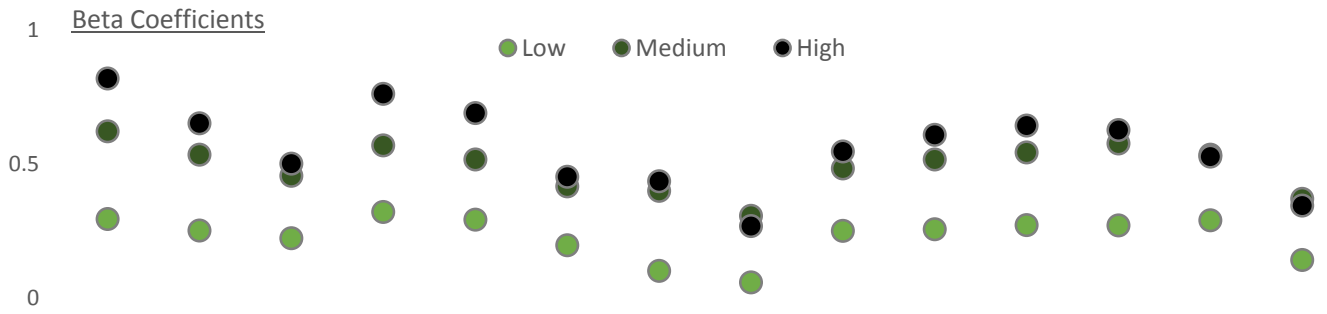
Medium and high skill levels are consistently significant when compared with the reference category 'very low' indicating that the ability to do financial concept calculations has an impact on savings frequency. However, there is less significance for 'low' skills levels suggesting that a higher level of financial concept calculation skills is most important, to help drive frequent savings behaviour.

The beta coefficients are positive and in the expected direction in most models. However, when the mindset variables of 'confidence' and 'attitudes' enter into the model, the pattern between the coefficients is less clear. For instance, 'high' merges with 'medium'. As seen with overall numeracy, confidence and attitudes appear more important than numeracy in relation to savings frequency.

Table 7.5

P values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CON + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Low	0.08	0.14	0.19	0.07	0.10	0.26	0.55	0.74	0.14	0.13	0.11	0.12	0.10	0.47
Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.02
High	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.04



Reference category: Very low

Note on interpretation:

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'very low' positive coefficients are expected, increasing from low to high. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

Chapter 8: Numeracy & Savings amounts

Chapter Summary

Overall Numeracy is a significant predictor of savings amounts in all models

- The models for 'amount in savings' have consistently the greatest explanatory power when compared to the other financial capability dependent variables examined (R^2>0.2)
- Overall numeracy is a significant driver of amount in savings, regardless of tenure, income, demographics and all other financial capability components tested.
- Financial concept calculations are consistently significant in the modelling of the difference aspects of numeracy, and are therefore considered the key aspect of numeracy driving amount in savings. This aspect of numeracy remains consistently significant when a range of control variables are included.

Modelling overall numeracy – key findings

- There is strong explanatory power when control variables are added to the model, with R^2 ranging from 0.25 to 0.46
- Overall numeracy works in the expected direction with amount in savings (B>0) and is significant in all models (p<0.1)
- Models that include demographics and savings goals see the greatest improvement in explanatory power (R^2>0.3).

Table 8.1

REGRESSION MODEL	NAGELKERKE R SQUARE	DIFFERENCE FROM TENURE ONLY MODEL	P VALUES	BETA COEFFICIENTS
Note on interpretation	R^2 > 0.2 indicates model has good explanatory power	A greater difference indicates greater explanatory power	Values below 0.1 show numeracy is significant	Values close to 0 mean numeracy has less impact in the model.
No controls	0.10		0.00	0.058
Tenure	0.25		0.00	0.045
Tenure & Income	0.29	0.03	0.00	0.035
Tenure & Demographics	0.34	0.09	0.00	0.036
Tenure & Income & Demographics	0.35	0.10	0.00	0.029
Tenure & Confidence	0.27	0.02	0.00	0.039
Tenure & Attitude	0.29	0.04	0.00	0.031
Tenure & Confidence & Attitude	0.31	0.05	0.00	0.026
Tenure & Perseverance	0.26	0.01	0.00	0.042
Tenure & Connection	0.27	0.02	0.00	0.044
Tenure & Connectivity	0.26	0.00	0.00	0.044
Tenure & Saving goals	0.34	0.08	0.00	0.045
Tenure & Perseverance & Connection & Connectivity & Saving goals	0.35	0.10	0.00	0.039
All variables in the model	0.46	0.21	0.04	0.011

In all models, numeracy is significant (p<0.1) and we reject the null hypothesis that this variable does not impact the dependent variable 'amount in savings'. When tenure is introduced, numeracy remains significant and the explanatory power of the model improves (R^2=0.25).

Explanatory power continues to rise as further variables are added to the model, and is especially strong with the addition of demographic variables (R^2=0.36) and savings goals (R^2=0.34). As further variables are added, explanatory power is slightly higher, but the notable impact is from the core demographics (age, gender, social grade, education & ethnicity) and savings goals. In the 'all variables' model the model shows greatest explanatory power but the beta coefficient for numeracy moves closer to zero, indicating it has less impact. However, numeracy remains significant throughout all models (p<0.1).

Modelling aspects of numeracy – key findings

- Financial Concept Calculations have a consistently significant impact on amount in savings, across all models and between different skills levels
- The 'very low' money calculation skill variable is significant when compared with the reference category 'high', but the difference is less clear between middle and high skill levels
- Ability to find numbers on bank statements and payslips did not have a significant impact on amount in savings, and produced weak models.

Money calculations

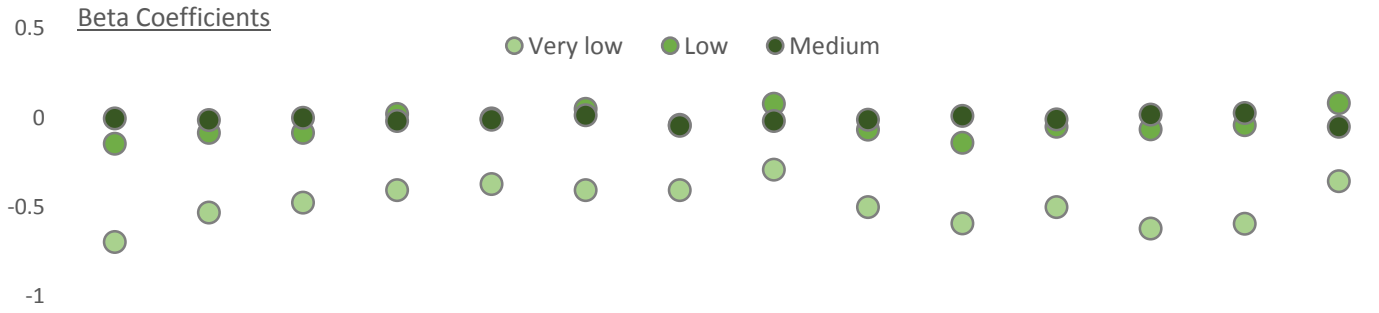
The 'very low' money calculations variable is significant when compared with the reference category 'high' ($p<0.1$) and remains significant when all variables are controlled for. This suggests only those with very low numeracy scores have lower outcomes and that basic ability to do money calculations has a positive impact on amount held in savings, holding true when other factors are added as control variables, including income.

However, low and medium scores are insignificant for all models when compared with high scores for money calculations. Further, the beta coefficients appear in the wrong direction when the demographic variables, confidence and attitudes enter the model. This also indicates this aspect of numeracy is having less of an impact on amount in savings.

Table 8.2

P values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CON + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Very Low	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.01
Low	0.21	0.48	0.48	0.86	0.97	0.68	0.74	0.51	0.58	0.24	0.68	0.59	0.74	0.53
Medium	0.98	0.91	0.99	0.88	0.93	0.89	0.69	0.87	0.92	0.92	0.94	0.87	0.82	0.68



Reference category: High

Note on interpretation:

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'high' negative coefficients are expected, increasing from very low to medium. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

Finding numbers on bank statements & payslips

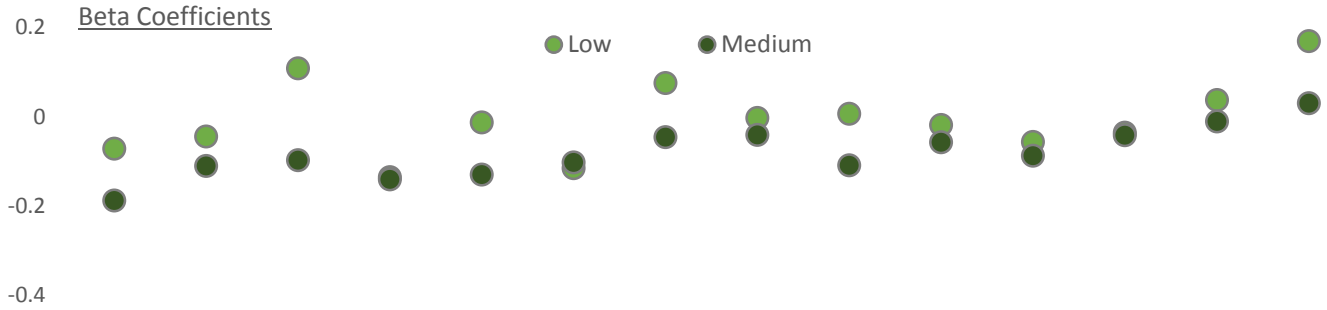
In almost all models in the chart below, the p values for low and medium scores are insignificant (p>0.1) and so the null hypothesis is accepted that this coefficient is not different from the reference category 'high'. Only medium appears significant when compared with high, and only for the model with no control variables (p=0.05), but the beta coefficients are in the wrong direction, a pattern seen across these models.

This suggests that ability to find numbers on bank statements and payslips in not linked to amount in savings and should be rejected as a driver.

Table 8.3

P values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CON + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Low	0.54	0.71	0.36	0.28	0.92	0.33	0.53	0.99	0.95	0.88	0.64	0.77	0.75	0.21
Medium	0.05	0.26	0.32	0.16	0.20	0.29	0.65	0.69	0.27	0.56	0.37	0.68	0.92	0.77



Reference category: High

Note on interpretation:

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'high' negative coefficients are expected, increasing from low to medium. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

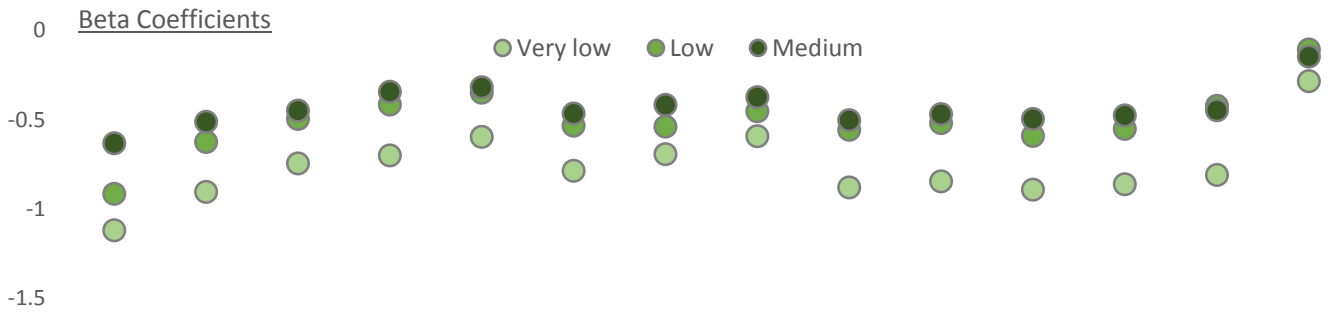
Financial concept calculations

The very low, low and medium skill levels are consistently significant when compared with the reference category high and the beta coefficients follow an expected pattern. Therefore, the ability to do financial concept calculations is having a significant impact on amount in savings, regardless of a wide range of control variables, including crucially, income.

Table 8.4

P values

	NONE	TEN	TEN + INC	TEN + DEM	TEN + INC + DEM	TEN + CONF	TEN + ATT	TEN + CON + ATT	TEN + PER	TEN + INF	TEN + CTN	TEN + SAV	TEN + PER + INF + CTN + SAV	TEN + ALL
Very Low	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Low	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.53
Medium	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23



Reference category: High

Note on interpretation:

P values: Values below 0.1 show numeracy is significant. Red values highlight insignificance.

Beta coefficients: As the reference category is 'high' negative coefficients are expected, increasing from very low to medium. Such a pattern could suggest numeracy is having an impact in the model, subject to how statistically significant the beta coefficients are.

Only when all variables are included in the model, do the coefficients move in an unexpected pattern and the low and medium variables are no longer significant when compared with high (p>0.1).

As with overall numeracy, modelling the impact of numeracy in groups with amount held in savings had the strongest explanatory power (see appendices).

Chapter 9: Technical Appendix

Research Quotas

The minimum quotas set for the research are shown in the two tables immediately below.

Table 9.1

BY AGE AND GENDER	% OF WORKING AGE POP		ONLINE QUOTA		F2F QUOTA	
	Males	Females	Males	Females	Males	Females
18-24	7.4%	7.1%	125	120	17	16
25-34	11.2%	11.2%	190	190	26	26
35-49	16.1%	16.4%	275	280	40	40
50-64	15.1%	15.6%	260	260	37	38
Total			850	850	120	120

Table 9.2

BY MODE & REGION	ONLINE	F2F	TOTAL
North East	78	12	90
North West	180	22	202
Yorkshire	135	16	151
East Midlands	119	15	134
West Midlands	143	16	159
East	150	18	168
London	238	25	263
South East	221	23	244
South West	133	16	149
Wales*	118	21	139
Scotland*	173	27	200
Northern Ireland*	62	39	101
Total UK	1750	250	2000

**The devolved nations were over sampled to ensure there were base sizes to facilitate robust analysis and modelling.*

The following tables detail an example sample frame, as used for the North East and North West:

- Number unemployed or not economically active (including students)
- Social grade (ABC1 / C2DE)
- Ethnicity (BME / Non BME)

Table 9.3

	NORTH EAST		NORTH WEST	
	Male	Female	Male	Female
18-24	1	1	2	2
25-34	1	1	2	2
35-49	2	2	3	3
50-64	2	2	3	4
Total	12		21	

Table 9.4

	NORTH EAST		NORTH WEST	
	Male	Female	Male	Female
BME	1	1	2	1
ABC1	2	3	5	5
C2DE	3	3	6	6
Not working/studying	2	2	2	3
Total	11		22	

Regression models

Saves frequently

ME23. Which of these describes how often you save money?

As the representation of this variable in the modelling was as a binary variable where:

1 = Every month

0 = All other answers.

The binary logistic regression model was applied:

$$\text{Logit}(Y) = b_1X_1 + b_2X_2 + b_3X_3 + c_1Z_1 \ldots\ldots + c_{m-1}Z_{m-1} + c_mZ_m$$

Where:

- Y is the binary outcome variable ME23
- X_1 is the Money Calculations (MC) categorical variable
- X_2 is the Finding numbers on statements & payslips (FN) categorical variable
- X_3 is the Financial Concept Calculations (FCC) categorical variable
- Z_1 is the first control variable entered into the model
- Z_m is the mth control variable entered into the model
- b's and c's are the respective model's coefficients.

Keeping Up & Amount in Savings & Investments

MF29. Which of the following statements best describes how well you are keeping up with your bills and credit commitments at the moments?

ME25. Could you estimate the total (savings and investments) ?

As the representation of these variables in the modelling were ordinal variables, an ordinal logistic regression model was applied:

Data: (Y_i, X_{1i}, ……., X_{ki}) for observations I = 1,….,n, where

- Y is the dependent variable with C ordered categories
- J = 1,…..,C, and probabilities $p^{(j)} = P(Y = j)$
- X_1,…..,X_k are k predictor/control variables.

The following holds for

$\gamma_i^{(j)}$ = $P(Y_i <= j)$ for each unit i and each category j = 1,……, C-1:

$$\log\left(\frac{\gamma_i^{(j)}}{1-\gamma_i^{(j)}}\right) = \log\left(\frac{P(Y_i <= j)}{P(Y_i > j)}\right) = \alpha^{(j)} - (\beta_1 X_{1i} + \ldots\ldots + \beta_k X_{ki})$$

- The ordinal logistic model considers a set of dichotomies, one for each possible cut-off of the dependent variable's categories into two sets, of 'high' and 'low' responses.
- The model for the cumulative probabilities is:

$$\gamma^{(j)} = P(Y <= j) = \frac{\exp\left[\alpha^{(j)} - (\beta_1 X_1 + ... + \beta_k X_k)\right]}{1 + \exp\left[\alpha^{(j)} - (\beta_1 X_1 + ... + \beta_k X_k)\right]}$$

The intercept terms are $a^{(1)}<a^{(2)}<....<a^{(C-1)}$, to guarantee that $g^{(1)}<g^{(2)}<...<g^{(C-1)}$

- $b_1, b_2, ..., b_k$ are the same for each value of j.

This model assumes that the coefficients that predict being in the next highest category are consistent across the ordered categories (known as the proportional odds assumption). To test this assumption, we compared the results of this simpler model to separate logistic regression models for each category. This produced similar results and therefore the simpler proportional odds model was appropriate.

Questions used in the modelling – control variables

Table 9.5

QUESTIONS USED IN MODELLING – HOUSEHOLD TENURE & INCOME	
TENURE (TEN) MG33. In which of the following ways do you occupy your home?	INCOME (INC) MG30. Which band from the grid below does your (household's) total gross income from all sources fall into?
Own it outright Own it with a mortgage Rent it from a private landlord Rent it from a local authority or housing association Part own/part rent the property (shared ownership) Live with your parents/grandparents/other family members Have some other arrangement Don't know Prefer not to say	[See questionnaire for bands: MG30]
The representation of these variables in the modelling was…	
An ordinal variable where: 1 = Own: outright and/or with a mortgage 2 = Rent: from a private landlord and/or housing association or local authority 3 = Other: part ownership, living with family and/or some other arrangement 4 = Don't know or Prefer not to say	A continuous variable with some imputed values

QUESTIONS USED IN MODELLING – DEMOGRAPHICS (DEM)		
GENDER SQ1. Are you…	AGE SQ2a. How old are you?	**EMPLOYMENT STATUS** SQ7. Which one of the following best describes your current situation?
Male Female	[Open response]	Employed full time (30+ hours) Employed part time (less than 29 hours) Self-employed full time (30+ hours) Self-employed part time (less than 29 hours) Looking after the home or family Unemployed On a government-work or training scheme Permanently Long term sick or disabled Retired from paid work In full-time education Not working for other reason Don't know
The representation of these variables in the modelling was…		
Binary variable where: 0 = Male, 1=Female	An ordinal variable where: 1= 18-24, 2= 25-29, 3= 30-34, 4= 35-39, 5= 40-44, 6= 45-49, 7= 50-54, 8= 55-64	1= 'Employed full time' 2= 'Employed part-time' 3= 'Self-employed full-time' 4= 'Self-employed part-time' 5= 'Looking after the home or family' 6= 'Unemployed' 7= 'Permanently Long-term sick or disabled' 8= 'Retired from paid work' 9= 'In full-time education' 10= 'Other'
EDUCATIONAL ATTAINMENT SQ4. Which, if any, of the following is the highest educational or professional qualification you have obtained. If you are still studying in full time education, please select the highest qualification reached before starting your current course or training.	SOCIAL GRADE SQ6. Please indicate to which occupational group you belong.	ETHNICITY SQ10. Which of the following best describes your ethnic group?
University higher degree (e.g. Masters/PhD or equivalent) First degree level qualification (including Foundation degree, Bachelor Degree, PGCE or equivalent) Diplomas in higher education, HNC/HND/BTEC Higher or equivalent A-Level, Scottish Higher, Welsh Baccalaureate, International Baccalaureate or equivalent Vocational qualifications such as Apprenticeships or City and Guilds GCSE/O-Level/CSE/Standard Grade Other I have no formal qualifications Don't know	[See questionnaire: SQ6]	White - English / Welsh / Scottish / Northern Irish / British White - Irish White - Gypsy or Irish Traveller White - Any other White background Mixed - White and Black Caribbean Mixed - White and Black African Mixed - White and Asian Mixed - Any other Mixed / multiple ethnic background Asian - Indian Asian - Pakistani Asian - Bangladeshi Asian - Chinese Asian - Any other Asian background Black - African Black - Caribbean Black - Any other Black / African / Caribbean background Arab Any other ethnic group Prefer not to say

THE REPRESENTATION OF THESE VARIABLES IN THE MODELLING WAS…		
1= 'University higher degree'. 2= 'First degree level qualification' 3= 'Diplomas in Higher Education…etc' 4= 'A-Level, Scottish Higher..etc' 5= 'Vocational qualifications' 6= 'GCSE/O-Level/CSE/Standard Grade' 7= 'Other/No formal quals'	1= A 2= B 3= C1 4= C2 5= D 6= E	Binary variable where: 0= White (White English and/or White Irish and/or White Gypsy and/or Any other white) 1= Other

QUESTIONS USED IN MODELLING - MINDSET	
CONFIDENCE (CONF) MA1. How confident do you feel working with numbers when you need to in everyday life? MA2. How confident do you feel managing your money? MA3. How confident do you feel making decisions about financial products and services?	ATTITUDES (ATT) ME20. To what extent do you agree or disagree with each of the following: 1. I am too busy to sort out my finances at the moment 2. When it comes to money I prefer to live for today rather than plan for tomorrow 3. Nothing I do will make a difference to my financial situation 4. It is important to shop around in order to make your money go further 5. I often buy things on impulse
Using a 0-10 scale where 0=not at all confident and 10=very confident	Strongly agree Tend to agree Neither agree nor disagree Tend to disagree Strongly disagree Don't know
The representation of these variables in the modelling was…	
A confidence score was created based on the summation of the ratings from MA1, MA2 and MA3. Each question had a rating scale of 0 (not at all confident) to 10 (Very confident). Thus the Confidence score ranged from 0 to 30.	Each statement was converted into a binary variable, where Code 0 = Negative and Code 1 = Positive. For statements 1,2,3, and 5 Tend to disagree and/or strongly disagree were coded as 1 (Positive), otherwise coded as 0 (Negative). For statement 4, Strongly agree was coded as 1 (Positive), otherwise coded as 0 (Negative).

Table 9.6

QUESTIONS USED IN MODELLING – MINDSET	
PERSEVERANCE (PER) MA4. When you get stuck working something out, can you think of different ways to keep trying?	SAVINGS GOALS (SAV) ME21. People save money for different reasons. What are the main reasons why you have saved money in the last two years?
Never Rarely Often Always Don't know	Your retirement Buying a house Rental deposit Starting a family/ Having more children To get married For a holiday To purchase a motor vehicle Education (for yourself or children) Saving money in general For the unexpected/rainy day Other I have not saved money in the last 2 years

THE REPRESENTATION OF THESE VARIABLES IN THE MODELLING WAS…	
Code 1 = Never Code 2 = Rarely Code 3 = Often Code 4 = Always The few DKs were recoded as 'Often' the most common answer.	1= Save in General (Saving money in general and/or For the rainy day) 2= Saving Goal (All other codes) 3= Holiday only 4= Not saved in last 2 years

Table 9.7

QUESTIONS USED IN MODELLING - CONNECTION	
CONNECTION ME26. Which of the following sources of information have you used in the last year to find out about anything to do with money – whether that is how to budget or plan your finances, the best insurance, banking or credit products available, how to claim benefits or grants, or to get any help or advice, etc.	CONNECTIVITY MG32a. Which of the following devices do you regularly use to manage your finances?
Family / Friends Financial Pages in Newspapers/Magazines Bank / Insurance Company Broker/ Professional Advisor Internet – Price Comparison Websites Internet – General Search Internet – Specialist site Government/ Non-Government Funded Org's (e.g. Citizens Advice / CAB) Other None	PC or laptop Tablet Mobile phone None of these Don't know
The representation of these variables in the modelling was…	
Code 1 = Family/Friends ONLY Code 2: All Other sources Code 3: None	0= Not Connected 1= Connected (PC or Laptop) and/or (Tablet) and/or (Mobile phone)

Model outputs

Numeracy aspects driving keeping up – R Square values

The table below presents the R square values (explanatory power) for the models where the numeracy inputs were in three different aspects of numeracy and relate to tables 6.2 – 6.4.

Table 9.8

REGRESSION MODEL	NAGELKERKE R SQUARE	DIFFERENCE FROM TENURE ONLY MODEL
No controls	0.04	
Tenure	0.12	0
Tenure & Income	0.17	0.04
Tenure & Demographics	0.18	0.06
Tenure & Income & Demographics	0.21	0.08
Tenure & Confidence	0.19	0.07
Tenure & Attitude	0.16	0.04
Tenure & Confidence & Attitude	0.22	0.10
Tenure & Perseverance	0.14	0.01
Tenure & Connection	0.13	0.00
Tenure & Connectivity	0.13	0.01
Tenure & Saving goals	0.16	0.04
Tenure & Perseverance & Connection & Connectivity & Saving goals	0.18	0.06
All variables in the model	0.30	0.18

Numeracy aspects driving savings frequency – R Square values

The table below presents the R square values (explanatory power) for the models where the numeracy inputs were in three different aspects of numeracy and relate to tables 7.3 - 7.5.

Table 9.9

REGRESSION MODEL	NAGELKERKE R SQUARE	DIFFERENCE FROM TENURE ONLY MODEL
No controls	0.05	
Tenure	0.10	
Tenure & Income	0.15	0.05
Tenure & Demographics	0.21	0.11
Tenure & Income & Demographics	0.23	0.13
Tenure & Confidence	0.15	0.05
Tenure & Attitude	0.15	0.05
Tenure & Confidence & Attitude	0.19	0.09
Tenure & Perseverance	0.13	0.02
Tenure & Connection	0.11	0.01
Tenure & Connectivity	0.11	0.01
Tenure & Saving goals	0.22	0.12
Tenure & Perseverance & Connection & Connectivity & Saving goals	0.25	0.15
All variables in the model	0.37	0.27

Numeracy aspects driving amount in savings – R Square values

The table below presents the R square values (explanatory power) for the models where the numeracy inputs were in three different aspects of numeracy and relate to table 8.2 – 8.4 above.

Table 9.10

REGRESSION MODEL	NAGELKERKE R SQUARE	DIFFERENCE FROM TENURE ONLY MODEL
No controls	0.12	
Tenure	0.26	
Tenure & Income	0.29	0.03
Tenure & Demographics	0.34	0.08
Tenure & Income & Demographics	0.36	0.10
Tenure & Confidence	0.28	0.01
Tenure & Attitude	0.30	0.04
Tenure & Confidence & Attitude	0.31	0.05
Tenure & Perseverance	0.27	0.01
Tenure & Connection	0.28	0.02
Tenure & Connectivity	0.26	0.00
Tenure & Saving goals	0.35	0.09
Tenure & Perseverance & Connection & Connectivity & Saving goals	0.36	0.10
All variables in the model	0.46	0.20

The Questionnaire

Screener

ALL RESPONDENTS

INTRO. Thank you for agreeing to take part in this important piece of research, which is on behalf of the **Money Advice Service**.

We would like to understand whether there is a link between people's numeracy levels and how confident and capable they are financially. The survey will take 10-15 minutes to complete, and is conducted in accordance with the Market Research Society Code of Conduct. You will not be contacted for any sales related purposes. The survey is in the strictest confidence and your answers will be completely anonymous and will be put together with all the people taking part in the survey so we get an overall picture.

All we ask, is that you attempt the survey questions, but if you cannot answer all the questions, move on to the next one.

To move forward throughout the questionnaire, please use the 'forward arrow' button. Do not use the forward and back buttons on your browser. Please click 'forward arrow' button below to start the survey.

ALL UK RESPONDENTS (Q264/243 AND QCOUNTRY/243)

SQ2a. How old are you?

[NUMERIC RANGE 18-120]

SQ2ai 1 Prefer not to say

IF REFUSED (SQ2ai/1)

SQ2b. Which of the following age bands are you in?

1. 18-24
2. 25-29
3. 30-34
4. 35-39
5. 40-44
6. 45-49
7. 50-54
8. 55-64
9. 65-74
10. 75+
11. Prefer not to say

ALL UK 18-64 RESPONDENTS (Q264/243 AND QCOUNTRY/243)

SQ3 Which nation or region of the country do you live in?

1 London
2. South East (not London)
3. South West
4. East of England
5. North East
6. North West
7. East Midlands
8. West Midlands
9. Yorkshire and the Humber
10. Scotland
11. Wales
12. Northern Ireland
13. Don't know [SCREENOUT]

ALL ANSWERING REGION (SQ3/1-12)

SQ4 Which, if any, of the following is the highest educational or professional qualification you have obtained. If you are still studying in full time education, please select the highest qualification reached before starting your current course or training.

1. University higher degree (e.g. Masters/PhD or equivalent)
2. First degree level qualification (including Foundation degree, Bachelor Degree, PGCE or equivalent)
3. Diplomas in higher education, HNC/HND/BTEC Higher or equivalent
4. A-Level, Scottish Higher, Welsh Baccalaureate, International Baccalaureate or equivalent
5. Vocational qualifications such as Apprenticeships or City and Guilds
6. GCSE/O-Level/CSE/Standard Grade
7. Other
8. I have no formal qualifications
10. Don't know

ALL ANSWERING REGION (SQ3/1-12)

SQ4a. Do you hold the equivalent of GCSE/O-level/CSE grade C or above in…?

This is equivalent to Scottish Standard Grade 4 or above.

[GRID]

1. Yes
2. No
3. Don't know

[RANDOMISE]

1 English
2 Mathematics

ALL PROVIDING REGION (SQ3/1-12)

SQ5. Are you the primary income earner in your household, that is, the person with the largest income, whether from employment, pensions, state benefits, investments or any other source?

1 Yes, I am the primary income earner

2 I and another member of my household are the primary income earners of about equal amounts.

3 No, I am not the primary income earner

ALL PROVIDING REGION (SQ3/1-12)

SQ6. Please indicate to which occupational group you belong.

1. Semi or unskilled manual work (e.g. Manual workers, all apprentices to be skilled trades, Caretaker, Park keeper, non-HGV driver, shop assistant) (D)
2. Skilled manual worker (e.g. Skilled Bricklayer, Carpenter, Plumber, Painter, Bus/ Ambulance Driver, HGV driver, AA patrolman, pub/bar worker, etc.) (C2)
3. Supervisory or clerical/ junior managerial/ professional/administrative (e.g. Office worker, Student Doctor, Foreman with 25+ employees, salesperson, etc.) (C1)
4. Intermediate managerial/ professional/ administrative (e.g. Newly qualified (under 3 years) doctor, Solicitor, Board director small organisation, middle manager in large organisation, principle officer in civil service/local government) (B)
5. Higher managerial/ professional/ administrative (e.g. Established doctor, Solicitor, Board Director in a large organisation (200+ employees, top level civil servant/public service employee) (A)
6. Student (C1)
7. Casual worker – not in permanent employment (E)
8. Housewife/ Homemaker (E)
9. Retired and living on state pension (E)
10. Unemployed or not working due to long-term sickness (E)
11. Full-time carer of other household member (E)
12. Other (E)
13. Don't know
14. Prefer not to say

ALL PROVIDING REGION (SQ3/1-12)

SQ7. Which one of the following best describes your current situation?

1. Employed full time (30+ hours)
2. Employed part time (less than 29 hours)
3. Self-employed full time (30+ hours)
4. Self-employed part time (less than 29 hours)
5. Looking after the home or family
6. Unemployed
7. On a government-work or training scheme
8. Permanently Long term sick or disabled
9. Retired from paid work
10. In full-time education
11. Not working for other reason
12. Don't know

ALL PROVIDING REGION (SQ3/1-12)

SQ8. Are you…?

1. Single
2. Married/co-habiting/civil partners
3. Divorced/separated/widowed

ALL PROVIDING REGION (SQ3/1-12)

SQ8a. Do you have any children or dependents in your household (aged 0-17)?

Please select all the age groups of your children below

[MULTIPLE]

1. 0-4 years old
2. 5-11 years old
3. 12-15 years old
4. 16-17 years old
5. None [EXCLUSIVE]

ALL WHO LIVE IN A MARRIED/CO-HABITING HOUSEHOLD (SQ8/2)

SQ9. Who would you say mostly manages the day-to-day finances in your household?

1. I mostly manage the day-to-day finances
2. My partner/spouse and I jointly manage the day-to-day finances
3. My partner/spouse mostly manages the day-to-day finances
4. I don't know

ASK ALL ANSWERING SQ8 (SQ9/1-3)

SQ9a. Why do you manage your day-to-day household finances in this way?

Please write below how you decided who manages the day-to-day finances in your household

[MANDATORY TEXT BOX]

ALL PROVIDING REGION (SQ3/1-12)

SQ10. Which of the following best describes your ethnic group?

1. White - English / Welsh / Scottish / Northern Irish / British
2. White - Irish
3. White - Gypsy or Irish Traveller
4. White - Any other White background
5. Mixed - White and Black Caribbean
6. Mixed - White and Black African
7. Mixed - White and Asian
8. Mixed - Any other Mixed / multiple ethnic background
9. Asian - Indian
10. Asian - Pakistani
11. Asian - Bangladeshi
12. Asian - Chinese
13. Asian - Any other Asian background
14. Black - African
15. Black - Caribbean
16. Black - Any other Black / African / Caribbean background
17. Arab
18. Any other ethnic group
19. Prefer not to say

Section A – Confidence

ALL QUALIFIED RESPONDENTS (Q99/1)

MA1INTRO. The next few questions are to look at your confidence with numeracy and money.

ALL QUALIFIED RESPONDENTS (Q99/1)

MA1. How confident do you feel working with numbers when you need to in everyday life?

Please answer on a scale of 0 to 10, where 0 is 'not at all confident and 10 is 'very confident'

[GRID]

1 0 Not at all confident
2 1
3 2
4 3
5 4
6 5
7 6
8 7
9 8
10 9
11 10 Very confident
12 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MA2. How confident do you feel managing your money?

Please answer on a scale of 0 to 10, where 0 is 'not at all confident and 10 is 'very confident'

[GRID]

1 0 Not at all confident
2 1
3 2
4 3
5 4
6 5
7 6
8 7
9 8
10 9
11 10 Very confident
12 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MA3. How confident do you feel making decisions about financial products and services?

Please answer on a scale of 0 to 10, where 0 is 'not at all confident and 10 is 'very confident'

	[GRID]
1	0 Not at all confident
2	1
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	9
11	10 Very confident
12	Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MA4. When you get stuck working something out, can you think of different ways to keep trying?

1	Never
2	Rarely
3	Often
4	Always
5	Don't know

Section B – Numeracy Questions

ALL QUALIFIED RESPONDENTS (Q99/1)

TXT1: The next few questions are a bit different. They look at using numbers in everyday life.

Please do not worry if you cannot answer all of them - some of them are designed to be difficult.

All we ask is that you do your best and attempt to answer any questions correctly that you can.

Alton *Bus Station*	0700	0720	0740	0800	0820
Tipham *Heston Square*	0718	0738	0758	0818	0838
Starton *Repham Road*	0728	0748	0808	0828	0848
Repham *High Street*	0734	0754	0814	0834	0854
Repham *Farley Road*	0738	0758	0818	0838	0858
Melsham *Helmsdale Street*	0742	0802	0822	0842	0902
Endham *Bus Station*	0750	0810	0830	0850	0910

Susie lives in Starton, and she takes the 599 bus to her work in Endham.

She wants to be in work by 8.45am.

It takes her 10 minutes to walk from Endham Bus Station to her work.

Please look at the image and then answer the questions below

[PN: DISPLAY MB8A AND MB8B ON SAME SCREEN]

ALL QUALIFIED RESPONDENTS (Q99/1)

MB8A. What time is the last bus Susie can catch to get to work on time?

1 07:40

2 08:08

3 08:10

4 08:28

5 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MB8B. What time will Susie arrive at work?

1 08:30

2 08:38

3 08:40

4 08:45

5 Don't know

[PN: DISPLAY MB9AND MB10 ON SAME SCREEN]

ALL QUALIFIED RESPONDENTS (Q99/1)

MB9. Susie is paid £9.00 an hour. She works four and a half hours each day.

How much does Susie earn each day?

1 £42.50

2 £41.50

3 £40.50

4 £44.50

5 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MB10. Susie gets a 5% pay increase. What is her new pay per hour?

1 £9.45

2 £9.25

3 £9.50

4 £9.05

5 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MB11. Susie buys a laptop costing EUR144 from a company in Germany, at an exchange rate of £1 = EUR1.20. What is the cost in pounds?

1 £172.80

2 £128.50

3 £135.00

4 £120.00

5 Don't know

Section C – Shopping Task Numeracy Questions

ALL QUALIFIED RESPONDENTS (Q99/1)

MC11. A mobile phone in Shop A is £140 and is currently reduced by 20%, whereas the same phone is £160 online, with a 30% reduction and no delivery cost. Which one is cheaper?

1 The one sold in shop A

2 The one sold online

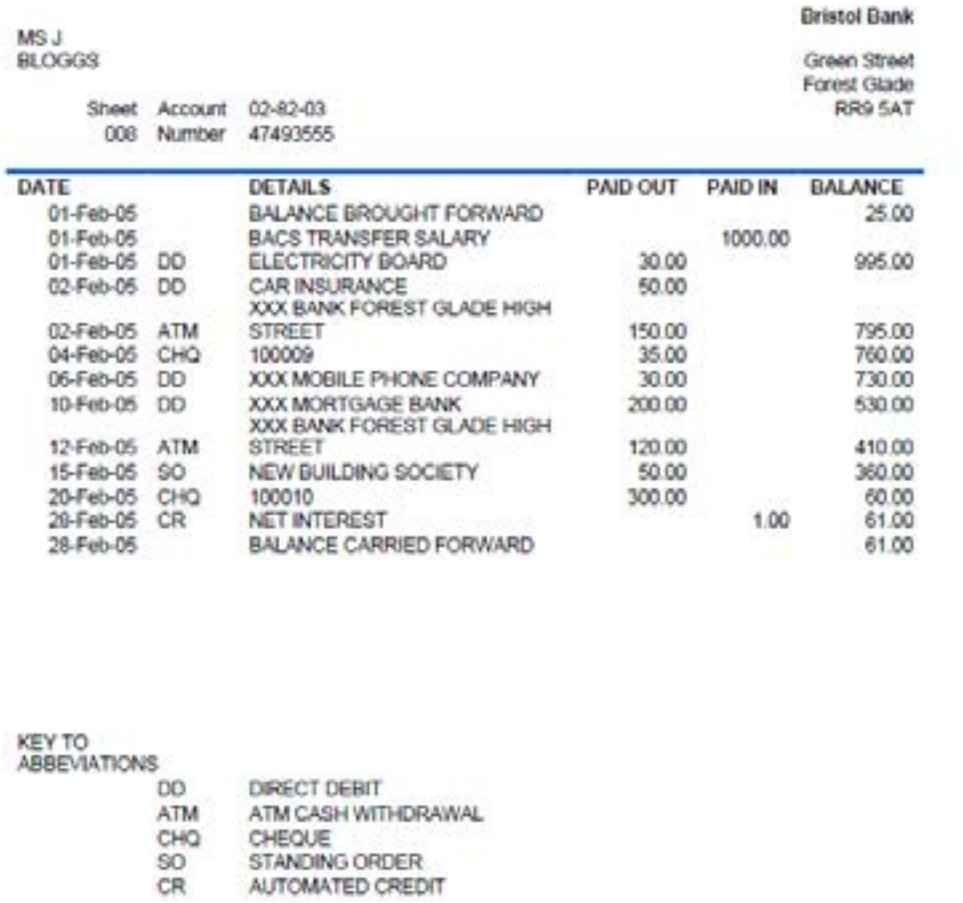
3 They are both the same price

4 Don't know

Section D – Financial Numeracy Questions

ALL QUALIFIED RESPONDENTS (Q99/1)

TXT2: Please look at the example bank statement.



MS J
BLOGGS

Bristol Bank
Green Street
Forest Glade
RR9 5AT

Sheet 008 Account Number 02-82-03 47493555

DATE		DETAILS	PAID OUT	PAID IN	BALANCE
01-Feb-05		BALANCE BROUGHT FORWARD			25.00
01-Feb-05		BACS TRANSFER SALARY		1000.00	
01-Feb-05	DD	ELECTRICITY BOARD	30.00		995.00
02-Feb-05	DD	CAR INSURANCE	50.00		
02-Feb-05	ATM	XXX BANK FOREST GLADE HIGH STREET	150.00		795.00
04-Feb-05	CHQ	100009	35.00		760.00
06-Feb-05	DD	XXX MOBILE PHONE COMPANY	30.00		730.00
10-Feb-05	DD	XXX MORTGAGE BANK	200.00		530.00
12-Feb-05	ATM	XXX BANK FOREST GLADE HIGH STREET	120.00		410.00
15-Feb-05	SO	NEW BUILDING SOCIETY	50.00		360.00
20-Feb-05	CHQ	100010	300.00		60.00
28-Feb-05	CR	NET INTEREST		1.00	61.00
28-Feb-05		BALANCE CARRIED FORWARD			61.00

KEY TO ABBEVIATIONS

DD	DIRECT DEBIT
ATM	ATM CASH WITHDRAWAL
CHQ	CHEQUE
SO	STANDING ORDER
CR	AUTOMATED CREDIT

[BANK MD13 AND MD13a ON SAME SCREEN; LOGIC CHECK TO FORCE RESPONDENT TO ONLY ANSWER 1 QUESTION]

ALL QUALIFIED RESPONDENTS (Q99/1)

MD13. Looking at this example of a bank statement, please can you tell me how much money was in the account at the end of February?

Please write your answer to the nearest pound

[NUMERIC RANGE 1-9,999]

MD13a Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

TXT3 Now please look at this payslip, and then answer the questions below.

Employee No.	Employee Name			Process Date	National Insurance Number
3	Sally James			28-10-15	SP739355C
Payments	**Units**	**Rate**	**Amount**	**Deductions**	**Amount**
Salary	1.00	2000.00	2000.00	PAYE Tax	382.60
Bonus	1.00	500.00	500.00	National Insurance	246.52
Overtime	20.00	10.00	200.00	Pension	100.00
				Other	20.00

	This Period		Year to Date	
Sally James	Pay	2700.00	Pay	27000.00
786 Marldon Road	PAYE Tax	382.60	PAYE Tax	3826.00
Kings Heath	Nat Insurance	246.52	Nat Insurance	2465.20
Birmingham	Pension	100.00	Pension	1000.00
B14 3TL	Other	20.00	Other	200.00

Tayler and Butler Limited — **Net Pay** 1950.88

Tax Code: 944L Payment Method: BACS Dept: No Department

[PN: DISPLAY MD13B AND MD13C ON SAME SCREEN]

ALL QUALIFIED RESPONDENTS (Q99/1)

MD13B. How much has Sally paid towards her retirement so far this year?

1 £100

2 £320

3 £2465.20

4 £1000

5 £200

6 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MD13C. How much was Sally paid this month before any tax or deductions were taken?

1 £1950.88

2 £2700

3 £2000

4 £27000

5 £246.52

6 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MD15A. Suppose you put £100 into a savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money.

How much would be in the account at the end of the first year, once the interest payment is made?

Please write your answer to the nearest pound

[NUMERIC RANGE 1-9,999]

MD15Ai Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MD15B. And how much would be in the account at the end of five years (remembering there are no fees or tax deductions). Would it be..?

1 More than £110

2 Exactly £110

3 Less than £110

4 Or is it impossible to tell from the information given

5 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MD14. If the inflation rate is 5% and the interest rate you get on your savings is 3%, will your savings have more, less or the same amount of buying power in a year's time?

1 More

2 The same

3 Less

4 Don't know

[BANK MD15a AND MD15ai AND ON SAME SCREEN]

Section E – Finanically Capable Behaviours

ALL QUALIFIED RESPONDENTS (Q99/1)

ME20. To what extent do you agree or disagree with each of the following?

[GRID]

1 Strongly agree

2 Tend to agree

3 Neither agree nor disagree

4 Tend to disagree

5 Strongly disagree

6 Don't know

[RANDOMISE]

1 I am too busy to sort out my finances at the moment

2 When it comes to money I prefer to live for today rather than plan for tomorrow

3 Nothing I do will make a difference to my financial situation

4 It is important to shop around in order to make your money go further

5 I often buy things on impulse

ALL QUALIFIED RESPONDENTS (Q99/1)

ME21. People save money for different reasons. What are the main reasons why you have saved money in the last two years?

[MULTICODE; ROTATE]

1 Your retirement

2 Buying a house

3 Rental deposit

4 Starting a family/ Having more children

5 To get married

6 For a holiday

7 To purchase a motor vehicle

8 Education (for yourself or children)

9 Saving money in general

10 For the unexpected/rainy day

96 Other (specify) [A; TEXT BOX]

97 I have not saved money in the last 2 years

ALL QUALIFIED RESPONDENTS (Q99/1)

ME22. Which of these best describes how accurately you know the balance on your account? We don't want to know how much is in your account, just how accurately you know how much money you have in your account.

1 I know within a pound or two

2 I know within £10

3 I know within £50

4 I know within £100

5 I know within £500

6 I have no idea at all

7 Don't know

8 Prefer not to say

ALL QUALIFIED RESPONDENTS (Q99/1)

ME23. Which of these best describes how often you save money? By 'saving money', we mean putting money aside into a savings account.

1 Every month

2 Most months

3 Some months, but not others

4 Rarely/never

5 Don't know

[BANK ME24 AND ME24a AND ON SAME SCREEN]

ALL QUALIFIED RESPONDENTS (Q99/1)

ME24 Approximately how much, if anything, do you personally have in savings and investments? Please do not include any money that you have saved in a pension or property.

Enter Exact Amount

[NUMERIC RANGE 0-999,999,999]

ME24a.

1 I do not have any savings and investments

2 Don't know

3 Prefer not to say

ALL SAYING DON'T KNOW (ME24/2)

ME25. Could you estimate the total within the following bands?

1 Nothing

2 £100 or less

3 £100 - £499

4 £500 - £999

5 £1000 - £4999

6 £5000 - £9999

7 £10,000 - £14,999

8 £15,000 - £19,999

9 £20,000 - £29,999

10 £30,000 - £39,999

11 £40,000 - £49,999

12 £50,000+

ALL QUALIFIED RESPONDENTS (Q99/1)

ME26. Which of the following sources of information have you used in the last year to find out about anything to do with money – whether that is how to budget or plan your finances, the best insurance, banking or credit products available, how to claim benefits or grants, or to get any help or advice, etc.

Please select all that apply.

[MULTICODE; ROTATE]

1 Family / Friends

2 Financial Pages in Newspapers/Magazines

3 Bank / Insurance Company

4 Broker/ Professional Advisor

5 Internet – Price Comparison Websites

6 Internet – General Search

7 Internet – Specialist site

8 Government/ Non-Government Funded Org's (e.g. Citizens Advice / CAB)

96 Other [A]

97 None [A; E]

ALL QUALIFIED RESPONDENTS (Q99/1)

ME27 How do you generally handle paying your bill each month for your credit card(s) or store card(s)?

1 I generally make the minimum payment each month, but I pay more than the minimum when I can

2 I vary in the amount I pay off – between the minimum and the full amount

3 I usually pay in full, but sometimes let part of the balance roll over to the next month

4 I always pay in full

5 Don't know

6 Prefer not so say

7 Not applicable – don't have a credit or store card

Section F – Finanical Wellbeing

ALL QUALIFIED RESPONDENTS (Q99/1)

MF27. Now thinking in more detail about your finances.

To what extent do you feel that keeping up with your bills and credit commitments is a burden?

1 It is not a burden at all

2 It is somewhat of a burden

3 It is a heavy burden

4 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MF28. In the last 6 months, have you fallen behind on, or missed, any payments for credit commitments or domestic bills for any 3 or more months? These 3 months don't necessarily have to be consecutive months.

1 Yes

2 No

3 Don't know

ALL QUALIFIED RESPONDENTS (Q99/1)

MF29. The next questions cover regular bills and credit commitments that you get and how you pay for them.

Which one of the following statements best describes how well you are keeping up with your bills and credit commitments at the moment?

Please select one only.

1 I am keeping up with all bills and commitments without any difficulties

2 I am keeping up with all bills and commitments, but it is a struggle from time to time

3 I am keeping up with all bills and commitments, but it is a constant struggle

4 I am falling behind with some bills or credit commitments

5 I am having real financial problems and have fallen behind with many bills or credit commitments

6 I don't have any bills or credit commitments

7 Don't know

8 Prefer not to say

Section G – Demographics

ALL QUALIFIED RESPONDENTS (Q99/1)

MG30. Thanks for answering the survey today, there are a few questions left to ensure that we are getting a good mix of people answering our survey.

Which band from the grid below does your total gross income from all sources fall into?

INCOME is any money from work, including a second job or occasional work, and any other sources, such as benefits, pensions, savings and investments, maintenance payments and rent from property or subletting.

GROSS means the amount you receive before any deductions, income tax, National Insurance etc.

Please select one only from the answers below.

	PER WEEK	PER MONTH	PER YEAR
1	Up to £86	Up to £374	Under £4,500
2	£87 - £124	£375 - £541	£4,500 - £6,499
3	£125 - £143	£542 - £624	£6,500 - £7,499
4	£144 - £182	£625 - £791	£7,500 - £9,499
5	£183 - £220	£792 - £957	£9,500 - £11,499
6	£221 - £259	£958 - £1,124	£11,500 - £13,499
7	£260 - £297	£1,125 - £1,291	£13,500 - £15,499
8	£298 - £336	£1,292 - £1,457	£15,500 - £17,499
9	£337 - £384	£1,458 - £1,666	£17,500 - £19,999
10	£385 - £480	£1,667 - £2,082	£20,000 - £24,999
11	£481 - £576	£2,083 - £2,499	£25,000 - £29,999
12	£577 - £672	£2,500 - £2,916	£30,000 - £34,999
13	£673 - £768	£2,917 - £3,332	£35,000 - £39,999
14	£769 - £961	£3,333 - £4,166	£40,000 - £49,999
15	£962 - £1,441	£4,167 - £6,249	£50,000 - £74,999
16	£1,442 - £1,922	£6,250 - £8,332	£75,000 - £99,999
17	£1,923+	£8,333+	£100,000+

98. Don't know

99. Prefer not to say

ALL QUALIFIED RESPONDENTS (Q99/1)

MG31. Approximately how many hours in total have you spent actively using the Internet in the last week (i.e. the last seven days)?

This includes E-mail, web browsing/surfing and other on-line services such as downloading, but does not cover time when you were connected but not using it. Please include both work and personal use.

1 None – not used in the last week

2 Less than 1 hour

3 1-6 hours

4 7-10 hours

5 11-15 hours

6 16-20 hours

7 20-25 hours

8 26-30 hours

9 31+ hours

10 Unsure

ALL QUALIFIED RESPONDENTS (Q99/1)

MG32. Which of the following devices do you regularly use?

[MULTICODE; RANDOMISE]

1 PC or laptop

2 Tablet

3 Mobile phone

4 None of these [A; E]

5 Don't know [A; E]

ALL QUALIFIED RESPONDENTS (Q99/1)

MG32a. Which of the following devices do you regularly use to manage your finances?

Please select all that apply.

[MULTICODE; RANDOMISE]

1 PC or laptop

2 Tablet

3 Mobile phone

4 None of these [A; E]

5 Don't know [A; E]

ALL QUALIFIED RESPONDENTS (Q99/1)

MG33. In which of these ways do you occupy your home?

[SINGLE; RANDOMISE]

1 Own it outright

2 Own it with a mortgage

3 Rent it from a private landlord

4 Rent it from a local authority or housing association

5 Part own / part rent the property (shared ownership)

6 Live with your parents/grandparents/other family members

7 Have some other arrangement (please specify) [A; TEXT BOX]

8 Don't know [A]

9 Prefer not to say [A]

ALL QUALIFIED RESPONDENTS (Q99/1)

MG34 That is the end of the survey. Thanks for answering the questions. Would you be willing for us to collect your address details so that we can get a geographical profile of your area on your survey results? Please be assured that your data will be used for no other purpose and your responses will remain secure and anonymous.

1 Yes

2 No

ALL RESPONDENTS AGREEING TO HAVE THEIR POSTCODE USED (MQ34/1 OR MG36/1,2)

MG35. Please can I get your name and address. I can reaffirm that your survey responses will remain secure and anonymous.

1	Name	[TEXT BOX]
2	Address Line 1	[TEXT BOX]
3	Address Line 2	[TEXT BOX]
4	City	[TEXT BOX]
5	County	[TEXT BOX]
Q326	Postal Code	
MG35a	Prefer not to say	

ALL QUALIFIED RESPONDENTS (Q99/1)

MG36. This research has been conducted on behalf of The Money Advice Service (MA/MAS). We may be conducting further research on this subject in the future. Would you be willing to be re-contacted by any of the following about this research?

Agreeing to this now places you under no obligation to take part in any future research.

Please select all that you are willing to be recontacted by

[MULTICODE]

1	The Money Advice Service	
2	Harris Interactive for and on behalf of the Money Advice Service	
3	No – none of these	[E]

ALL AGREEING TO RECONTACT (MG36/1,2 AND MQ34/2)

MG36a Take contact details:

1	Postal address	[TEXT BOX]
2	Postal Code	[TEXT BOX]
1	Yes	
2	No	

Money Advice Service
Holborn Centre
120 Holborn
London EC1N 2TD