# Consumer debt decisions and credit card delinquency in the UK 

Stavroula (Vina) THEODORAKOPOULOU

This thesis is being submitted in partial fulfiliments of the requirements of Kingston University for the award of a PhD

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Acknowledgements

First and foremost I gratefully acknowledge the guidance and support of my current Director of Studies, Prof. Vince Daly, with respect to the empirical work and the final drafting of this thesis. I respectfully acknowledge the guidance of my initial Director of Studies, Dr. Wilhelmus (Willem) Spanjers, with reference to the chapter dealing with decision making under uncertainty.

I wish to thank my employer, Munich Re UK Services Ltd, for accommodating a fortnightly study leave over the last year-and-a-half of my studies. Last but not least, I would like to express my gratitude to my family for their support and patience over the years. A special mention and thanks are due to my husband for his understanding and encouragement.

This thesis is dedicated to my late grandparents, Leonidas and Ekaterini.


#### Abstract

The chief undertaking of this study is to investigate consumer debt decisions and identify the factors that may lead to credit card delinquency. We base the analysis on the UK and present a synthesis of these findings with respect to education and policy making.


The thesis:

- summarises relevant academic literature and key policy debates;
- explores new approaches to decision making under uncertainty;
- makes a case for measures to improve financial literacy;
- employs the recently accessible UK Wealth and Assets survey (WAS) that is not yet the basis for published research findings in the area of consumer debt; ${ }^{1}$
- uses appropriate empirical methods to discover the factors that increase risk of credit card delinquency amongst the 16-35 age group.

With respect to credit card delinquency, the study concludes that personal demographic and socio-economic characteristics which have been found to be relevant predictors of fragile personal finances in previous research are relevant also in the case of credit card delinquency amongst young persons in the UK. Gender, ethnicity and education are discovered to be important determinants of the risk of delinquency and there is some evidence that personal attitudes to financial risk may also be relevant.

[^0]With respect to financial literacy and policy making, the study concludes that there is a need for the Government and the policy makers to promote financial education across the population with emphasis on young adults, particularly males without Higher Education and ethnic minorities. Moreover, policy makers should acknowledge the presence of uncertainty in consumer debt decisions and incorporate seminars on risk awareness in the educational system and labour market.

## INTRODUCTION

Personal debt has become an issue of economic and social concern and intense public debate, especially since the 2007/08 global financial crisis. Lenders in the UK have since then been forced to write off billions in bad debts. Yet, consumer debt in the UK currently exceeds GBP 1.426 trillion, an amount nearly as high as the country's GDP in $2012 .{ }^{23}$

Perhaps more alarmingly, the make-up of debt has also changed. Whereas historically it chiefly concerned individuals on social benefits, it nowadays affects a significant proportion of homeowners and middle class professionals, a phenomenon accentuated by the recent financial crisis, which resulted in austerity, lower disposable income and, in certain cases, unemployment. Debt-ridden individuals struggle to service their debt, be they mortgages and other secured loans or unsecured debt, such as credit card debts.

Condemnation for Britain's well-established 'buy now, pay later' culture that creates a false impression that the future will be better than today is often expressed. Nevertheless, in sharp contrast with the undue amounts of consumer debt, cheap credit and expectations of higher house prices drive the recovery of the UK economy, creating an apparent reliance on the debtfuelled consumers.

[^1]In the light of the above, this study examines consumer debt decisions and seeks to identify the factors that may lead to credit card delinquency in the UK. The structure of the study is as follows:

Chapter I offers an overview of existing research about consumer debt. A substantial literature, which focuses chiefly on the US due to the availability of relevant data sources, documents the major factors influencing consumer debt. Such factors span from demographic and financial characteristics to psychological and attitudinal traits and place emphasis on problem debt. The chapter also discusses the literature that studies population cohorts which are more at risk, such as young people, students and low income households. The distinction between secured and unsecured debt is well documented, as is the role of the life cycle hypothesis in debt accumulation.

Chapter II provides an overview of the UK credit market accompanied by relevant time series data. It proceeds with a close examination of i) the frequency of unsecured arrears and ii) the volumes of both outstanding mortgage as well as (outstanding) credit card debt across all age groups using data from the first wave of the Wealth and Assets Survey. Household debt is then broken down in its core types: credit card spending, personal loans and student loans [unsecured debt], and, mortgage-related borrowing [secured debt] alongside current data. To offer a pragmatic insight into the UK household debt reality, real-life examples of credit consumption are discussed and the downside risks -in light of the prevailing uncertainty and one's expectations- are identified.

Chapter III explores consumer debt decisions under uncertainty; it examines the principles of incalculable risk (ambiguity) and argues that the level of ambiguity faced by consumers is affected by the amount of information available to them. This is reflected in the exaggerated optimism that characterises the debt-stricken group of consumers, who often take
uninformed decisions and make no allowances for potentially negative contingencies. Such consumers may fall into the trap of unmanageable debt as a result of lack of scenario planning, poor money management and ultimately inappropriate financial decisions.

In view of the above, Chapter III ${ }^{4}$ reviews the results of the target market analysis carried out as part of the Thoresen Review of Generic Financial Advice (GFA) (Thoresen (2007), Thoresen (2008)) and discusses policies that have been implemented or proposed in Britain with the aim of promoting financial capability, whilst making policy recommendations that promote financial education and enable well informed decisions, reducing the 'unknown'.

In our increasingly cashless society, managing credit card debt is often regarded as challenging. Being a convenient payment method as well as an easy source of financing, credit cards are one of the key means of payment for everyday purchases. Consequently, credit card payment arrears are regarded as a sign of financial fragility. Chapter IV investigates credit card payment arrears amongst our group of focus, those aged between 16 and 35, in the UK and uses data from the first wave of the Wealth and Assets Survey (WAS) collected between July 2006 and June 2008. The empirical analysis employs a logit model, in which a number of financial, demographic and behavioural characteristics are considered in order to explain the incidence of arrears in credit card payments. Overall, the findings are consistent with recent studies of personal financial fragility. However, we find

[^2]evidence that certain variables, for example ethnicity ${ }^{5}$, have an importance that has not been extensively highlighted hitherto.

Following the same model specification and employing the same set of explanatory variables, Chapter V replicates the econometric analysis carried out in Chapter IV with mortgage arrears as the dependent variable. The aim of this exercise is to establish the differences and/or similarities between the determinants of arrears in secured vs. unsecured debt servicing. It addresses the question of comparability between the two types of debt and discusses the results of the analysis.

The study finishes with a concluding chapter in which the key features and findings of the thesis are summarised. Policy recommendations pertinent to the findings are made and suggestions for further research are offered.

[^3]
## CHAPTER I- Literature review

## 1. Introduction

Personal debt has become an issue of economic and social concern, especially since the 2008-2009 global financial crisis. It could be argued that the crisis weakened the financial position of already vulnerable economic units, those with low incomes, less education and relatively few assets, leading to an increased number of cases of unmanageable personal debt.

This chapter offers a review of the existing literature in the area of personal debt. In particular, it summarises the key findings of available research in respect of the determinants of household and individual debt. Whilst we adopt a worldwide approach to ensure that the subject matter is sufficiently covered, the geographical focus of the review and the study as a whole is the United Kingdom. It is noteworthy that personal debt continues to be significant in the UK, with the average household debt, including mortgages, standing at GBP54,110 in July 2013 (GBP54,014 in the preceding June); similarly, the value of average household debt, excluding mortgages, was GBP6,005 in July 2013 (GBP5,931 in the previous month). ${ }^{6}$

The chapter is organised in the following sections: an overview of the empirical work on personal debt through the prism of certain cohorts and key datasets [2] followed by a more detailed review of the work done on unmanageable ('problem') debt [3]. The ensuing section [4] distinguishes between secured [4.1] and unsecured debt [4.2] and outlines the core findings of relevant research. This is followed by an overview of the permanent income hypothesis and the role of credit and borrowing

[^4]constraints [5], as highlighted in the existing literature. The chapter concludes with an account of those psychological and attitudinal factors [6] that researchers highlight as pertinent to the development of personal debt.

## 2. Empirical work on personal debt

A significant amount of research on the determinants of household and/or individual-level debt has been carried out over recent years. Prominent examples include Dessart and Kuylen (1986), Ford (1988), Coles (1992), Livingstone and Lunt (1992), Lea et al. (1993), Tokunaga (1993), Webley (1994), DeVaney and Lytton (1995), Ford et al. (1995), Walker (1996), Lea (1999), Böheim and Taylor (2000), Sullivan et al. (2000), Chien and Devaney (2001), Crook (2001), Kempson (2002), Bridges and Disney (2004), Kempson et al. (2004), Brown et al. (2005b), Brown and Taylor (2005), Stone and Maury (2006), Kamleitner and Kirchler (2007), Legge and Heynes (2009) and Mewse et al. (2010).

Brown and Taylor (2005) investigate the determinants of debt and financial asset accumulation at the household level in the United States, Germany and Great Britain using data from the Panel Study of Income Dynamics (PSID), the German Socio-Economic Panel (GSOEP) and the British Household Panel Survey (BHPS), respectively.

They, as in Bertaut and Starr-McCluer (2002), employ a tobit model to separately explore the determinants of debt and assets at the household level. The findings (here discussed with reference to Great Britain only) highlight that sex, marital status, income of both the household head and that of his/her spouse, unearned income, number of children and household size are significantly associated with both asset and debt accumulation. Educational attainment has a significant relationship with financial asset
accumulation only. Similarly, house value is also related to financial assets, albeit weakly, while age -being insignificant- denotes no life-cycle effect.

Their findings, in line with existing research (Lamont and Stein 1999, Aoki et al. 2004, Nickell 2004, Almeida et al. 2006 and lacoviello 2005), suggest a positive relationship between household assets and debt. The authors, however, stress that 'debt outweighs financial assets for a significant proportion of households'7, which mainly consists of the poorest and youngest ones, in Great Britain.

Crook (2001) explores the determinants of household debt in the US, using data from the Survey of Consumer Finances (SCF) spanning the period from 1990 until 1995. He finds that income, home ownership, family size are positively associated with debt. Bertola and Hochguertel (2007) analyse the household debt portfolio, outline the main characteristics of debt instruments and explore the categories of personal debt. They also evaluate the measurement issues arising from the use of different types of data (principally focusing on a comparison between administrative ${ }^{8}$ and panel data).

### 2.1 Available datasets in the UK and the US

A plethora of research on personal debt is based on US datasets: Godwin 1997, Crook 2001, Crook 2003a, Cox and Jappelli 1993, Jappelli 1990, Cox and Jappelli 1990, Gross and Souleles 2002, Bertaut and Haliassos 2006, Stone and Maury 2006, Brown et al. 2010, Bricker et al. 2011, Lusardi et al.

[^5]2011, amid academic interest surfacing from the United Kingdom (Bridges and Disney 2004, Brown et al. 2005a, Brown et al. 2005b, Bridges et al. 2006b, Tudela and Young 2005, Disney et al. 2008, Mewse et al. 2010).

A possible reason for this belated development is the lack of British datasets which could facilitate an in-depth analysis of personal debt. And although the majority of researchers have thus far employed the British Household Panel Survey (BHPS) followed by the Families and Children Study (FACS), the Family Resources Survey (FRS) and the Family Expenditure Survey (FES), these datasets contain restricted information on individual and household debt. For example, the FRS offers an insight to mortgage repayments, whereas the FES only holds personal loans related data. Similarly, the Financial Research Survey (FiRS) and the General Household Survey (GHS) are general surveys and therefore lack an adequate variety of variables related to personal debt.

In comparison, there are two surveys in the US which are widely-used for the purpose of consumer debt analysis: the triennial Survey of Consumer Finances (SCF) and the Consumer Credit Panel (CCP). The former, introduced in 1983, is the most widely used and thorough data source for such studies in the US for it gathers information on families' balance sheets, enables research on the demand and supply of credit and offers insight to credit constraints, adverse selection and search behaviour (Crook 2005).

The Survey of Consumer Finances (SCF) is regarded as the most thorough source of data on credit card use in the US. Nevertheless, researchers using the particular data source may ignore the possibility of it undercounting credit card borrowing, argue Zinman (2009) and Brown et al. (2011). Having compared each SCF survey year from 1989 to 2004 with lender-side data ${ }^{9}$,

[^6]Zinman (2009) finds that the SCF gives much lower revolving debt estimates than the industry data, although both are comparable in account totals and credit card charges.

No obvious explanation for SCF undercounting ${ }^{10}$ of credit card borrowing is identified, but a caveat is expressed "if it is correlated with an observed heterogeneity in preferences, resources, or another factor that us in turn correlated with outcomes if interest like financial condition, consumption paths or portfolio choice." (Zinman, 2009, p. 262)

We acknowledge the view that considers the intentional underreporting of the size of personal debt to be problematic for household surveys (Wyner (1980), Meansetal (1992)). Like a large number of researchers in the area of consumer debt, we nevertheless carry out our analysis using the available survey data. In our study we do not use the size of credit card debt but rather whether or not the respondent has had difficulties meeting minimum monthly repayments. We hope, but cannot guarantee, that this different angle of questioning is less at risk of inaccurate responses.

A new UK survey, the Wealth and Assets Survey (WAS), which was launched in 2006, is designed to provide targeted information on assets and liabilities at the individual and household level in the UK. The WAS is discussed in more detail in chapter IV.

### 2.2 Cohorts of focus

Due to data limitations (as noted above) and for reasons of focused analysis, researchers work on specific cohorts of consumers, who they can reach and investigate more easily. In particular, extensive research has been done in the area of student credit card debt: Feinberg et al. (1992), Makela et al.

[^7](1993), Davies and Lea (1995), Xiao et al. (1995), Politano and Lester (1997), Leach and Hayhoe (1998), Munro and Hirt (1998), Roberts (1998), Hayhoe et al. (1999), Hayhoe et al. (2000), Jamba-Joyner et al. (2000), Kidwell and Turrisi (2000), Pinto et al. (2000), Warwick and Mansfield (2000), Austin and Phillips (2001), Palmer et al. (2001), Pinto et al. (2001a), Pinto et al. (2001b), Roberts and Jones (2001), Yang and Lester (2001), Bianco and Bosco (2002), Hayhoe (2002), Joo et al. (2003), Lyons and Hunt (2003), Mansfield et al. (2003), Norvilitis et al. (2003), Braunsberger et al. (2004), Cunningham (2004), Lyons (2004), Pinto et al. (2004), Yang et al. (2004), Hayhoe et al. (2005), James et al. (2005), Lester et al. (2005), Pinto et al. (2005), Bowen and Jones (2006), Norvilitis et al. (2006), Pinto and Mansfield (2006a), Pinto and Mansfield (2006b), Adams and Moore (2007), Allen et al. (2007), Mansfield and Pinto (2007), Pirog and Roberts (2007), Nelson et al. (2008), Norum (2008a), Norum (2008b), Oosterbeek and van den Broek (2009), Robb and Sharpe (2009), Wang and Xiao (2009), Watson (2009), Joireman et al. (2010), Norvilitis and MacLean (2010), Robb and Pinto (2010), Robb (2011).

Similarly, low income households have been the research object of a number of studies about debt (Bowers 1979, Zhu and Meeks 1994, Bridges and Disney 2004, Christen and Morgan 2005). Bridges and Disney (2004) evaluate low-income households' access to credit as well as examine their attitude towards arrears and default ${ }^{11}$. It is concluded that the differences in credit consumption and default across low income households in Great Britain are influenced by labour market status, age, access to social security

[^8]benefits and household composition, whilst Christen and Morgan (2005) propose that income inequality to some extent influences consumer debt.

### 2.3 Financial literacy

Norvilitis et al. (2006) examine the predictive power of money attitudes, personality factors and financial knowledge. Lack of financial knowledge is the strongest predictor of debt, followed by the number of credit cards and credit card use habits, attitudes towards possessions and spending, and delay of gratification. On the other hand, sensation seeking, materialism and demographic variables (except for age) are not found to predict debt.

Lusardi (2008a) views financial literacy as one of the essential tools for individuals in taking sound financial decisions and argues that lack thereof leads to financial mistakes that have a negative impact not only on the individuals but on the society as a whole. The research underscores that although financial illiteracy is common across the population, it plagues ethnic minorities, women and those with low education the most (Lusardi 2008b).

To further explore the characteristics of the financially literate, Lusardi and Tufano (2009) investigate debt literacy using data from a sample of 1,000 US respondents to a phone interview. Taking into account the interviewees' assessment of their own debt levels, they find that those who pay their monthly credit card bills in full are more debt literate and financially knowledgeable, whereas those who hold costly borrowing are less financially skilled and of vulnerable demographic groups (e.g. elderly, women, low income and wealth, certain ethnic minorities).

Similarly, those whose financial decisions incur fees or penalties that could have been avoided are less debt literate and do not possess sufficient
financial knowledge. The authors conclude that financial literacy is related to the choices that people make with less knowledgeable people taking more costly decisions.

In the UK, Disney and Gathergood (2013) use data from YouGov's online quarterly Debt Track Survey to examine the relationship between financial literacy and the respondents' credit portfolios. Not dissimilar to Lusardi and Tufano (2009) they find that less financial literate individuals hold higher portions of costly credit than those who are more financially skilled.

How likely are such individuals to plan for the future; for example, plan towards retirement? Lusardi (2008b) concentrates on retirement planning and finds that lack of information and low financial literacy influence the ability to save (accumulate wealth) and to plan one's retirement (Lusardi and Mitchell 2007b). Similarly, Lusardi and Mitchell (2007a) use two cohorts of data from the Health and Retirement Study (HRS) in 2004 and 1992 to study and compare the planning behaviour and financial knowledge of people close to retirement age.

The researchers investigate whether (retirement) planning influences the accumulation of retirement wealth and report that those respondents who are said to have planned for retirement enter retirement with higher wealth levels than those who claim to have done no planning. Moreover, they find financial literacy positively correlated with planning.

Further analysis by Lusardi and Mitchell (2008) on older women, a particular population cohort susceptible to old-age poverty due to their longer longevity and shorter work experiences than men, unveils that a) women have much lower levels of financial literacy than the older population as a whole and $b$ ) those women who display lower financial literacy levels are less likely to plan ahead for their retirement.

## 3. Emphasis on 'problem debt'

Cox et al. (2002) explore the levels of financial distress across British households. Having performed a descriptive data analysis, they conclude that it is households with high levels of both income and net wealth that possess the highest levels of debt (in absolute terms). Such households, despite the accumulated debt, are expected to be resistant towards temporary adverse financial shocks (Deaton 1991), treating their assets as a safety net (Angeletos et al. 2000). The fact that these households still hold debt, although it is probably more costly for them (debt repayments typically have higher interest rates than those received from -for instance-savings) is intriguing, nonetheless. Assuming that these households are not continuously using interest-free arrangements (for instance, 0\% balance transfers on credit cards) to revolve their debt, it can be argued that a group of households consider debt holding to be preferable to debt repaying through dissaving. ${ }^{12}$

May and Young (2005) develop indicators of financial distress based on arrears, insolvencies and self-reported aspects of the burden of debt, in order to explore the debt experience across British households. Using timeseries and household-level evidence (as provided by the BHPS), they suggest that the financial circumstances across households are characterised by stark heterogeneity. Particularly a significant difference between homeowners and renters has been reported; the perceived burden of unsecured debt is significantly lower for the homeowners. Moreover, high risk households have been more heavily burdened with unsecured debt over time, whereas the riskiness of mortgage debt has fallen sharply since the 1990s.

[^9]Rinaldi and Sanchis-Arellano (2006) examine household financial fragility, in order to elucidate the nature of the large debt increase over the preceding years. Particularly, they use information on non-performing loans (i.e. loans in arrears for at least 3 months) since the latter constitute an indicator for household financial fragility. The database they use covers seven countries (Belgium, France, Finland, Ireland, Italy, Portugal and Spain) of the euro area and consists of quarterly time-series for the household sector from 1989Q3 to 2004Q2.

The theoretical model that calculates the probability of falling into arrears is explored empirically using the ratio of total household debt to household disposable income, the real disposable (household) income, the ratio of household gross financial assets to disposable income, the real lending interest rate, the unemployment rate, the inflation rate, the house price index and the ratio of owner-occupied dwellings (treated as a proxy of the share of collateralised loans) as explanatory variables. The results indicate that an increase in the debt ratio will not trigger higher levels of arrears, as long as it is accompanied by a rise in disposable income. In reality, however, income has grown less than the ratio of debt in the countries under investigation. That shows that the increase in the debt ratio has put the household sector at a riskier financial position.

Lusardi et al. (2011) study the ability of Americans to respond to a financial emergency -in this case finding USD2,000 in 30 days- using data from the 2009 TNS Global Economic Crisis survey. Their investigation highlights that a remarkably high number of Americans -one quarter- reports inability to respond to such an emergency call for money, whilst another 19\% could come up with the required funds by resorting to payday loans, pawning or selling their belongings, as necessary. The researchers find that financial fragility has extended beyond unemployed individuals with dependents, low
educational qualifications and poor financial literacy, becoming a growing concern amongst a significant number of 'middle class' Americans.

Amongst the empirical studies of household debt accumulation is that of Dessart and Kuylen (1986) who employed group factors to investigate the causes of problematic debt amongst households in the Netherlands. They concluded that i) institutional, ii) behavioural, iii) socioeconomic and iv) psychological factors affect the accumulation of problematic debt. Lea (1999) distinguishes between credit use, debt and problem debt in order to emphasise on unmanageable (debt) situations, in which households cannot repay loans or meet regular debt payment commitments, as opposed to manageable credit arrangements.

Kempson et al. (2004), commissioned by the UK Department for Work and Pensions, are mandated to examine the nature of indebtedness as well as the characteristics of the households suffering from 'problem debt' (Kempson et al. 2004, p. 7). The researchers investigate the factors that are believed to have a significant impact on being in arrears using information from the Department of Trade and Industry (DTI) -commissioned Over-indebtedness Survey (OdS) conducted in 2002. Without distinguishing between different types of households, they find that differences in housing tenure, age group, drops in income, active credit commitments and whether a current account is being used to manage money are significantly associated with the risk of arrears (ibid, p. 32). However, the findings are modified once they focus on families with children in the OdS (housing tenure, income reduction and active use of credit are the only statistically significant factors), whereas when looking into families with children but using information from the Families and Children Survey (FACS) ${ }^{13}$ more variables are found significant (savings, housing tenure, health, age, family size and religion).

[^10]
## 4. Determinants of secured and unsecured debt

Whitley et al. (2004) focus on determining the factors that affect mortgage (secured borrowing) arrears and those responsible for credit card (unsecured borrowing) arrears at the (aggregate) household level in the UK. They argue that although debt has risen (in both absolute terms as well as in relation to income) considerably since 1997, the percentage of mortgage loans in arrears has been reduced. On the contrary, the value of credit card arrears (with respect to the value of credit card balances) has increased.

They use a time-series approach in order to examine the factors that fuel consumers' attitude towards mortgage arrears. Their reduced-form empirical model, which employs variables suggested by previous studies ${ }^{14}$ (such as measures of income gearing, unemployment rate, level of (undrawn) equity and loan-to-value (LTV) ratios), ${ }^{15}$ indicates mortgage income gearing as the most significant variable. The unemployment rate, the amount of undrawn equity and the LTV for first-time buyers are also significantly related to mortgage arrears.

Similarly, their model on credit card arrears entertains a number of variables suggested by the existing literature such as income gearing, unemployment, wealth, consumer confidence and proxies for the growth of the credit card market. ${ }^{16}$ According to the findings, both income gearing and the number of active credit cards have a significant impact on credit card arrears, whereas (un)employment is not statistically significant.

[^11]Lending arrangements for unsecured and secured debt differ in some respects, to the extent that theoretical literature has developed differing arguments concerning, for example, the constraints on borrowers' decision making. Considering (mortgaged) borrowing for house-purchase as a leading example of secured debt, the constraint on borrowing is often welldefined; in the UK it is typically expressed as a multiple of income that is applied to all borrowers, or to all borrowers within a given risk class. In contrast, the borrowing constraint faced by an individual taking on unsecured debt, such as credit card debt, is typically less clearly specified and more ad hominem.

Credit card borrowing limits tend to be specific to the individual and may be subject to upwards revision upon request by that individual. Chatterjee et al. (2008) point out that the constraint upon unsecured borrowing may in fact be decided by the borrower themselves as an instrument for establishing their reputation and credit worthiness in other financial arrangements. Consequently, there is more opportunity for individuals' personality and circumstances to influence their take up of unsecured debt than is offered by the less flexible constraints of secured borrowing.

### 4.1 Secured debt

It should be noted that the analysis of the levels of housing ownership and, effectively, borrowing for a house purchase in the United Kingdom is particularly interesting due to -in principle- institutional reasons: the UK, an early credit market deregulator, is characterised by high levels of mortgage, high house price volatility, as well as high levels of home ownership (in comparison with other European countries).

Böheim and Taylor (2000) look at housing evictions and arrears of renters and homeowners for the period 1991-1997, while Coles (1992) employs
information from a Council of Mortgage Lenders (CML) survey, in order to ascertain the determinants of repossessions and arrears, without distinguishing between different types of the latter. The study's findings suggest that unemployment, income shocks, business failure, a relationship breakdown as well as poor financial management are the most salient factors that can lead to arrears. It is also shown that the majority of households in (serious) arrears still make regular and relatively substantial (debt) repayments, while repossessions take place typically after being in arrears for about six months.

May and Tudela (2005) analyse the dynamics and determinants of a selfreported measure of financial distress among households with mortgage debt. The study notes that the burden of secured debt is related to net wealth, but highlights that it is the original loan-to-value (LTV) ratio taken out by mortgagors -rather than the current LTV ratio- that has a significant effect. It is also found that regular saving lessens the likelihood of reporting mortgage payment problems.

The relationship between rising housing equity and household debt in the UK is explored by Bridges et al. (2006b) using BHPS and FACS data. They note that although home ownership (in essence, housing wealth) provides easier access to unsecured debt (due to the former acting as evidence for the borrower's credit-worthiness, as argued by Bester 1985), higher housing equity is not proved to have an effect on either greater aggregate amounts of unsecured debt or greater arrears on outstanding debt.

Chan and Kanatas (1985) look into the role of collateral in-loan agreements under a context of asymmetric valuations. They argue that collateral is an instrument employed by the borrower in order to transmit information about her financial situation. Under the context of asymmetric valuations (caused by different beliefs between the borrower and the lender) the use of collateral
can be quite crucial; for instance, in case the lender's valuation of the borrower's financial situation is lower than that of the latter, then the borrower is inclined to offer collateral as a way to secure a more favorable loan rate.

Bridges et al. (2006a), using data from the BHPS, examine the existence of a financial accelerator ${ }^{17}$ in relation to households that have access to both secured and unsecured debt. The empirical results highlight that the existence of collateral -irrespective of its size- is positively related to access to unsecured debt, while households that face more binding collateral constraints have higher levels of unsecured debt. The hypothesis that 'rising collateral values allow households with high values of unsecured debt to substitute secured for unsecured debt' (ibid, p. 23) is statistically and theoretically supported.

### 4.2 Unsecured debt

Credit cards ${ }^{18}$ are another potential cause of problematic debt, which is reflected in the growing number of studies that focus on this type of unsecured borrowing and examine it through the prism of consumer behaviour, ownership and usage practices, as well as debt, default rates, delinquencies and bankruptcies (Hirschman 1979, Garcia 1980, Kinsey 1981, Feinberg 1986, Feinberg et al. 1992, Stavins 2000, Grieb et al. 2001,

[^12]Hamilton and Khan 2001, Kaynak and Harcar 2001, Kim and Devaney 2001, Agarwal and Liu 2003, Norvilitis et al. 2003, Bernthal et al. 2005, Goyal 2006, Norvilitis et al. 2006, Scott 2007, Sprenger and Stavins 2008, Ding et al. 2009, Wickramasinghe and Gurugamage 2009 and Wang et al. 2011).

Del-Rio and Young (2005) investigate financial distress through unsecured debt problems. Particularly, the responses to a specific BHPS question (included in waves 5 and 10 of the survey), asking whether the repayment of unsecured debt (if any) constitutes a financial burden, are employed as a self-reported indicator of financial distress. The results of the estimation of an ordered logit model indicate that the factors that exert a significant impact on (unsecured) debt problems are the unsecured debt-to-income ratio, the level of mortgage income gearing, the level of the household's (financial) wealth, the household members' health, ethnicity, marital status, as well as whether a household member is unemployed.

A key finding is that the housing status affects the possibility of facing debt problems in two opposing ways: a) having mortgage debt puts a further strain on one's outgoings; hence, an increase in the likelihood s/he will face debt problems, and b) homeowners not only have easier access to credit than non-homeowners (Bridges et al. 2006a), but also borrow on better terms, therefore decreasing the likelihood that they will face debt problems. It is also worth highlighting that although unsecured debt (amongst the BHPS respondents) almost doubled between 1995 and 2000, there was no change in the amount of the respondents who perceived unsecured debt as 'somewhat of a burden' or, even, 'a heavy burden'. The authors refer to this as 'a general softening in attitudes towards debt' (Del-Rio and Young 2005, p. 29), whilst noting that young (May et al. 2004) and low-income households are more likely to not only report debt problems but also be vulnerable to potential (income and interest rate) shocks.

Whilst Chien and Devaney (2001) concentrated on identifying the factors predictive of installment and credit card debt, Stavins (2000) employed the number of credit cards, their outstanding balance and other demographic factors to predict bankruptcy and delinquency levels. May et al. (2004) evaluate unsecured debt levels and investigate the evolution of debt problems over time in the UK, with reference to the findings of the 2004 NMG Research ${ }^{19}$ survey commissioned by the Bank of England. The survey that includes 1,838 respondents across the UK addresses questions regarding one's unsecured and secured borrowing, housing-related wealth, as well as attitude(s) towards debt.

The findings of May et al. (2004) demonstrate the existence of considerable life-cycle effects (presented in more detail in section 5 of this chapter) on household indebtedness (Wells and Gubar 1966, Webley and Nyhus 2001 and Baek and Hong 2004); in particular young households stand a greater chance of being in debt, as opposed to older households. It is concluded that household debt is still affordable due to high house price inflation and the avoidance of loans with high loan-to-value (LTV) ratios by more households.

### 4.2.1 The 'accountant-shopper' model

Cox et al. (2002) observed that a considerable number of US households have revolving credit card debt, whilst -simultaneously- holding substantial

[^13]liquid assets. This motivated Bertaut and Haliassos's (2006) study of households' decision to not only be in the possession of a credit card, but also revolve debt in it, using data from successive waves of the SCF. Having rejected the role of bankruptcy motives and/or financial distress in one's taking such a decision, the authors propose an 'accountant-shopper' model.

The 'accountant-shopper' model, according to which a rational accountant attempts to control an impulsive shopper, confirms the significant impact of self-control: it either discourages consumers from applying for a credit card altogether, or encourages the accountant type of consumers who already own a credit card to leave little room for overspending to their shopper counterparts, by constantly revolving a balance on the card.

In light of the literature and their own analysis, Bertaut and Haliassos (2006) argue that "credit cards provide a most fertile ground for analysing consumption behaviour, payment and repayment choice (including bankruptcy and delinquency), portfolio selection regarding both assets and debts, and the elusive nature of consumer preferences." (ibid, p. 37)

## 5. The Life Cycle Hypothesis and the role of borrowing constraints in personal debt

The Life-Cycle Hypothesis (Modigliani 1970) is regarded as "a model in which consumption decisions are determined within the intertemporal optimization framework." (Attanasio 1999, p. 745) Simply put ${ }^{20}$, households with a given anticipated income stream plan an optimal life-time consumption pattern, with associated periods of saving and dis-saving, such that debts

[^14]incurred during periods of dis-saving do not exceed what can be serviced by the anticipated income stream.

Households may enter into debt, especially whilst young - for example to finance the purchase of lumpy consumer durables, with the expectation that future income will be sufficient to both pay for planned future consumption and also service the debt.

If households expect their income to rise over time, they will, according to the theory, borrow when they are young. The four successive phases of borrowing and saving activities over a consumer's life cycle, as outlined by Berthoud and Kempson (1992) and Attanasio (1999), are tabulated below.

Table 1-Borrowing and saving over life cycle

| Period (age <br> group) | Income | Change in <br> Income | Activity |
| :---: | :---: | :---: | :---: |
| Young adult | Below lifetime <br> average | Rising fast | Borrowing |
| Young middle <br> age | Above lifetime <br> average | Rising slowly | Repaying <br> Borrowings |
| Older middle <br> age | Above lifetime <br> average | Falling slowly; <br> big fall expected | Saving |
| Elderly | Below lifetime <br> average | Falling slowly | Spending <br> Savings |

Source: Berthoud and Kempson (1992, p.10)

Jaffe and Russell (1976) and Stiglitz and Weiss (1981) extend the theory in order to allow for credit constraints, whilst Webley and Nyhus (2001) and Bernthal et al. (2005) look into the effects of lifecycle stages on consumer debt and Baek and Hong (2004) focus on the lifecycle stage with respect to predicting the likelihood of getting into credit card and installment debt.

The 2006 NMG Research survey asks respondents who report problems with paying off their debts for the cause of these difficulties. According to Waldron and Young (2006), the prime reasons given are 'temporary cashflow shortfalls and overspending' (ibid, p. 100). It can therefore be argued that households view their debt-related problems as either a temporary phase or as a result of their own choices (e.g. poor money management). The authors report that while most respondents do not perceive bankruptcy as a solution to their debt problems, approximately $16 \%$ of those interviewed admit being subjected to either perceived or actual credit constraints. This particular group of interviewees also holds more unsecured debt than those who reported no constraints.

Cox and Jappelli (1993) investigate whether the presence of borrowing (liquidity) constraints affects debt accumulation. The study explores whether there is a gap between observed and desired debt and estimates its extent. It is claimed that borrowing constraints constitute the reason why desired debt is higher than actual debt. The authors use data from the 1983 SCF as it contains questions about whether households were denied credit or, even, were discouraged from applying (in case their application would be turned down). They build a 3-equation generalised Tobit scheme and estimate 'household liabilities conditional on holding positive debt and being unconstrained in the credit market.' (Cox and Jappelli 1993, p. 201)

Han and Mulligan (2001) emphasize the role of borrowing noting that debt is likely to be boosted by the desire of households to materialise their investment plans. Cox and Jappelli (1993), however, highlight that '[d]esired debt predicted from the characteristics of the credit-constrained is 75 percent higher than their actual debt' (ibid, p. 198); should the liquidity constraints be removed, the aggregate debt holdings would increase by $9 \%$. Evidently, liquidity constraints affect the borrowing behaviour of those unable to obtain the credit they want; consequently relaxing such constraints would benefit
the credit-constrained group, particularly young households for whom the gap between desired and observed debt levels is at its highest.

Crook (2003b) compares the results of studies on the supply and demand of (consumer) credit across several countries -primarily EU ones- and concludes that the life cycle pattern is present in debt holdings by age in all countries under investigation. Crook and Hochguertel (2006) investigate as well as compare the determinants of (household level) credit constraints across the US, Spain, Italy and the Netherlands, using micro data ${ }^{21}$ that span over the last 15 years. Credit constraints are measured from selfreports on having been turned down for a credit application, while discouraged potential applicants are also accounted for.

In order to enable meaningful comparisons across countries, the authors employ single equation models, where a household's decision to apply for credit depends on exogenous variables (i.e. log current income, log difference between current and permanent income, age and $\log$ net worth, as well as taste shifters ${ }^{22}$ ) suggested by the existing literature to be in line with the Permanent Income Hypothesis (PIH).

### 5.1 Institutional factors

Duygan and Grant (2006) investigate the role of institutional factors in household arrears by focusing on cross-country differences as well as on the panel nature of the data; the latter originate from the European Community Household Panel (ECHP) and are used in order to extract the determinants of household debt arrears.

[^15]The empirical analysis has highlighted that the most common cause of default is an income shock (Cox et al. 2002, Del-Rio and Young 2005), despite the fact that certain types of households, e.g. renters as opposed to homeowners (May and Young 2005), are more prone to fall into arrears. Moreover there are stark differences across countries in households falling behind with repayments, which suggest that institutional factors play an important role in explaining households' attitude towards arrears.

It is also highlighted that it is the level of severity of the punishment for defaulting that can magnify the extent to which an income shock results in arrears. According to Duygan and Grant (2006), the increase in the incidence of default is greater in countries where information sharing is limited and/or creditor rights are poor. Finally, it is argued that the decision to default is of a strategic nature (Bertaut and Haliassos 2006); households might even find that falling into arrears is the optimal decision to take, in the absence of any other way(s) to insure themselves against shocks. Hence the role of institutions in this context is critical (Crook and Hochguertel 2006).

The econometric analysis ${ }^{23}$ of Crook and Hochguertel (2006) reveals substantial differences across countries -possibly due to institutional disparities (Duygan and Grant 2006)-, the most intriguing of which are:
i. While average debt holdings are greater in the US, a much higher number of US households apply for credit, as opposed to the rest of the countries under investigation. And of those who do apply for credit (in all countries), US households suffer the highest rejection rates.

[^16]ii. Unemployment reduces the likelihood of (proceeding with) a credit application in the US and the Netherlands, while it increases the likelihood of being turned down (or simply discouraged from applying) in the Netherlands and Italy.
iii. Being a single household head reduces the likelihood of applying for credit in all four countries. Wealth, as well as age, reduces the likelihood of being credit constrained. ${ }^{24}$ Similarly, being retired also reduces the likelihood of being constrained in (only) the US. Having a disability is positively related to being constrained (in both the US and the Netherlands).

Jappelli and Pagano (2002) investigate whether information sharing between lenders has any effect(s) on (aggregate) lending activity, and/or reduces default rates. They find that countries where lenders consult credit bureaus or public credit registers before finalising a lending-related decision enjoy higher lending numbers as well as smaller credit risk.

### 5.2 Drivers of personal bankruptcy

Bertola and Hochguertel (2007) note that the implications of bankruptcy regulation for the borrowing behaviour of consumers have been extensively researched in the US (Gropp et al. 1997, Domowitz and Sartain 1999, Grant 2000, Fay et al. 2002, Dick and Lehnert 2007).

Gropp et al. (1997) explore the relationship of personal bankruptcy and bankruptcy exemptions with credit markets. They argue that bankruptcy exemptions have an impact on the supply and demand for credit. Using data from the 1983 SCF and information on US states' bankruptcy exemptions in 1983, they find that state personal bankruptcy exemptions have a significant

[^17](and positive) relationship with the likelihood that households (in the particular state) are either refused credit or discouraged from borrowing.

While the majority of the existing research has concentrated on cross sectional differences in personal bankruptcy, Dick and Lehnert (2007) study the rising number of bankruptcies in the US from a different angle: they evaluate the relationship between credit market competition and consumer default in the US ${ }^{25}$. The results of multiple regression analysis indicate that it is the removal of restrictions to competition (brought forth by the US credit market deregulation ${ }^{26}$ ) and not the changes ${ }^{27}$ in bankruptcy law that are significantly related to the rise in bankruptcies.

Also trying to shed light onto the rising number of personal bankruptcy filing in the US Scott et al. (2005) propose the strategic model of bankruptcy according to which individuals decide to file for bankruptcy when the financial benefits of doing so are greater than the losses. On the contrary, the authors find no support for the non strategic model of bankruptcy, which predicts that individuals file for bankruptcy as a result of an unforeseeable event that compromises their ability to repay.

Although the subject of bankruptcy and potentially its reform remains on the cards across governments, economists have been unable to provide thorough policy recommendations due to the limited amount of data on bankruptcy filings (Scott et al. 2005).

[^18]
## 6. Psychological and attitudinal factors

Livingstone and Lunt (1992), Norvilitis et al. (2003), and Robb and Sharpe (2009) argue that demographic variables have limited explanatory power over the level of debt; similarly Walker (1996) stresses that demographic and economic factors are not significant predictors of debt. Due to the inconsistent ${ }^{28}$ predictive power of demographic variables, researchers have turned to psychological factors (Tokunaga 1993, Lea et al. 1995, Donkers and van Soest 1999, Webley and Nyhus 2001, Barron et al. 2002, Brown et al. 2005a, Brown et al. 2005b, Mewse et al. 2010 and Wang et al. 2011) including attitude towards debt (Livingstone and Lunt 1992, Lea et al. 1993, Zhu and Meeks 1994, Davies and Lea 1995) and personality variables (Lea et al. 1993, Webley 1994, Norvilitis et al. 2006) as predictors of the level of debt.

In particular, studies concentrate on impulsive and compulsive buying (O'Guinn and Faber 1989, Baumeister 2002, Youn and Faber 2002), (excessive) optimism (Scheier et al. 1994, Seaward and Kemp 2000, Brown et al. 2005b), (external) locus of control (Lumpkin 1985, Livingstone and Lunt 1992, Tokunaga 1993, Ding et al. 2009 -although they contrast Lea et al. 1995- and Wang et al. 2008), self efficacy (Sherer et al. 1982, Schwarzer and Jerusalem 1995), deferment of gratification (Ray and Najman 1986), materialism across low-income consumers (Ponchio and Arancha 2008) and money attitudes (Yamauchi and Templer 1982, Lea et al. 1995, Stone and Maury 2006). A representative sample of these studies is presented below.

[^19]
### 6.1 Attitudinal debt triggers

Livingstone and Lunt (1992) look into the economic, demographic, behavioural, social and psychological factors that are associated with personal debt and debt repayment, using a sample of 279 individualsresidents in (and in close proximity to) Oxford- that was collected in September 1991. The authors note that attitudinal factors (i.e. being procredit as opposed to anti-debt) are significantly related to both debt accumulation and debt repayment, while one's disposable income only affects her debt repayment ability (disposable income was unrelated to indebtedness). Livingston and Lunt (1991) argue that age, a significant factor of indebtedness, mirrors generational differences (rather than the life cycle hypothesis).

Lea et al. (1995) argue that in order for the determinants of debt to be explored, one should consider social and psychological factors in addition to the economic variables. Social support for debt, economic socialisation, social comparisons, money management styles, consumer behaviour, time horizons, attitudes and locus of control, are amongst the psychological and social factors that previous studies have claimed to be related to debt.

The authors use data from a survey that was carried out by a utility (water) company, Dwr Cymru Welsh Water and includes households in Wales, as well as households in the county of Hereford and Worcester in England. The questionnaires comprise questions on the social and psychological factors outlined above. The empirical analysis highlights that poor money management has a positive effect on debt. It is, however, the psychology of poverty that -according to the results- has the greatest impact on the psychology of debt. More specifically, debtors evaluate their own money management skills lower, claim that their parents were financially better off
than themselves, have a shorter time horizon and possess less money management facilities than the rest of the households.

### 6.2 Psychological debt triggers

Donkers and van Soest (1999) use certain questions from two waves of the CentER Data panel in order to construct subjective measures of household preferences, such as measures of the rate of time preference, risk aversion and one's interest in financial matters. By and large, the results were strong and in line with the theoretical framework, despite exceptions (attributed -mainly- to data limitations). The authors conclude that the use of such psychological variables is meaningful in exploring consumer behaviour under uncertainty and in a life-cycle context.

Brown et al. (2005a) look into the relationship between psychological distress and debt of household heads using the BHPS. They claim that debt is indeed related to psychological distress and that it is unsecured debt that is more likely to affect psychological well-being than secured debt. Their measures of psychological distress are based on the General Health Questionnaire (GHQ) of the BHPS. ${ }^{29}$

Entertaining a standard ordered probit model, Brown et al. (2005a) also investigate whether there is a significant difference in psychological wellbeing between debtors and non-debtors. They use a series of variables, such as purchases of consumer durable goods, individuals' subjective evaluation of their future financial situation, monthly income, annual savings, investments, windfall payments received over the previous year, outstanding mortgage loans and a subjective estimate of house value for home owners

[^20](ibid p. 651). In line with existing research ${ }^{30}$ on individual psychological wellbeing in the UK, the authors also include 'age, gender, marital status, the number of adults and dependent children in the household, ordinal indicators of self-reported health status, labour market status, housing tenure, car ownership, educational attainment, ethnicity and region of residence' (ibid, p. 651).

The empirical results indicate that the (labour) income of household heads is positively associated with their reported levels of psychological well-being. Also, significantly lower levels of psychological well-being are reported by households with some debt as opposed to those with no debt at all. It was highlighted that heads of household with only secured debt, do not report significantly different levels of financial distress. Individuals' subjective evaluation of their future financial situation is significantly related to their level of psychological well-being.

### 6.2.1 Materialism

Ponchio and Aranha (2008) note that materialism potentially leads lowincome households into installment plan agreements, whilst Webley and Nyhus (2001) support the inclusion of psychological factors (alongside economic variables) in the analysis of consumer debt. They suggest the use of subjective measures of present orientation, self-control, money management, attitudes towards debt (also in Livingston and Lunt 1992 and Lea et al. 1993, whereas Lea et al. 1995 find that attitudes are not associated with debt), as well as one's evaluation of her future financial situation (also in Brown et al. 2005b).

[^21]
#### Abstract

The authors emphasise that being in debt is often short-lived (also supported by Waldron and Young 2006) with the minority of chronic ${ }^{31}$ debtors constituting the only exception. They conclude that the existing literature does not indicate the direction of causality between psychological factors and debt, adding that their dynamic analyses revealed that differences in psychological variables between non-debt-holders and debt-holders may arise as a result of debt accumulation (and not vice versa). Debtors tend to demonstrate lower self-efficacy and an external locus of control, take fewer steps to retain money and regard money as a source of power and status according to Tokunaga (1993).


### 6.2.2 Positive outlook (optimism)

Brown et al. (2005b) investigate the determinants of debt and debt growth at both the individual and household level. The subjective evaluation of one's future financial situation (based on the answers given to the relevant BHPS question ${ }^{32}$ ) is the stepping stone of this analysis. Their theoretical model proposes a positive relationship between one's anticipation of good financial prospects and the quantity of debt. The empirical model also reveals that the size of the effect is considerable: individuals with a positive outlook-even if they otherwise have average characteristics- accumulate approximately double the debt compared to other people in the sample.

It is important to stress that it is one's optimism towards her future financial situation and not the accuracy of her expectations that influences debt growth. On the other hand, one's negative perception of her future financial situation is found to have no significant effect on debt. The results also

[^22]suggest that debt is determined at the individual rather than the household level.

## 7. Conclusion

The chapter reviews the contemporary literature in the area of consumer debt with emphasis on problem debt. Research outcomes on problem debt are discussed, and a distinction is made between secured and unsecured debt.

Our literature review offers an insight into the available datasets in the UK and the US and highlights the introduction of the Wealth and Assets Survey (WAS), a longitudinal survey that looks into the financial wellbeing of individuals -and private households- in Great Britain. This relatively new survey has not yet been a basis for much published research in the area of consumer debt, motivating this study's focus upon it. One noticeable feature of the existing research is that authors have often selected a particular population cohort for study, e.g. students, young individuals, low income households and individuals on the brink of retirement. Exploratory research in the present study suggested that a single model for the surveyed population was not likely to be successful and the study has followed the literature by focusing on a restricted cohort, in this case 'young persons'.

Given the complexity of debt accumulation, the existing literature takes into account a number of factors which may influence one's ability of debt management, such as: financial literacy, the life cycle income hypothesis, psychological and attitudinal factors alongside demographic and economic characteristics, as well as the institutional framework of bankruptcy.

The surveyed research highlights the need for an in-depth analysis of debt incidence, including a search for contextual variables pertinent to its
development. It is argued within the literature that debt is determined at the individual rather than the household level (Brown et al., 2005b). Credit cards are recognised as a particular instance where financial management is a personal activity, reflecting consumers' behavioural traits, as well as their socioeconomic and demographic characteristics (Bertaut and Haliassos, 2006).

In light of the plethora of literature in the area of consumer debt, a summary table outlining the key contributions is provided.

Table 2-Consumer debt: summary of main contributions

| Authors | Dataset | Main emplirical correlates |
| :---: | :---: | :---: |
| Bertaut and Haliassos (2002) | Survey of Consumer Finances $(1995,1998)$ | Choice of whether to (usually) revolve a credit card or not; number of children, non white/hispanic, age, college degree, log income, log nonliquid financial wealth, $\log$ non financial wealth, self employed, not working/unemployed, acceptance to borrow for furjewelry, smoker, saver, shops around for best saving and investment |
| Bertaut and Nyhus (2001) | CentERdata-panel (1995, 1996) | Measure of debt; net income, variation on income, age, number of children, education, attitudes towards debt, conscientiousness, self-control, money management, time preferences |
| Bertaut and StarrMcCluer (2000) | Survey of Consumer Finances (1995) | Consumer debt; marital status, age, log income, log wealth, non white/hispanic, education, selfemployed, home ownership |
| Bridges and Disney $(2004)$ | Survey of Low Income Families | Default among low-income households; labour market status, age, access to social security benefits, household composition |
| Bridges et al. (2006) | Families and Children Survey (FACS) (2001) | Log of the total value of arrears; home ownership, family composition, number of benefits, own age, couple partner's age, education, number of children |
| Brown et al. (2005) | British Household Panel Survey (BHPS) (1995, 2000) | Psychological well-being; age, gender, log labour income, saver, outstanding credit, believes financial situation is worse than one year ago, expects financial situation to worsen in next year |


$\left.$| Authors | Dataset | Main empirical correlates <br> Chien and Devaney <br> (2001) |
| :---: | :---: | :--- |
| Survey of Consumer |  |  |
| Finances (1998) |  |  |$\quad$| Credit card debt; education, marital |
| :--- |
| status, professional status, |
| household size, income, (favorable) |
| general attitude toward using credit | \right\rvert\,


| Authors | Dataset | Main emplirical correlates |
| :---: | :---: | :---: |
| Stone and Vasquez Maury (2006) | Survey combination of Air Force Community Needs Assessment Survey (2000), Air Force Financial Status Survey (2001), Survey of Consumer Finances (1995, 1998), Survey of Active Duty Personnel (1999) | Unsecured personal debt; age, perceived financial condition, number of credit and store cards, money beliefs, income, situational aspects (life altering events in the last 12 months), parents attitudes toward credit card use |
| Wang et al. (2011) | Chinese commercial bank survey | Revolving credit card use; number of credit cards, social class, profession, attitude factors, money attitudes, credit attitudes, debt attitudes, credit limit, personality factors (self-control, self-esteem, self-efficacy, locus of control) |
| Whitley et a. (2004) | Council of Mortgage Lenders (CML) and ONS data | Credit card arrears; supply factors, income gearing, ratio of the value if the mortgage loan to the value of housing equity |
|  |  | Mortgage arrears; level of housing equity, income, interest payments, unemployment, ratio of the value if the mortgage loan to the value of housing equity |

## CHAPTER II- Overview of the UK Credit Market

## 1. Introduction

Debt is a complex phenomenon; it 'entails a promise to repay principal and interest on a loan or advance- a promise whose fulfilment is by its nature uncertain and will differ among borrowers. ${ }^{\prime 33}$ According to Bertola and Hochguertel (2007) the largest items in a typical household's debt portfolio are: a) revolving credit and credit card balances, b) personal loans, c) instalment credit, d) mortgages and other collateralised credit and e) education loans, alimony payments and other forms of government sponsored/regulated credit.

The ensuing sections show time series for household debt in the UK over recent years followed by a close examination of i) the frequency of unsecured arrears and ii) the volumes of both outstanding mortgage as well as (outstanding) credit card debt across all age groups using data from the first wave of the Wealth and Assets Survey [section 2.Household debt].

Household debt is then broken down into: i) unsecured debt (credit card spending; personal loans; student loans) and ii) secured debt (mortgagerelated borrowing). Each type of secured and unsecured debt is discussed and supported by relevant data [section 3.Types of secured and unsecured debt]. Real-life examples of credit consumption are presented and downside risks are identified in light of the prevailing uncertainty and one's expectations [section 4. The downside risks].

[^23]
## 2. Household debt

The two main types of household debt are i) unsecured, such as personal loans and credit cards, and ii) secured debt, such as mortgages and other collateralized debt. The table below presents the household debt to income ratio for the UK between 1995 and 2012.

Table 3- UK household debt

| Year | Household debt in the UK <br> (\% of net disposable income) |
| :---: | :---: |
| 1995 | 109.7 |
| 1996 | 106.6 |
| 1997 | 107.1 |
| 1998 | 108.7 |
| 1999 | 113 |
| 2000 | 115.7 |
| 2001 | 121.6 |
| 2002 | 133.9 |
| 2003 | 145.1 |
| 2004 | 157.4 |
| 2005 | 160.4 |
| 2006 | 171.7 |
| 2007 | 179.8 |
| 2008 | 174.9 |
| 2009 | 167.9 |
| 2010 | 160.1 |
| 2011 | 155.9 |
| 2012 | 151.5 |
|  | Source: OECD |

It is evident that household debt has risen over the years with the exception of the period between 2008-2012. One may argue that the decline in household debt has been in part affected by the most recent financial crisis and the resulting tightening in spending as well as lending. Historical data of the latter -in particular, credit card; total unsecured; secured and total lending- is also provided:

Table 4- Lending in the UK (time series)

| Date | Total net credit card lending to individuals in sterling millions | Total net unsecured lending to individuals in sterling millions | Total net secured lending to individuals and housing associations in sterling millions | Total net lending to individuals and housing associations in sterling millions |
| :---: | :---: | :---: | :---: | :---: |
| $\begin{gathered} \text { Dec- } \\ 87 \\ \hline \end{gathered}$ | 5,826 | not available | 165,158 | 201,526 |
| $\begin{gathered} \hline \text { Dec- } \\ 88 \\ \hline \end{gathered}$ | 6,491 | not available | 207,268 | 240,961 |
| $\begin{gathered} \text { Dec- } \\ 89 \end{gathered}$ | 7,034 | not available | 256,572 | 296,427 |
| $\begin{gathered} \text { Dec- } \\ 90 \end{gathered}$ | 8,760 | not available | 293,665 | 346,798 |
| $\begin{gathered} \text { Dec- } \\ 91 \end{gathered}$ | 9,510 | not available | 319,578 | 373,671 |
| $\begin{gathered} \text { Dec- } \\ 92 \end{gathered}$ | 9,776 | not available | 339,609 | 392,760 |
| $\begin{gathered} \text { Dec- } \\ 93 \end{gathered}$ | 10,192 | 53,497 | 357,344 | 410,841 |
| $\begin{gathered} \text { Dec- } \\ 94 \end{gathered}$ | 11,389 | 58,636 | 375,553 | 434,190 |
| $\begin{gathered} \text { Dec- } \\ 95 \end{gathered}$ | 13,252 | 69,379 | 390,137 | 459,516 |
| $\begin{gathered} \text { Dec- } \\ 96 \\ \hline \end{gathered}$ | 15,443 | 79,254 | 409,496 | 488,750 |
| $\begin{gathered} \hline \text { Dec- } \\ 97 \end{gathered}$ | 18,222 | 90,620 | 431,148 | 521,769 |
| $\begin{gathered} \text { Dec- } \\ 98 \\ \hline \end{gathered}$ | 22,368 | 105,788 | 456,249 | 562,037 |
| $\begin{gathered} \text { Dec- } \\ 99 \end{gathered}$ | 31,939 | 120,819 | 494,151 | 614,970 |
| $\begin{gathered} \text { Dec- } \\ 00 \\ \hline \end{gathered}$ | 37,551 | 134,622 | 535,884 | 670,505 |
| $\begin{gathered} \hline \text { Dec- } \\ 01 \\ \hline \end{gathered}$ | 41,612 | 150,067 | 590,611 | 740,678 |
| $\begin{gathered} \text { Dec- } \\ 02 \end{gathered}$ | 47,069 | 168,514 | 674,300 | 842,814 |
| $\begin{gathered} \text { Dec- } \\ 03 \\ \hline \end{gathered}$ | 47,694 | 180,238 | 773,354 | 953,593 |
| $\begin{gathered} \hline \text { Dec- } \\ 04 \\ \hline \end{gathered}$ | 54,993 | 198,496 | 875,737 | 1,074,233 |
| $\begin{gathered} \text { Dec- } \\ 05 \end{gathered}$ | 57,889 | 211,058 | 965,302 | 1,176,360 |
| $\begin{gathered} \text { Dec- } \\ 06 \end{gathered}$ | 54,773 | 213,246 | 1,077,256 | 1,290,501 |
| $\begin{gathered} \text { Dec- } \\ 07 \\ \hline \end{gathered}$ | 54,891 | 221,704 | 1,185,886 | 1,407,590 |
| $\begin{gathered} \text { Dec- } \\ 08 \end{gathered}$ | 52,828 | 234,124 | 1,224,887 | 1,459,011 |


|  | Total net <br> credit card <br> lending to <br> Date <br> individuals in <br> sterling <br> millions | Total net <br> unsecured <br> lending to <br> individuals in <br> sterling <br> millions | Total net <br> secured <br> lending to <br> individuals and <br> housing <br> associations in <br> sterling <br> millions | Total net <br> lending to <br> individuals and <br> housing <br> assoclations in <br> sterling <br> millions |
| :---: | :---: | :---: | :---: | :---: |
| Dec- <br> 09 | 53,239 | 214,835 | $1,234,467$ | $1,449,301$ |
| Dec- <br> 10 | 58,499 | 212,727 | $1,238,169$ | $1,450,896$ |
| Dec- <br> 11 | 55,718 | 206,266 | $1,244,887$ | $1,451,153$ |
| Dec- <br> 12 | 55,233 | 209,713 | $1,267,153$ | $1,476,866$ |
| Dec- | 56,881 | not available | $1,276,237$ | not available |
| 13 |  |  |  |  |

Source: Bank of England

Lending -both secured and unsecured- has also risen over the years with a relatively minor reduction in the volumes of unsecured lending during 20082012 (during the same period the growth of secured lending slows down).

Given the pronounced size of household debt and our focus on unsecured debt, it is of interest to explore which age group is most susceptible to unsecured arrears and which holds the majority of debt. Data from the first wave of the Wealth and Assets Survey (WAS), which is presented in detail in Chapter IV, indicate that personal financial fragility is most prevalent amongst young adults, as illustrated in the following table. This is consistent with previous research (Disney et al. 2008, Kempson 2002, Kempson et al. 2004).

Table 5- Incidence of unsecured arrears across age groups

| Age group | Respondents with any <br> unsecured arrears (\%) |
| :---: | :---: |
| $16-24$ | 4.6 |
| $25-34$ | 6.2 |
| $35-44$ | 5.2 |
| $45-54$ | 4 |
| $55-64$ | 2.1 |
| $65-74$ | 0.9 |
| $75-84$ | 0.3 |


| Age group | Respondents with any <br> unsecured arrears $(\%)$ |
| :---: | :---: |
| $85+$ | 0.0 |

The table shows that unsecured debt is most prevalent amongst those aged 25-34 (6.2\% of the respondents in this group reported unsecured arrears). From the age of 35 onwards, the incidence of unsecured arrears is seen to progressively fall. But does this age group hold the majority of unsecured debt?

Table 6- Total outstanding debt on all credit cards

| Age group | Total outstanding debt on all credit cards in sterling |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 0-500 | $\begin{gathered} 501 \\ - \\ 5,000 \\ \hline \end{gathered}$ | $\begin{gathered} \hline 5,001 \\ - \\ 10,000 \end{gathered}$ | $\begin{gathered} 10,001 \\ - \\ 50,000 \end{gathered}$ | $\begin{gathered} 50,001 \\ - \\ 100,000 \end{gathered}$ | $\begin{gathered} 100,001 \\ - \\ 300,000 \end{gathered}$ | Total (using midpoints) | $\%$ of the <br> total <br> $44,142,250$ |
| 16-18 | 645 | 6 | 0 | 0 | 0 | 0 | 177,750 | 0.4 |
| 19-35 | 10,355 | 1,564 | 185 | 77 | 0 | 0 | 10,587,250 | 24 |
| 36-50 | 12,133 | 2,085 | 406 | 173 | 2 | 2 | 17,552,000 | 39.8 |
| 51-65 | 12,498 | 1,073 | 194 | 111 | 1 | 2 | 11,335,250 | 25.6 |
| 66-101 | 11,427 | 253 | 27 | 22 | 1 | 0 | 4,490,000 | 10.2 |

With 39.8\% of the total outstanding debt on all credit cards held by the 36-50 year olds, it is apparent that the specific age group holds the majority of (credit card) debt. This is in part due to a greater incidence of extremely large debts.

Table 7- Total outstanding debt on mortgage

| Age group | Total amount outstanding on mortgage in sterling |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} 0- \\ 50,000 \end{gathered}$ | $\begin{aligned} & 50,001- \\ & 100,000 \end{aligned}$ | $\begin{aligned} & 100,001- \\ & 250,000 \end{aligned}$ | $\begin{gathered} 250,001- \\ 400,000 \end{gathered}$ | $\begin{aligned} & 400,001- \\ & 600,000 \end{aligned}$ | $\begin{aligned} & 600,001- \\ & 900,000 \end{aligned}$ | $\begin{aligned} & 900,001- \\ & 1,200,000 \end{aligned}$ | Total (using midpoints) | \% of the total $4,075,725,013$ |
| 16-18 | 1,829 | 445 | 329 | 30 | 10 | 6 | 0 | 201,650,000 | 4.9 |
| 19-35 | 8,339 | 2,187 | 2,348 | 199 | 35 | 13 | 2 | 1,085,900,000 | 26.7 |
| 36-50 | 8,782 | 3,202 | 2,662 | 373 | 92 | 30 | 1 | 1,335,875,000 | 32.8 |
| 51-65 | 12,330 | 1,045 | 587 | 97 | 21 | 13 | 1 | 841,425,013 | 20.6 |
| 66-101 | 11,653 | 133 | 67 | 17 | 2 | 0 | 0 | 610,875,000 | 15 |

Similarly, the above table based on WAS data supports an estimate that most of mortgage debt ( $32.8 \%$ of the total) is held by the 36-50 (age) group. Summing up, although the incidence of debt is largest amongst the under35 s group, this group does not make the largest contribution to overall debt.

The following section presents key examples of unsecured (credit card spending, personal loans, student loans) and secured (mortgage-related borrowing) debt. Moreover, it outlines the downside risks in light of uncertainty and (unfounded and unrealised) expectations.

## 3. Types of secured and unsecured debt

### 3.1 Credit card spending

Purpose: for the purchase of holidays; this is an example of direct consumption rather than investment.

According to Bertaut and Haliassos (2006, p. 182), 'Credit cards offer the convenience of cashless transactions [...] also offer consumers the flexibility of deferring payment to a future date, and thus can allow consumers to smooth spending over temporary liquidity shortfalls.'

It is worth highlighting that credit card debt rose rapidly after the late 90 s ; Bridges et al (2006b, p. 146) suggest that this was due to an 'aggressive competitive strategy [...], which involved both greater marketing to existing cardholders but also targeting income groups that had previously been excluded from credit card access either because of their income or credit histories.'

According to the UK Cards Association, outstanding credit card balances in 2013Q1 was $£ 55.5$ billion, representing an increase by $£ 0.2$ billion compared to 2012Q4 figures. In particular, of the $£ 55.5$ billion $£ 23$ billion represented balances on which no interest was being charged, i.e. monthly expenditure
repaid in full, and $£ 32.5$ billion of revolving credit. ${ }^{34}$ With the Bank of England Base Rate being $0.5 \%$ and the average interest rate on credit card lending 17.61\% (June 2013 figures) ${ }^{35}$, their considerable difference of $17.11 \%$ highlights that revolving credit can cause significant financial troubles to households and individuals alike.

### 3.2 Personal Ioan

Purpose: for the purchase of a car, i.e. an example of investing in a durable good

This constitutes an investment, often financed by bank (personal) loans; a person has the option to take on a personal loan in order to, for instance, purchase a car today (as s/he cannot otherwise afford it), or start saving today and buy/invest in a car at a later date when the required funds are available.

In the UK average consumer borrowing (including credit cards, motor and retail finance deals, overdrafts and unsecured loans) per adult was GBP 3,176 in July this year, an increase from the revised GBP 3,136 a month earlier. ${ }^{36}$ Nevertheless, the total balance owed on all personal loans has dropped significantly ${ }^{37}$ according to an analysis by the British Bankers'

[^24]Association (BBA), in the face of intensive market competition that has driven personal loan rates at a record low of $4.9 \%{ }^{38}$.

### 3.3 Student loan

Purpose: in order to finance one's studies (higher education utilised as an example of capital investment)

The above often implies borrowing, in the form of applying for and taking on a student loan ${ }^{39}$. The loan has been introduced in replacement of the old system of grants. Given that a) more individuals enter higher education nowadays and $b$ ) fees for colleges and universities have risen considerably, the numbers of young adults in debt have also increased.

It should be noted that a student might consider additional means of financing his/her studies, such as borrowing from commercial sources (overdraft, credit cards and bank loans). However, as the latter have been reviewed in the example of direct consumption, we concentrate solely on student loans.

In the UK ' t ] he stock of student loans has doubled over the five years to 5 April 2012 to GBP 47 billion, and now represents more than $20 \%$ of the stock of overall consumer credit'40, whilst '[t]he Government has estimated that the

[^25]total outstanding amount will be more than GBP 80 billion by the start of 2017-18'41; consequently, the Bank of England has introduced a new measure of consumer credit that excludes student loans.

### 3.4 Mortgage

Purpose: for the purchase of a house, an example of a long-term investment

Since buying a house constitutes a long-term investment, it requires careful consideration of several parameters [this is, undoubtedly, the most complicated type of all four]. Taking into account the high house prices, it is rather unlikely that the average consumer -a young adult- will have enough funds to purchase a house without getting a housing loan, a mortgage. On this basis, once one decides to buy a house, s/he becomes indebted instantly. Unlike the three types considered above, there is no possibility of staying out of debt in this case.

In the UK, mortgage lending was GBP 1.267 trillion at the end of June 2013 (up from GBP 1.263 trillion at the end of June 2012), whilst GBP 112,548 was the estimated average outstanding mortgage for the 11.3 million households that have mortgage debt. ${ }^{42}$ According to CreditAction ${ }^{43}$, on a daily basis 158 mortgage possession claims are issued, 112 mortgage

[^26]possession orders are made and 88 properties are repossessed (based on Q1 2013 trends). ${ }^{44}$

## 4. The downside risks

The below table demonstrates the unsettling contingencies that may occur in respect of each credit consumption activity described above. Its purpose is to highlight the prevalence of downside risks that may contradict one's expectations in respect of a certain decision and subsequently point in the direction of scenario planning in decision making under uncertainty.

Tim Harford, writer of the 'Undercover Economist' column in British Airways' business life magazine, praises the ability of keeping one's "options open for some important uncertainties" whilst stressing that scenario planning is about "qualitative explorations" rather than "quantitative tweaks". Consequently, the "alarming contingencies" are taken into account ex ante and expectations are shaped accordingly. ${ }^{45}$

[^27]Table 8-Examples of credit consumption and the downside risks

|  <br> Unrealised Expectations <br> Examples | Future Income Expectations | Depreciation and Maintenance Cost Expectations | Interest Rate Expectations | Financial Return (profitability) Expectations |
| :---: | :---: | :---: | :---: | :---: |
| i) Financing one's holidays (credit-card-generated debt) | Earnings reduction (due to unforeseeable events- e.g. dismissal, poor health, unemployment. economic depression) | N/A <br> (intangible good) | N/A (relatively short-term repayment period; APR unlikely to fluctuate) | N/A <br> (direct consumptiongenerates no future returns) |
| ii) Purchasing a car (personal loangenerated debt) | Earnings reduction (due to unforeseeable events- e.g. dismissal, poor health, unemployment, economic depression) | Higher than anticipated depreciation rate and increase in oil prices (high user costs) | If there's a rise in interest rates, monthly repayments will increase | Being a car owner might yield lower return (increased user and maintenance costs) than using alternative means of transportation |
| iii) Financing one's studies (student loan-generated debt) | Increased unemployment, depressed wages and high supply of graduates in the labour market could result in a fall of future earnings | Skills and expertise gained from higher education could devalue if not frequently employed, trained and retrained | N/A (normally a nominal 0\% rate- only in line with inflation) | Future profitability could fall due to higher unemployment, lower wages, increased supply of labour force |


| ```Risk & Uncertainty Unfounded & Unrealised Expectations Examples``` | Future Income Expectations | Depreciation and Maintenance Cost Expectations | Interest Rate Expectations | Financial Return <br> (profitability) <br> Expectations |
| :---: | :---: | :---: | :---: | :---: |
| iv) Purchasing a house (mortgagegenerated debt) | Earnings reduction (due to unforeseeable events- e.g. dismissal, poor health, unemployment, economic depression) | House price depreciation over time leads to lower capital gain; 'hidden' faults; income tax reductions increase the user cost of housing (housing now more expensive than renting) | If base rates increase and it is a variable rate mortgage, monthly repayments will increase | Low (financial) return of owneroccupied property, as imputed rent falls in relation to the opportunity cost of capital |

## 5. Conclusion

This chapter offers an insight into the UK credit market. Time series for household debt over recent years are given and the make-up of debt across age groups is discussed. Using data from the first wave of the Wealth and Assets Survey we establish that unsecured debt is most prevalent amongst those aged 25-34, but it is the 36-50 year olds who hold the majority of both credit card and mortgage debt.

Following real-life examples of the key types of secured and unsecured debt, we tabulate the respective downside risks of credit consumption. The chapter argues that unsettling contingencies may occur in light of uncertainty and one's unfounded and unrealized expectations. As a protective shield against such contingencies the consumer should incorporate scenario planning in her decision making.

# CHAPTER III- Consumer debt decisions under uncertainty 

A version of this chapter is published as:

Theodorakopoulou, V. (2009). Consumer Debt Decisions The Role of Ambiguity. International Journal of Economic Issues, Issue 2(2), JulyDecember 2009, pp. 241-261, ISSN 0974-603X.

Supporting materials, not included in the published version, are integrated here as appendices (A1, A2, A3) and references have been merged into the main bibliography.

## 1. Introduction ${ }^{46}$

Lenders in the UK have been forced to write off billions in bad debts, whilst consumer debt in the UK currently exceeds $£ 1.4$ trillion ${ }^{47}$. According to a report by the TDX Group - a provider of detailed debt-collection information to banks - 'about one million Britons are struggling with $£ 25$ billion of unsecured borrowings that they cannot repay'; an average of $£ 25,000$ per capita. ${ }^{48}$ It is also worth noting that near 60 per cent of Britain's $£ 25$ billion

[^28]unsecured problem debt is on credit cards. ${ }^{49}$ Based on Bank of England figures, '[u]nsecured personal borrowing soared by $£ 2.4$ billion in February [2008], the biggest monthly rise for more than five years [...]. ${ }^{150}$ At the same time the number of mortgages (secured debt) has fallen to the lowest figure since records began in $1999 .{ }^{51}$

First the rising inflation, increasing the cost of living, ${ }^{52}$ then the fall in the house prices, and finally the economic downturn ${ }^{53}$ have reinforced consumers' financial problems. But the face of debt has also changed. Whereas historically it primarily concerned individuals on social benefits such as income support and those in social housing, it nowadays affects a significant proportion of homeowners as well as middle class professionals. This has become even more noticeable since the credit crisis broke out. This particular type of debt-suffering social class finds it increasingly hard to deal with their mortgages and other secured loans as well as their unsecured debt, primarily in the form of credit card debts.

What are the characteristics the above group of consumers have in common that lead them to this debt-suffering state? The undue amounts of consumer

[^29]debt are often blamed on Britain's well-established 'buy now, pay later' culture that creates a time illusion, a false impression that the future will be better than today. The exaggerated optimism that characterises the debtstricken group of consumers distracts them from the potentially negative consequences of their financial decisions. Instead they often have only a vague idea of the complexities underlying their decisions.

Despite their various backgrounds and willingness to repay, what these consumers have in common is their failure to recognise the impact of ambiguity on their decision making. Credit consumption choices constitute complex cases where it is difficult to assign meaningful probabilities to plausible future scenarios: the basic characteristic of ambiguity.

The credit crisis mirrors a 'them and us' divide. 'The 'us' [...] are the well educated and well positioned [...] The 'them' are the under-educated and less fortunate who have seen their jobs lost or their incomes depressed [...] ${ }^{154}$ The former tend to be less prone to ambiguity than the latter, some of whom are pessimist (ambiguity averse), fearing the worst and therefore, abstaining from excessive credit consumption. Others tend to behave in a manner of excessive optimism and are in denial of the potential dangers of their present financial circumstances. Hoping for better days ahead, they take on unsustainable amounts of debt.

The questions that the chapter addresses are:

- What is the role of ambiguity in credit consumption decisions?
- Can one - by investigating the heterogeneity of individuals - identify the appropriate policy for them?

[^30]- How can the banking sector be organised in order to acknowledge the presence of ambiguity?
- In which way(s) can consumers be encouraged to take appropriate decisions in the presence of ambiguity?


## 2. Uncertainty: Distinguishing between risk and ambiguity ${ }^{55}$

The project looks into decision making under uncertainty. Uncertainty is a fact of life; as Ghatak and Spanjers (2007) declare, 'the most certain thing in the world is uncertainty'. Therefore, an individual's choices and, ultimately, decisions regarding credit consumption are characterised by uncertainty over the outcome that will eventually be realised.

Uncertainty is widely subdivided in calculable risk and incalculable risk, the latter also known as ambiguity or Knightian uncertainty.

This distinction was first made by Knight (1921, p. 26), who proposed the separation of - in his own words - 'uncertainty' from 'risk':
[...] But Uncertainty must be taken in a sense radically distinct from the familiar notion of Risk, from which it has never been properly separated. The term 'risk', as loosely used in everyday speech and in economic discussion, really covers two things which, functionally at least, in their causal relations to the phenomena of economic organization, are categorically different.

Knight (1921, p. 26) bases this distinction on the twofold character of what he refers to as 'risk':

[^31][...] The essential fact is that 'risk' means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character; and there are far-reaching and crucial differences in the bearings of the phenomenon depending on which of the two is really present and operating.

The above lead to the acceptance of two types of risk, the measurable and the unmeasurable risk:
[...] It will appear that a measurable uncertainty, or 'risk' proper, as we shall use the term, is so far different from an unmeasurable one that it is not in effect an uncertainty at all. We shall accordingly restrict the term 'uncertainty' to cases of the non-quantitive type. (Knight, 1921, p. 26)

Knight (1921, p. 28) emphasises that it is the 'true or unmeasurable uncertainty' that influences '[...] the economic organisation and its bearings upon economic theory', as opposed to '[...] risk in the narrow sense of a measurable probability'. In this sense, 'the production of goods' and the role of the procedure's principal decision makers, consumers, producers and entrepreneurs, are used by Knight (1921, Ch. VII, p. 295 and p. 297) to illustrate the presence and impact of ambiguity. ${ }^{56}$

Nevertheless, certain differences in terminology are evident in the work of contemporary researchers and their predecessors. According to the contemporary literature, it is uncertainty that incorporates both calculable risk

[^32]and incalculable risk, ${ }^{57}$ i.e. ambiguity. ${ }^{58} 59$ The present chapter builds on this basis and appropriately adjusts the terminology used in early literature in order to ensure consistency within the conceptual framework.

### 2.1 Risk

This section investigates the nature and role of calculable risk. Calculable risk describes situations in which the decision-maker can clearly identify both the possible states of nature and the probabilities relevant to the choice she faces, as e.g. in roulette gambling.

The study of choice under calculable risk normally starts by 'considering a setting in which alternatives with uncertain outcomes can be described by means of objectively known probabilities defined on an abstract set of possible outcomes' (Mas-Colell et al. 1995, p. 167). The basis of this is the expected utility hypothesis which states that it is the expected utility of a risky venture - rather than the expected payoff - that influences the choices of a rational decision maker. In particular, it leads to an expected utility function:

$$
U(x ; p)=\Sigma_{x \epsilon X} p(x) U(x)
$$

[^33]where $X$ is the finite set of possible outcomes, $p(x)$ the probability of a particular outcome $x \in X$ and $u: X \rightarrow R$ is a real-valued utility index over outcomes.

The above can be re-written as:

$$
U(x ; p)=E_{p}\{u(x)\}
$$

The expected utility function assigns each random variable the expected value of the utility it generates from the von Neumann-Morgenstern utility index. Particularly, the preferences of the decision maker are represented by a utility function that is the expected value of the von Neumann-Morgenstern utility index, $u$, over random outcomes, $x$, with respect to its probability distribution, represented by $p$.

Savage's (1954) introduction of subjective expected utility is regarded as an intermediate stage between the analysis of decision making under risk and that under ambiguity, since it maintains the use of probabilities - as in choice under risk - but at the same time introduces the characteristic of subjectivity, transforming the probabilities into amorphous beliefs that are better suited to real-life scenarios.

As argued in section 2.2, Savage's approach itself does not constitute a method of modelling ambiguity. Nevertheless, it is an important step towards acknowledging incalculable risk that set a solid stepping stone for researchers like Ellsberg (1961), Schmeidler (1982/89), Gilboa (1987) and Gilboa and Schmeidler (1989) who later extended its decision-theoretic foundation.

### 2.2 Ambiguity

According to Keynes (1937, pp. 213-214) ambiguity is a prominent feature of decision making under uncertainty:

By 'uncertain' knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty [...]. Or, again, the expectation of life is only slightly uncertain. Even the weather is only moderately uncertain. The sense in which I am using the term is that [...] there is no scientific basis on which to form any calculable probability whatever. We simply do not know.

It becomes obvious that Keynes views 'the game of roulette' as an example of calculable risk, whereas situations where 'there is no scientific basis on which to form any calculable probability' constitute cases of non-calculable risk or ambiguity. Knight (1921, p. 293) dubs the latter one of the fundamental things in life:
[...] Life is mostly made up of uncertainties, and the conditions under which an error or loss in one case may be compensated by other cases are bafflingly complex. We can only say that 'in so far as' one confronts a situation involving uncertainty and deals with it on its merits as an isolated case, it is a matter of practical indifference whether the uncertainty is measurable or not.

Knight's (1921) and later Keynes' (1937) distinction between calculable and incalculable risk has been positively received by the so-called PostKeynesians, such as Shackle (1949, 1961, 1979) and Davidson (1982, 1991), who argue that Knightian uncertainty may be the only way to address
randomness in economics, especially when characterised by time and knowledge or, indeed, the lack thereof.

Keynes (1937), Knight (1921) and their Post-Keynesians advocates refer to incalculable risk as uncertainty, but it should be highlighted that the term that is nowadays used interchangeably with incalculable risk is ambiguity.

Unlike calculable risk, ambiguity is likely to arise in complex situations. ${ }^{60}$ In such situations, probabilities can only be poorly defined and lack of confidence prevails. Generally speaking, when the relevant information to guide consumers' actions grows more complicated they may find it difficult to specify ex ante all the possible states of nature that may be relevant for their decision. Alternatively, they may find it problematic to assign meaningful probabilities to these states of nature.

In the presence of ambiguity, '[...] we have, as a rule, only the vaguest idea of any but the most direct consequences of our acts. Sometimes we are not much concerned with their remoter consequences, even tho time and chance may make much of them [...].' (Keynes 1937, p. 213)

Particularly, under ambiguity it is possible to:

- not know what probability distribution applies for the states of nature, even when the outcomes obtained in each state of nature are known.
- not know what outcomes are associated with individual states of nature, even when the subjective probabilities of the relevant states of nature are known.

[^34]For example, in the case of an individual's decisions regarding their personal finance, the future behaviour of the UK economy - say indexed by GDP per capita, may have implications for key relevant variables such as the individual's future income stream and the monetary authority's decisions regarding interest rates. Ambiguity may exist with respect to the probability distribution for the future state of nature (GDP per capita) and/or how any particular state of nature will impact on such key variables.

Keynes refers to real life examples that reflect the presence of ambiguity, such as 'the prospect of a European war [...], or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention or the position of private wealth owners in the social system in 1970' (Keynes 1937, p. 213). 61

Einhorn and Hogarth (1986) investigate the decision maker's attitude towards ambiguity. They distinguish between i) ambiguity loving, i.e. hoping for the best (optimistic), ii) ambiguity averse, i.e. fearing the worst (pessimistic), and iii) ambiguity neutral decision makers. They emphasise, however, that the size of the probability of an unambiguous choice can affect one's attitude towards ambiguity. ${ }^{62}$

Acknowledging ambiguity deems the use of rational expectations and subjective expected utility inappropriate for the modelling of one's decision making, as already argued by Keynes (1937, p. 222):

[^35][...] The orthodox theory assumes that we have a knowledge of the future of a kind quite different from that which we actually possess.
[...] The hypothesis of a calculable future leads to a wrong interpretation of the principles of behaviour which the need for action compels us to adopt, and to an underestimation of the concealed factors of utter doubt, precariousness, hope and fear.

Clearly, such theoretical principles cannot withstand the impact of sudden, violent changes:

In particular, being based on so flimsy a foundation, [beliefs about the future are] subject to sudden and violent changes. The practice of calmness and immobility, of certainty and security, suddenly breaks down. New fears and hopes will, without warning, take charge of human conduct. The forces of disillusion may suddenly impose a new conventional basis of valuation. All these pretty, polite techniques, made for a well-panelled Board Room and a nicely regulated market, are liable to collapse. At all times vague panic fears and equally vague and unreasoned hopes are not really lulled, and lie but a little way below the surface. (Keynes 1937, p. 214)

Amongst the first who challenged the expected utility decomposition of choice under incalculable risk was Ellsberg (1961) who -by his thought experiment- showed that Savage's subjective expected utility approach fails to properly distinguish between ambiguity and risk. Further attempts to reaxiomatise the existing theory followed influential experimental studies, most prominently those by Kahneman and Tversky (1979). ${ }^{63}$

[^36]Schmeidier (1982/89) investigates decision making under ambiguity using the theoretical framework of the non-additive expected utility. The latter constitutes a generalisation of the expected utility theory. In particular, the non-additive expected utility theory assumes that a decision maker can state her preference over two alternatives even when faced with ambiguity. Given that '[...] such preferences satisfy certain properties similar to -but slightly weaker than- those of the subjective expected utility, then these preferences can be represented by the generalised expected utility of the outcomes that follow a non-additive probability measure as obtained by applying the Choquet integral.' (Ghatak and Spanjers 2007, p. 21)

It should also be noted that '[n]on-additive probabilities, also called capacities, represent the ambiguity an agent faces about the relative frequencies with which outcomes are likely to occur.' (Kelsey and Spanjers 2004, p. 534)

Based on Spanjers (2008) the utility function, $U$, which represents the preferences of the decision maker in the presence of ambiguity, is:

$$
\begin{align*}
& U(x ; p, \gamma)=\gamma \cdot E_{p}\{u(x(s))\}+(1-\gamma) \cdot \beta \cdot\left[\max _{\text {se }[\text { smin,smax }]} u(x(s))\right]+ \\
& (1-\gamma) \cdot(1-\beta) \cdot\left[\min _{s c[s \min , s \operatorname{six}]} u(x(s))\right] \tag{1}
\end{align*}
$$

where:
U: utility function representing preferences
$x$ : function mapping states of nature to outcomes
$p$ : probability distribution over the states of nature
$E_{p}$ : expected value; average to be obtained if the probability distribution, $p$, applies
$u$ : the von Neumann-Morgenstern (vNM) utility index
$\beta$ : degree of optimism of decision maker $\beta \in[0,1]$
$\gamma$ : level of confidence in his assessed probability distribution $Y \in[0,1]$
smin: smallest value of state of nature, $S$, which the decision maker considers to be plausible smax: largest value of state of nature, $S$, which the decision maker considers to be plausible

It should be noted that the set of states of nature, $S$, is defined by the interval between smin and smax.

Furthermore, for a given level of confidence $Y \in[0,1]$ the associated level of ambiguity is obtained as 1- $\gamma$. Similarly, for a given level of optimism $\beta \in[0,1]$, the associated level of pessimism is obtained as 1- $\beta$.

If the consumer is optimistic, i.e. $\beta=1$, she believes that in the presence of ambiguity the most favourable outcome is obtained. In this case, the utility function can be rewritten:

$$
\begin{equation*}
U(x ; p, y)=\gamma \cdot E_{p}\{u(x(s))\}+(1-y) \cdot\left[\max _{\text {se }}(\text { smin,smax }] u(x(s))\right] \tag{2}
\end{equation*}
$$

### 2.3 Components of the Impact of Ambiguity

Equation (1) identifies the prime components that capture the impact of ambiguity: the level of ambiguity, the ambiguity attitude, the vNM utility of the best case, and the vNM utility of worst case.

So the second term becomes:
Level of ambiguity $\times$ degree of optimism $\times v N M$ utility of the best case,
whereas the third term gives us

Level of ambiguity $\times$ degree of pessimism $\times \mathrm{vNM}$ utility of the worst case.

In the special case of a fully optimistic consumer the third term vanishes and, since $\beta=1$, overall utility becomes:

> Level of confidence $\times$ expected outcome + Level of ambiguity x vM utility of the best case.

## 3. Debt decisions under ambiguity ${ }^{64}$

The project investigates personal debt; it is suspected that the analysis will reveal a pattern of attitudes according to which a sub-group of less-educated consumers with small-to-median incomes who apply for loans end up falling behind with their repayments. The intuition behind this phenomenon is that even before the credit crisis erupted, this sub-group of consumers, who were exposed to ambiguity and were overly optimistic, took out high loans whose repayments they were eventually unable to meet. Banks did not sufficiently protect consumers against accumulating excessive debt.

As highlighted above, this group consists of those with low income and low levels of education, who applied for and obtained loans they should not have been granted in the first place. They later encountered difficulties in repaying the outstanding amount. The impact of such difficulties is greater for the consumers than for the banks, since the latter can charge higher rates of interest to offset the risk of default.

We argue that these consumers would not have applied for the loan if they had realised what they were bargaining for. In reality, however, as a result of the ambiguity they faced, these consumers reacted in an overly optimistic manner. Banks - who face less ambiguity due to their business experience -

[^37]levy a charge for calculable risk. This surcharge on the interest rate reimburses them for the loss associated with the estimated fraction of consumers likely not to be able to repay their loans. Financial institutions also promote insurance products, so called 'risk-minimising vehicles'. These provide additional revenue which could potentially be used to cover any excessive losses resulting from defaults.

### 3.1 The Credit Crunch through the Prism of Ambiguity

As a result of the global credit crunch that followed the US sub-prime mortgage market crisis, banks face difficulties in securitising and selling mortgage debt to other investors. This caused a sharp reduction of the amounts they are willing to lend to households and businesses and to a refusal to lend to those with poor credit histories. According to the Bank of England, mortgage approval numbers have more than halved since their peak at the end of $2006 .{ }^{65}$

At one point, consumers who expected house prices to increase obtained mortgages of up to 130 per cent of the value of their property. This has proved to be an erroneous decision by lenders, some of whom suffered large losses due to the sub-prime crisis and falling house prices. Such mortgages have now ceased to be offered. In the light of stricter lending rules and the sudden fall in house prices, homebuyers are currently offered mortgages that cover a maximum of 85 per cent of the value of their property. Indeed,

[^38]'[m]any lenders, including Nationwide, Britain's biggest building society, are charging higher rates for borrowers who do not have a 25 per cent deposit'. 66

The credit crisis puts household disposable incomes under massive pressure. Some cash-strapped consumers use up their savings and resort to unsecured borrowing which, according to Bank of England figures, ${ }^{67}$ rose by $£ 2.4$ billion in February 2008, the biggest monthly rise for more than five years. At the same time, consumers with poor credit histories find it difficult to overcome periods of limited/no liquidity, due to the tightening of the banks' lending criteria. Being unable to borrow to cover their short-term credit needs may ultimately force them to resort in a debt settlement option or, even, file for bankruptcy. ${ }^{68}$

Both in the unsecured loans market and in the mortgage market, the issue is not so much rates as availability, i.e. whether or not lenders approve an application for credit. Small loans, i.e. loans of $£ 5,000$ or less, are more difficult to obtain as lenders tend to regard consumers borrowing more a better risk than those borrowing less. Small loan applications are usually interpreted as a sign of borrowing out of desperation during a period of low liquidity. As a consequence, better deals are offered to those consumers who borrow more. ${ }^{69}$ But, irrespective of the amounts involved, both secured

[^39]and unsecured loans include an extra charge, the so called 'credit crunch premium'. This premium is used by banks and building societies as a precaution against defaults. Although it is used as a buffer, it is unlikely to fully protect the lenders against future losses.

### 3.2 Financial Vulnerability: a Target Market Analysis

This section presents the results of the target market analysis carried out as part of the Thoresen Review of Generic Financial Advice (GFA). The analysis entertains the data of the $\mathrm{FSA}^{70}$ Financial Capability baseline survey ${ }^{71}$ from 2006, carried out to 'profile the UK population according to vulnerability'. ${ }^{72}$ Its objective is to ensure 'effective targeting of those most vulnerable to the consequences of poor financial decision making'. ${ }^{73}$ Those most vulnerable were identified on the basis of three indicators: ${ }^{74}$

- vulnerability,
- consequences and
- poor financial planning.

Based on the above indicators, the UK adult population is divided into four categories of users of financial services: ${ }^{75}$

[^40]i) 'most vulnerable' ( 7.5 million adults in the UK),
ii) 'regular users' ( 11.7 million adults in the UK),
iii) 'infrequent users' ( 20.7 million adults in the UK), and
iv) 'occasional users' ( 5.6 million adults in the UK). ${ }^{76}$

Details on the vulnerability, demographics and GFA needs of each of the four target groups are presented in Appendix A4.

### 3.2.1. Group A: Most Vulnerable

The vulnerability characteristics and demographics of this group reveal irrational behaviour in the decision-making process. These consumers suffer from over-indebtedness and face difficulties getting by, but at the same time seem uninterested in financial products and solutions. Their non-participation in the financial system has blocked their access to commercial financial advisers who could potentially assist them. In addition, their demographic characteristics provide further evidence in support of inertia and the observation that they have given up trying to safeguard a financially secure future. Their excessive impulsivity seems to lead - at times - to significant deviations from the principle of rational decision making. But our basic framework for decision making under ambiguity assumes rational decision making. Therefore, the analysis of the behaviour of this group of consumers is beyond the scope of this chapter.

### 3.2.2. Group B: Regular Users

The impact of ambiguity is evidenced in Group B, Regular Users. These consumers are rational decision makers; they are generally good at keeping

[^41]track of money and may have some savings, but fail to take proper account of the presence and subsequent impact of ambiguity on their decision making. Their lack of experience in choosing products or planning ahead may be a source of ambiguity. Low scores on making ends meet, some lack of savings and over-indebtedness show that they may have failed to give proper consideration to the worst case scenario. When this scenario becomes reality, these consumers suffer negative financial consequences.

The combination of over-indebtedness and not being good at planning ahead may reveal a degree of optimism; the consumers of this group take decisions in anticipation of better days ahead. This attitude may lead to an inadequate consideration of time and state contingencies, i.e. to horizon effects. The optimistic expectations of the consumers may fail to materialise.

These consumers need to be made aware of the ambiguity that affects their decisions. They would benefit from advice that not only offers financial education but also highlights the implications of not considering the worst case scenarios during decision making, i.e. of being overly optimistic.

### 3.2.3. Group C: Infrequent Users

Group C, Infrequent Users, is a group of well-informed consumers with education levels that are slightly above average. Their capability of planning ahead and staying informed reduces the amount of ambiguity they face. Being good at planning ahead suggests a more realistic approach towards future developments, as a result of which the consumers make allowances for potentially difficult times.

However, there still are some consumers in Group C who face some overindebtedness and some lack of savings. Both can indicate that previous decisions of credit consumption may have failed to adequately consider the
case that things may turn worse than anticipated leading to unsustainable accumulation of debt and/or reducing savings below their intended levels.

By and large, Group C appears well-informed and relatively protected against large financial shortfalls. Nevertheless, these consumers could still benefit from understanding both the impact of ambiguity on their decision making and the potentially negative consequences of overly optimistic behaviour in this context.

### 3.2.4. Group D: Occasional Users

Group D, Occasional Users, includes consumers with no significant signs of vulnerability other than some lack of access to commercial advice and difficulties with keeping track of their money.

These users have adopted a rather pessimistic attitude towards financial decision-making, ensuring they use their relatively high levels of savings as a buffer against rainy days. There is no strong evidence of poor decisionmaking as their safe, calculated choices have safeguarded them against negative consequences.

High education levels, i.e. 60\% A-Level or above, typically higher income and/or wealth, ability to understand and hold financial products, as well as homeownership -over 90\% owning their house- justify the assumptions regarding the group's financial capability and well-informed decision making.

### 3.3 Financial Vulnerability as a Consequence of Ambiguity

The policy recommendations of the Thoresen Review, which is presented in detail in section 4.3, fail to consider the presence and impact of ambiguity on the financial decisions taken by the groups of consumers specified above. As a result, its recommendations become a mere box-ticking exercise that
fails to address the real problems of the identified groups. Financial vulnerability is not just a list of demographics and vulnerability criteria that are applied across all consumer groups; it is also the consequence of ambiguity.

The main components of decision making under ambiguity, i.e. the level of ambiguity, the ambiguity attitudes, and the best case / worst case scenarios, can shed light on the causes of consumers' financial problems. These insights may inform appropriate policy recommendations for addressing the problems.

An imperfection of the Thoresen Review is that it only accounts for short-run planning in the form of monthly budgeting and for long-run planning regarding retirement. It fails to adequately consider the middle term, e.g. in the form of career planning. The analysis also fails to include risk awareness, and as a result fails to recommend contingency planning for different potential scenarios that may occur. Middle term planning is characterised by horizon effects that may be a cause of ambiguity. ${ }^{77}$

[^42]
## 4. Policy recommendations

### 4.1 Proposed Changes

According to Einhorn and Hogarth (1986), ambiguity is affected by the amount of information available, the quality of evidence and the clarity of the causal process. The occurrence of the credit crisis affects the level of ambiguity, as decision makers are constantly updating their ambiguous beliefs in light of new information, and/or increase their awareness of the presence of ambiguity. This has behavioural implications for both consumers and banks. Therefore, measures that remove the source of the ambiguity, which leads to excessively pessimistic behaviour by banks and consumers and excessively optimist behaviour by others, should be considered.

### 4.1.1 Models to Account for Ambiguity

Financial institutions currently promote insurance products which provide additional revenues at the consumers' expense. Such products are treated by the financial organisations as risk-minimising vehicles that could potentially be used to finance any deficits of banks due to defaults on loans.

These products may positively affect pessimistic consumers by improving the outcome of the worst case scenario. But they may also lead to moral hazard and excessive risk taking. The banks can remove ambiguity by securitising and selling the loans in question. Alternatively, they can insulate their balance sheets from the effects of ambiguity by explicitly integrating its presence in their credit rating models.

As noted in The Economist ('A special report on international banking', 17/05/2008, p. 11):

Models still have their place: optimists expect them to be greatly improved now that a big crisis has helpfully provided loads of new data on stressed markets. Even so, there is now likely to be more emphasis on non-statistical ways of thinking about risk. That means being more rigorous about imagining what could go wrong and thinking through the effects.

### 4.1.2 Reforming the Financial Regulatory System

The regulatory framework for banks and building societies would benefit from reform. In particular, it may be beneficial for lenders to dissuade consumers, who are optimistic and face a significant amount of ambiguity, from credit consumption. In their present form, the marketing strategies of the banks and building societies may already do all that is reasonably possible to encourage pessimists to take out a loan through the provision of guidance and information.

The rules that govern personal insolvency should also be reviewed. The leniency that characterises them is often mentioned as contributing towards the increased levels of consumer debt across the country. In particular, according to the Enterprise Act -a bankruptcy reform introduced in 2004bankrupts may be discharged after 1 year, as opposed to the 3 years period that was the minimum prior to the reforms. This change intended to reduce the bankruptcy stigma that prevented individuals from future access to credit and put certain careers in jeopardy. ${ }^{78}$

This leniency may have encouraged individuals to take on debt they cannot repay, exacerbating in this way the losses suffered by banks and other

[^43]lenders. Consumers tend to treat bankruptcy as a convenient solution of last resort if and when their optimistic expectations fail to materialise.

### 4.1.3 Promoting Financial Education

To encourage saving whilst counteracting borrowing habits, a change in consumers' attitude towards credit consumption is called for.

In its financial capability report in 2006, the FSA advised that '[n]early half of all adults have no savings at all [...] two million households are constantly struggling to keep up with their commitments [...] the under-40s are less capable than their elders (especially the 18-30 age group [...]) [...] [and] unless action is taken, the population will store up problems for the future.' ${ }^{79}$ The numbers have since increased further, which may reveal a syndrome of excessive optimism and hope that any financial problems will miraculously disappear.

The government may therefore, want to consider allocating additional funds to financial education, especially for money management and debt advice. A nationwide service that offers free, simple and impartial financial advice would seem most helpful. Because additional information tends to reduce ambiguity, it is useful to provide optimists with more information to help them make more realistic decisions.

The next section presents the actions that the government, public institutions and financial institutions have taken so far towards informing and educating consumers on financial matters.

[^44]
### 4.2 National Strategy for Financial Capability

In 2003 the FSA launched the National Strategy for Financial Capability initiative, in order to assist and educate the under-saved, under-protected and over-indebted. The MoneyMadeClear project is part of this campaign and aims at providing impartial and clear information directly to the consumers so that they can subsequently take well-informed decisions and manage their money efficiently.

The National Strategy focuses on guiding those consumers, who may fail to have access to regulated advice and/or may need guidance and education in order to make sound financial decisions and avoid subsequent problems. The campaign is the first attempt towards a collective national service that will join forces with educational institutions, regulated advice providers and specialist debt advice organisations.

The government promote various educational projects through a number of trusted intermediaries. As noted above, the wider campaign aims at engaging consumers of all ages and hopes to reach the most vulnerable groups.

Banks have also started offering guidance and education to individuals. NatWest, a subsidiary of the Royal Bank of Scotland Group (RBSG), announced that from Friday the $12^{\text {th }}$ of December 2008 it became 'the first high street bank to offer free, impartial financial guidance to everyone, including customers of other banks and those without bank accounts'. ${ }^{80}$ In partnership with Consumer Credit Counselling Service (CCCS) and through the RBSG MoneySense initiative, NatWest has trained 1,000 advisers across 1,000 branches in the UK to offer impartial service that is not linked to

[^45]selling products. The advisers started consulting consumers across the country on a wide range of money management questions on the $13^{\text {th }}$ of December 2008. ${ }^{81}$

### 4.3 Thoresen Review of Generic Financial Advice

The British government has noted the necessity of offering direct, clear and impartial financial advice to all consumers, and in particular to those who are most susceptible to the consequences of poor financial decisions.

In January 2007, Otto Thoresen was commissioned by the Economic Secretary to the Treasury to review how Generic Financial Advice (GFA) should be best delivered at a national level. The core objective was to enable greater access to affordable high quality financial advice for those most vulnerable to the effects of poor financial decision-making. His final report was published in March 2008. ${ }^{82}$

The Review's recommendations are based on extensive consultation, research and analysis that formed the Review's evidence base. In particular, one of its main findings indicates that such service should focus on preventing financial problems, rather than acting as a (financial) crisis resolution agent. This could be achieved by providing advice on budgeting, saving and money management.

The findings of the Review could potentially provide the means of bridging the gap between the provision of impartial information and money guidance. The latter is considered to be a vehicle that can help people to make sound

[^46]financial decisions. As a consequence '[...] more people will enjoy the financial security and independence of having saved and having protected themselves and their families from the unexpected events in life that can tip almost any of us into financial crisis'. ${ }^{83}$

The principles of a national service were therefore identified as impartiality, supportiveness, prevention, universality and being 'sales free'. According to the Review, Money Guidance should focus on educating and providing information and guidance and, thus, encouraging consumers to take better financial decisions. In particular, Thoresen's Review proposes that it should assist towards weekly budgeting or monthly spending; saving and borrowing; protecting and insuring the individual and the family; retirement planning; understanding tax and welfare benefits better; and 'jargon bursting'. ${ }^{84}$

Money Guidance should operate in a dynamic way, so that it can both meet consumers' demand for help towards managing their personal finances and respond to developments in the financial markets. The service aims at helping the consumers develop a better informed approach towards financial decisions. This should help them to make ends meet, keep in touch with their financial commitments, stay informed, plan ahead, and make better choices. ${ }^{95}$

It should be noted that although Money Guidance is regarded as a guiding mechanism for the consumers, its scope can be extended to helping them choose between a small number of options and/or refer them to external services, as appropriate.

[^47]In particular, 'generalist' accredited partners will be responsible for guiding consumers on 'the full range of Money Guidance topics to a consistent level', while 'specialist' 86 accredited partners will be responsible for providing 'indepth guidance on a specific topic, such as pensions.' (Thoresen 2008, p. 45) Nevertheless, the service as well as the partners whether generalist or specialist, should under no circumstances make recommendations to buy or alter a specific product from a particular provider. ${ }^{87}$

## 5. Summary and conclusions

This chapter considered the principles of decision making under ambiguity, i.e. incalculable risk, in the context of individual credit consumption decisions.

The first thing to note is that ambiguity distorts decision making. Due to the presence of incalculable risk - caused by a lack of knowledge and (a lack of) confidence - plausible future scenarios cannot always be assigned meaningful probabilities. In the face of ambiguity, optimistic consumers tend to take on unsustainable amounts of debt in anticipation of better days ahead.

On the other hand, pessimistic decision makers tend to be overly concerned with the worst case scenario. Although, sales methods for financial products can reduce some of the ambiguity faced by the pessimists, the latter tend to reject credit consumption in order to protect themselves against bad times.

[^48]The level of ambiguity faced by consumers is affected by the amount of information available to them. The uncertainties of the credit crisis may, therefore, affect both consumers' probability estimate and the level of ambiguity they face. Decision makers are constantly updating their ambiguous beliefs in light of new information, and/or increasing their awareness of the presence of ambiguity. On this basis, the chapter reveals a need for measures that remove the source of ambiguity which leads to the excessively optimistic consumer behaviour.

The policy recommendations that result from our study suggest that credit scoring models should be extended to account for the presence and impact of ambiguity. The regulatory system that governs the financial markets should be reformed accordingly and it is advisable that the government promotes financial education.

Moreover, our examination of the target market analysis of the Thoresen Review of General Financial Advice suggests that policy makers need to acknowledge the presence of ambiguity. In doing so, policy makers could incorporate risk awareness and multiple planning horizons in their measures towards resolving consumers' financial problems.

## CHAPTER IV- Empirical analysis of credit card delinquency

## 1. Introduction

Academic interest in credit card use and attitudes towards them has grown ${ }^{88}$ in response to the global circulation ${ }^{89}$ of credit cards and their broadened scope of usage. The UK is an increasingly cashless society, with card payments having almost doubled over the past decade; last year $73 \%$ of all

[^49]'high street' retail spending was made using cards. ${ }^{90}$ According to the UK Card Association, GBP140bn worth of purchases were made using credit and charge cards in 2012 in the UK, a number which is expected to grow to £214bn in $2022 .{ }^{91}$

Credit cards function as a means of payment, and potentially also as a means of access to credit. In retail purchases for example, the payment that is due to the retailer is provided by the credit card company and thus becomes a debt owed by the consumer to that company. Credit card companies typically charge a transaction fee to the retailer and also charge interest to the consumer on whatever part of the debt remains outstanding after a monthly billing date. Consequently the consumer pays nothing for using the card purely as a means of payment, but will acquire debt-servicing obligations if the outstanding balance is not fully repaid at the next billing date. The interest rates charged by credit card companies are typically high relative to (say) an unsecured personal loan from a retail bank.

When credit cards are used as a source of credit - an emergency fund, a 'safety valve'- to pay for education, out of pocket medical expenses and, even, for basic living expenses, they can become hazardous for anyone with no means to pay off the outstanding balance. Particular population cohorts, for example, young people, who tend to have little savings and are in the early stages of their career, may find it especially hard to cope with the high interest rates of credit cards and risk falling in arrears.

[^50]The aim of this chapter is to offer an empirical exploration of the observations made in the previous chapter. In particular, we examine the impact of financial illiteracy and ambiguity on consumer credit delinquency and investigate the key drivers of credit card payment arrears amongst the young; namely, those aged between 16 and 35 . The analysis is carried out using the first wave of the Wealth and Assets Survey (WAS). This survey was conducted in Great Britain between 2006 and 2008.

As an introduction to the survey data and in line with our focus on financial (i))literacy, we illustrate the relationship between the respondents' selfassessed mathematical ability (excellent; good; moderate; poor) and credit card arrears by means of the below histograms. ${ }^{92}$

Figure 1- Credit card arrears for the various levels of self-assessed mathematical ability

| Excellent mathematical ability [self-assessed] | Good mathematical ability [self-asssessed] |
| :---: | :---: |
| 4,000 | $4,000{ }^{3,369}$ |
| 3,000 | 2,000 |
| 1,000 | 1,000 |
| noc/arrears creditcard (c/c) arrears | noc/c credit card arrears (c/c) arears |

[^51]

To support the interpretation of the histograms, a contingency table illustrating the incidence of credit card arrears in conjunction with the selfassessed mathematical ability is provided below:

Table 9- Incidence of credit card arrears in conjunction with the selfassessed mathematical ability

| Credit card <br> arrears | Self-assessed mathematical ability |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Excellent | Good | Moderate | Poor |
| No arrears | 1,692 | 3,369 | 1,558 | 241 |
| In arrears | 223 | 483 | 247 | 57 |
| Total | 1,915 | 3,852 | 1,805 | 298 |
| In arrears (\%) | 11.6 | 12.5 | 13.7 | 19.1 |

The evidence of this table indicates that the incidence of credit card arrears is positively correlated with one's mathematical ability. Specifically, the incidence of credit card arrears is largest amongst those who assess their mathematical ability as 'poor' (19.1\%), followed by those with a 'moderate' mathematical ability (13.7\%) and those with 'good' (12.5\%). The respondents whose self-assessment of mathematical ability is described as 'excellent', are -according to the above table- the least susceptible to credit card debt.

The chapter is divided into the following sections:

## 2. Data and summary statistics

The Wealth and Assets survey is presented; in particular, the objectives of the data collection, the survey's two parts, the categories of questions asked and the number and profile of the respondents. Key demographic and financial characteristics of the respondents are also provided.

## 3. Econometric model and estimation

The section presents the econometric modelling framework and outlines the model specification search. Following the process of selecting the preferred model specifications, the regression method and estimation outputs are discussed.
4. Interpretation and conclusions

The results are presented and discussed with reference to the theoretical framework and existing literature. Key conclusions are drawn.

All statistical analyses were conducted using Stata version 12 (Stata Corp, College Station, Texas, USA).

## 2. Data and summary statistics

The Wealth and Assets Survey (WAS) ${ }^{93}$

In order to investigate the characteristics of those with credit card arrears, we use the first wave of the WAS, a longitudinal survey introduced in July

[^52]2006. The first wave was collected between July 2006 and June 2008 and sampled private households in Great Britain. The core objective of the survey was to offer a broad insight into the financial well-being of both individuals and also their respective households. This focus is, as discussed in chapter $I$, the main reason for deciding to use this particular dataset in order to examine credit card payment arrears.

The WAS focuses on the assets and liabilities of the individuals and their households, and therefore includes -but is not limited to- questions on employment earnings, benefit receipts, savings, mortgage and nonmortgage debt as well as various types of credit agreements and loans. In addition, it contains questions on behaviour and spending habits, financial advice and expectations as well as attitudes towards risk.

In particular, the survey questionnaire is split into two parts ("schedules"):

- The household schedule

One person per household provides general household- and demographicsrelated information. The household schedule also includes mortgage debt data. Wave 1 covers 30,595 households across Great Britain.

- The individual schedule

Each household member is considered as an interviewee, giving a total of 71268 interviewees. However, the full set of questions is not presented to all interviewees. For those who are below the age of 16 or in the age range 1618 and in full-time education the WAS individual schedule records only basic demographic variables. Hence, the full interview is carried out for only 53,298 individuals.

Table a1 in Appendix A4 presents a number of basic demographic characteristics across the full sample. The survey intended to be a
representative cross-section of the population of Great Britain, as illustrated in the table, namely:
the respondents' average age is around 40 years with a minor difference between women and men. In line with the population, the ethnic background of the majority of the interviewees are White British ( $85.72 \%$ of the entire sample set), whilst other ethnicities are represented. ${ }^{94}$ Educational attainments, an important factor for this study on the hypothesis that better education enhances financial literacy, are recorded in the WAS with slightly more than half (50.75\%) of the respondents claiming one or more educational qualifications and $16.52 \%$ possessing a degree or a higher qualification. The survey offers a valuable insight to the labour market; it covers people who are out of work, those who have retired, as well as those who are in work. In particular, $58.51 \%$ of the full sample of 71,268 individuals -rather than just the applicable profiles- is in the workforce and of those $73.13 \%$ in employment.

Turning to investigate the core financial characteristics of the survey respondents, we observe, surprisingly, that more than half of the respondents appear to have zero earnings. This is attributed to a number of reasons. Firstly, as mentioned earlier in this section, the WAS records basic demographic characteristics and some other variables, such as earned income, for all household members, irrespective of their age. Therefore, preschool children, children under school leaving age and non-working students (to name a few groups out of the workforce) are allocated zero earnings. Secondly, those of working age but out of work are allocated zero earnings. Similarly, pensioners are recorded as zero-earnings recipients. ${ }^{95}$

[^53]The above is illustrated in Table 10 by means of a cross-tabulation of the respondents' age and their annual net earnings (to enable this, both of these continuous variables were re-coded into groups and the variables age_ba and dvallnet_bands were generated, to represent age groups and earnings groups respectively).

Table 10-Cross tabulation of age and net annual earnings

| Age <br> bands <br> (age_ba) | Net annual earnings in bands (dvallnet_bands) [in GBP] |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | dvallnet s0 | $\begin{gathered} 0< \\ \text { dvallnet } \\ \leq 5,000 \end{gathered}$ | 5K< dvallnet s10K | $10 \mathrm{~K}<$ dvallnet s30K | 30K< dvallnet s50K | 50K< dvallnet s100K | 100K< dvallnet s500K | 500K< dvallnet $\leq 2,400 \mathrm{~K}$ | Total |
| $0<$ <br> Age <br> $<1$ <br> year(yr) | 859 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 859 |
| $\begin{gathered} 1 \mathrm{yr} \leq \\ \mathrm{Age} \\ \leq 16 \mathrm{yr} \end{gathered}$ | 14,407 | 26 | 21 | 5 | 0 | 0 | 0 | 0 | 14,459 |
| $\begin{gathered} \begin{array}{c} 16 \mathrm{yr}< \\ \text { Age } \\ \text { s18yr } \end{array} \end{gathered}$ | 1,363 | 97 | 177 | 79 | 1 | 0 | 0 | 0 | 1,717 |
| $\begin{gathered} 18 \mathrm{yr}< \\ \mathrm{Age} \\ \leq 25 \mathrm{yr} \end{gathered}$ | 1,977 | 462 | 846 | 1,721 | 32 | 6 | 2 | 0 | 5,046 |
| $\begin{gathered} 25 \mathrm{yr}< \\ \text { Age } \\ \leq 35 \mathrm{yr} \\ \hline \end{gathered}$ | 1,975 | 432 | 935 | 4,207 | 425 | 92 | 11 | 0 | 8,077 |
| $\begin{gathered} 35 \mathrm{yr}< \\ \text { Age } \\ \leq 50 \mathrm{yr} \\ \hline \end{gathered}$ | 3,128 | 957 | 2,173 | 7,340 | 1,098 | 393 | 51 | ${ }^{2}$ | 15,142 |
| $\begin{gathered} 50 \mathrm{yr}< \\ \text { Age } \\ 565 \mathrm{yr} \end{gathered}$ | 5,761 | 1,073 | 1,683 | 4,698 | 595 | 218 | 63 | 3 | 14,094 |
| $\begin{gathered} \text { 65yr< } \\ \text { Age } \\ \leq 101 \mathrm{yr} \end{gathered}$ | 10,995 | 401 | 201 | 232 | 23 | 16 | 4 | 0 | 11,872 |
| Total | 40,465 | 3,448 | 6,036 | 18,282 | 2,174 | 725 | 131 | 5 | 71,266 |

Arguably, individuals have various sources of income with earnings from employment and state benefits being key amongst these (http://www.hmrc.gov.uk/statistics/personal-incomes/tables3-1_3-10.pdf [accessed: 21/07/2013]). The individual questionnaire records two different groups of state benefits:

Group 1 includes the following benefits: child benefit; guardian's allowance; carer's allowance; retirement pension (National Insurance (N.I.)) or old person's pension; widow's pension, bereavement or widowed parents' allowance; war disablement pension or war widow's/widower's allowance; war disablement pension or war widow's/widower's pension; severe disablement allowance; care component of disability living allowance; mobility component of disability living allowance.

Group 2 includes: jobseeker's allowance (JSA); pension credit; income support; incapacity benefit; maternity allowance; industrial industry disablement benefit; working tax credit (excluding any childcare tax credit) and child tax credit (including any childcare tax credit).

In total 18 different types of benefits are considered in the first wave of the WAS. Nevertheless, whilst these benefits are identified, they are not specified by name, but are assigned a number (1-18). Repeated attempts to draw this to the attention of the WAS team failed to elicit the required information that would enable a more targeted analysis of particular (named) types of benefits. Consequently, in order to overcome this hurdle, we employed the four most populated benefit types, which we have taken through a series of transformations (as shown in Appendix A5) in order to compute the total annual benefit receipts variable (Tben). In turn, we generate the total net annual income (Tinc), which equates to the total annual benefit receipts plus the total net annual earnings and amounts to GBP 16,360 (on average).

In light of the above, the next step is to identify any signs of financial fragility on the basis of relevant questions asked over the course of the interview.

Table 11- Signs of financial fragility

| Have you been unable to make the minimum payment on your credit card(s) at any time during the past 12 months? | Yes 12.62\% | No 87.38\% |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Do you think it is likely that you will save any money in the next 12 months? | Yes <br> 21.87\% |  |  |  |  |
| Are you having any difficulty paying off the overdraft(s) on accounts at present? ${ }^{98}$ | Yes <br> 36.41\% | No |  |  |  |
| Whether has arrears on loans | $\begin{aligned} & \text { Yes } \\ & 0.37 \% \end{aligned}$ | No 99.63\% |  |  |  |
| Have you ever sought any help or advice because of debt? ${ }^{97}$ | $\begin{aligned} & \text { Yes } \\ & 7.7 \% \end{aligned}$ | $\begin{aligned} & \text { No } \\ & 92.3 \% \end{aligned}$ |  |  |  |
| How much are the payments of debts a burden ${ }^{98}$ | A heavy burden <br> 9.56\% | Somewhat of a burden $20.78 \%$ | Not a problem at all $69.66 \%$ |  |  |
| In the past 12 months, how often have you had money left at the end of the week/month | Always $30.99 \%$ | Most of time <br> 16.61\% | Sometimes <br> 18.40\% | Hardly ever <br> 17.76\% | Never $16.24 \%$ |
|  |  |  |  |  |  |

[^54]${ }_{97}$ The question is only asked to those who claim to be in debt.
${ }^{98}$ Ditto, the question is only asked to those who claim to be in debt.

| What do you mainly do with the money left over? | Put it intol leave it in current account $48.22 \%$ | Spend it 11.14\% | Put it into/ leave it in savings account/ investments $25.66 \%$ | Leave it in current account, then put it into savings/ investments $12.46 \%$ | Keep it in purse wallet for the next week month $2.52 \%$ |
| :---: | :---: | :---: | :---: | :---: | :---: |

It is noteworthy that upon being asked how often they have money left at the end of the week/month (depending on how often they get paid) respondents tend to argue that this is a somewhat infrequent event. Nevertheless, in case they do have money left (residual income), most interviewees are inclined to put/leave it in the current account followed by those who invest it in savings accounts or other investments, whilst others initially leave the excess funds in their current accounts to then transfer them to their savings and/or investments; spending the money left over is the preferred mode of action for $11.14 \%$ of the respondents whereas a small percentage of respondents simply keep it in their wallet for the next week/month. The responses attest to an observation that careful management of their surplus (residual) income is not the norm amongst the survey respondents. Provision for potential financial fragility is not part of their day-to-day money management, indicating a potentially inadequate level of personal financial management that calls for further investigation.

Furthermore, when asked whether they trust it is possible that they will save any money over the next twelve months, most of the survey participants express a negative response. Meanwhile, difficulties paying off the overdraft(s) on accounts at present have been reported by $36.41 \%$ of the respondents as opposed to the rest for whom repaying the outstanding overdraft(s) does not constitute financial trouble. And although the reported incidents of loan arrears concern only $0.37 \%$ of the sample set, debt repayments are articulated as 'heavy burden' or 'somewhat of a burden' across $9.56 \%$ and $20.58 \%$ of the respondents, respectively. Nevertheless, a smaller fraction of the debt-laden respondents have sought help or advice on
debt, indicating that the problematic situation is likely to persist over a longer period of time without the involvement of some external aid.

In parallel, to better understand the respondents' attitude towards risk and to investigate to what extent mathematical literacy (and an ability to carry out simple calculations of probabilities) equates to or encourages financial literacy, we examine the responses given to two questions on money choices and the respondents' self-assessment of mathematical ability:

Table 12- Money choices and self-assessment of mathematical ability

| Choice between a guaranteed payment of one thousand pounds and a one in five chance of winning ten thousand | Guaranteed payment ofGBP 1,000$77.98 \%$ |  | One in five chance ofGBP 10,000$22.02 \%$ |  |
| :---: | :---: | :---: | :---: | :---: |
| Which would you choose: receiving a thousand pounds today or one thousand one hundred pounds in a year's time | GBP 1,000 today78.95\% |  | GBP 1,1100 in a year 21.05\% |  |
| Self-assessment of mathematical ability | Excellent 22.85\% | Good <br> 46.58\% | Moderate $25.16 \%$ | Poor <br> $5.41 \%$ |

The responses to the first question demonstrate a risk-averse stance for most interviewees, who favour the guaranteed payment of GBP 1,000, as opposed to the chance of winning GBP 10,000 (with an expected value of GBP 2,000). Similarly, the second question indicates that the majority is prone to instant gratification instead of an attractive return in a year's time (most respondents prefer GBP 1,000 today over the same amount plus a $10 \%$ return in a year's time). Given the low returns of investment or saving accounts nowadays, such a response does not tie in with the respondents' self-assessment of mathematical ability (the majority of the respondents rates their mathematical ability positively) and draws attention to financial literacy issues.

Financial literacy is extensively investigated in the literature of personal finance (Gathergood and Disney 2011, Jappelli 2010, Jappelli and Padula 2011, Lusardi 2004, Lusardi 2008a, Lusardi 2008b, Lusardi and Mitchell 2008, Lusardi and Mitchell 2007a, Lusardi and Mitchell 2007b, Lusardi and Tufano 2009). A cross-tabulation of the interviewees' responses to each of the above questions with their (self-assessed) mathematical ability illustrates that mathematical literacy does not guarantee financial literacy:

Table 13- Cross tabulation of money choices and self-assessment of mathematical ability

| Choice between a guaranteed <br> payment of one thousand pounds <br> and a one in five chance of winning <br> ten thousand | Excellent | Good | Moderate | Poor |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | $16.73 \%$ | $36.82 \%$ | $20.19 \%$ | $4.22 \%$ |
|  | $6.26 \%$ | $9.83 \%$ | $4.88 \%$ | $1.07 \%$ |
|  |  |  |  |  |
| Which would you choose: receiving <br> a thousand pounds today or one <br> thousand one hundred pounds in a <br> year's time | Self-assessment of mathematical abillty |  |  |  |
| GBP 1,000 today | Good | Moderate | Poor |  |
| GBP1,100 in a year |  |  |  |  |

The above tabulation points out that there is little to no correlation between the respondents' self-assessment of mathematical ability and their responses to the above two questions, whose "mathematically correct" responses can be easily computed. This observation highlights the existence of financial literacy problems as reported by existing literature in the particular field. Moreover, it would be of interest to ascertain whether there is homogeneity across the respondents of each question through means of a cross-tabulation of the two questions as shown in the following table.

Table 14- Cross tabulation of questions on money choices

| Choice between a guaranteed <br> payment of one thousand pounds <br> and a one in five chance of winning <br> ten thousand | $\|c\|$  <br> Which would you choose: receiving a <br> thousand pounds today or one thousand <br> one hundred pounds in a year's time  | GBP 1,000 today |
| :--- | :---: | :---: |
| Guaranteed payment of one thousand <br> pounds | $62.59 \%$ | $15.37 \%$ |
| One in five chances of winning ten <br> thousand pounds | $16.39 \%$ | $5.65 \%$ |

Indeed, we notice a strong similarity in the response patterns of the two questions; the majority of the respondents favour the guaranteed payment of GBP 1,000 today in both cases, while the minority choose to receive GBP 1,100 in a year's time and accept a one in five chance of winning GBP 10,000 . This uniformity strengthens the argument of poor financial literacy. It can also be argued that it highlights that credit markets are not perfectly competitive. In this case, individuals may be forced by liquidity needs to 'rationally' select an option (e.g. GBP 1,000 today) that would not be rational if credit was freely available.

We are also interested in the intertemporal consumer behavior across age groups. Using WAS data we split the continuous age variable into bands, in order to investigate whether the respondents' money attitudes and financial circumstances change as they become older.

In a manner similar to the preceding tables, we cross-tabulate the age bands with the responses given to the following two questions (presented in tables 15 and 16):

Table 15- In the past 12 months, how often have you had money left at the end of the week/month? [row percentages given]

| Age bands | In the past 12 months, how often have you had money left at the end of the week/month |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Does not apply | Always | Most of the time | Sometimes | Hardly ever | Never | Total |
| $\begin{aligned} & 0 \text { months }(m) \\ & <A g e<12 m \end{aligned}$ | $\begin{gathered} 859 \\ (100 \%) \\ \hline \end{gathered}$ | $\begin{gathered} \hline 0 \\ (0 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 0 \\ (0 \%) \end{gathered}$ | $\begin{gathered} 0 \\ (0 \%) \end{gathered}$ | $\begin{gathered} 0 \\ (0 \%) \end{gathered}$ | $\begin{gathered} 0 \\ (0 \%) \end{gathered}$ | $\begin{gathered} 859 \\ {[100 \%]} \\ \hline \end{gathered}$ |
| $\begin{gathered} 12 \mathrm{~m} \leq \mathrm{Age} \\ \leq 16 \text { years(yr) } \end{gathered}$ | $\begin{array}{r} 14,406 \\ (99.63 \%) \\ \hline \end{array}$ | $\begin{gathered} 6 \\ (0.04 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 8 \\ (0.06 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 6 \\ (0.04 \%) \end{gathered}$ | $\begin{gathered} 8 \\ (0.06 \%) \end{gathered}$ | $\begin{gathered} 25 \\ (0.17 \%) \end{gathered}$ | $\begin{aligned} & 14,459 \\ & {[100 \%]} \end{aligned}$ |
| 16yr<Ages18yr | $\begin{gathered} 1,372 \\ (80.33 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 48 \\ (2.82 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 34 \\ (1.99 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 38 \\ (2.22 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 80 \\ (4.68 \%) \\ \hline \end{gathered}$ | 136 $(7.96 \%)$ | $\begin{aligned} & 1.708 \\ & {[100 \%]} \end{aligned}$ |
| 18yr<Age $\leq 25 \mathrm{yr}$ | $\begin{gathered} 1,880 \\ (37.61 \%) \\ \hline \end{gathered}$ | 519 $(10.39 \%)$ | $\begin{gathered} 520 \\ (10.41 \%) \end{gathered}$ | $\begin{gathered} 636 \\ (12.72 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 668 \\ (13.36 \%) \end{gathered}$ | $\begin{gathered} 777 \\ (15.54 \%) \end{gathered}$ | $\begin{aligned} & 5,000 \\ & {[100 \%]} \end{aligned}$ |
| 25 yr <Ages 35 yr | $\begin{gathered} 1,631 \\ (20.38 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,338 \\ (16.72 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,010 \\ (12.62 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,296 \\ (16.19 \%) \end{gathered}$ | $\begin{gathered} 1,424 \\ (17.79 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,305 \\ (16.30 \%) \\ \hline \end{gathered}$ | $\begin{array}{r} 8,004 \\ {[100 \%]} \\ \hline \end{array}$ |
| 35yr<Ages50yr | $\begin{gathered} 2,554 \\ (17.06 \%) \end{gathered}$ | $\begin{gathered} 3.037 \\ (20.28 \%) \end{gathered}$ | $\begin{gathered} 1,903 \\ (12.7 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 2,440 \\ (16.3 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 2,560 \\ (17.1 \%) \end{gathered}$ | $\begin{gathered} 2,479 \\ (16.56 \%) \\ \hline \end{gathered}$ | $\begin{aligned} & 14,973 \\ & {[100 \%]} \end{aligned}$ |
| 50yr<Ages65yr | $\begin{gathered} 1,855 \\ (13.42 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 4,489 \\ (32.47 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 2,009 \\ (14.53 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,915 \\ (13.85 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,887 \\ (13.65 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1.671 \\ (12.08 \%) \end{gathered}$ | [100\%] |
| $65 \mathrm{y}<$ Age $\leq 101 \mathrm{yr}$ | $\begin{gathered} 851 \\ (7.37 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 4,495 \\ (38.95 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,983 \\ (17.18 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,944 \\ (16.85 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,356 \\ (11.76 \%) \end{gathered}$ | $\begin{gathered} 911 \\ (7.89 \%) \\ \hline \end{gathered}$ | $\begin{aligned} & 11,540 \\ & {[100 \%]} \end{aligned}$ |

Table 16- What do you mainly do with the money left over? [row percentages given]

| Age bands | What do you mainly do with the money left over |  |  |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \text { Does not } \\ \text { apply } \end{gathered}$ | Put it intol leave it in current account | Spend it | Put it intol leave it in savings account investments | Leave it in current account. then put it into savings/ investments | Keep it in purse / wallet for the next week / month |  |
| 0 months(m) <Age<12m | $\begin{gathered} 859 \\ (100 \%) \end{gathered}$ | $\begin{gathered} 0 \\ (0 \%) \end{gathered}$ | $\begin{gathered} 0 \\ 0 \%) \end{gathered}$ | $\begin{gathered} 0 \\ 0 \%) \end{gathered}$ | $\begin{gathered} 0 \\ 0 \%) \end{gathered}$ | $\begin{gathered} 0 \\ (0 \%) \end{gathered}$ | $\begin{gathered} 859 \\ {[100 \%]} \end{gathered}$ |
| $\begin{gathered} 12 \mathrm{~m} \leq \mathrm{Age} \\ \leq 16 \text { years }(\mathrm{yr}) \end{gathered}$ | $\begin{gathered} 14,439 \\ (99.87 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 11 \\ (0.08 \%) \end{gathered}$ | $\begin{gathered} 6 \\ (0.04 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1 \\ (0.01 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 0 \\ 0 \\ \hline \end{gathered}$ | $\begin{gathered} 0 \\ (0 \%) \end{gathered}$ | $\begin{aligned} & 14,457 \\ & {[100 \%]} \end{aligned}$ |
| 16yr<Ages18yr | $\begin{gathered} 1,597 \\ (93.67 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 58 \\ (3.4 \%) \end{gathered}$ | $\begin{gathered} 21 \\ (1.23 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 21 \\ (1.23 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 5 \\ (0.29 \%) \end{gathered}$ | 3 $(0.18 \%)$ | $\begin{aligned} & 1,705 \\ & {[100 \%]} \end{aligned}$ |
| 18yr<Ages25yr | $\begin{gathered} 3,371 \\ (68.45 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 685 \\ (13.9 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 384 \\ (7.8 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 318 \\ (6.46 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 109 \\ (2.21 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 58 \\ (1.18 \%) \\ \hline \end{gathered}$ | $\begin{aligned} & 4,925 \\ & {[100 \%]} \end{aligned}$ |
| 25yr<Age 335 yr | $\begin{gathered} 4.433 \\ (56.77 \%) \end{gathered}$ | $\begin{gathered} 1,496 \\ (19.16 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 554 \\ (7.09 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 899 \\ (11.51 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 362 \\ (4.64 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 65 \\ (0.83 \%) \\ \hline \end{gathered}$ | $\begin{aligned} & 7,809 \\ & {[100 \%]} \end{aligned}$ |
| 35yr<Ages50yr | $\begin{gathered} 7,762 \\ (53.09 \%) \end{gathered}$ | $\begin{gathered} 3,197 \\ (21.87 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 804 \\ (5.5 \%) \end{gathered}$ | $\begin{gathered} 1,871 \\ (12.8 \%) \end{gathered}$ | $\begin{gathered} 856 \\ (5.85 \%) \end{gathered}$ | $\begin{gathered} 130 \\ (0.89 \%) \\ \hline \end{gathered}$ | $\begin{aligned} & 14,620 \\ & {[100 \%]} \end{aligned}$ |
| 50yr<Ages65yr | $\begin{gathered} 5,681 \\ (41.59 \%) \end{gathered}$ | $\begin{gathered} 3,632 \\ (26.58 \%) \end{gathered}$ | $\begin{gathered} 666 \\ (4.88 \%) \end{gathered}$ | $\begin{gathered} 2,310 \\ (16.91 \%) \end{gathered}$ | $\begin{gathered} 1,214 \\ (8.89 \%) \end{gathered}$ | $\begin{gathered} 157 \\ (1.15 \%) \end{gathered}$ | $\begin{aligned} & 13,660 \\ & {[100 \%]} \end{aligned}$ |


|  | What do you mainly do with the money left over |  |  |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Age bands | Does not apply | Put it into/ leave it in current account | Spend it | Put it into/ leave it in savings account/ investments | Leave it in current account, then put it into savings/ investments | Keep it in purse / wallet for the next week / month |  |
| $65 \mathrm{yr}<$ Ages 101 yr | $\begin{gathered} 3,450 \\ (30.21 \%) \end{gathered}$ | $\begin{gathered} 4,358 \\ (38.14 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 670 \\ (5.86 \%) \\ \hline \end{gathered}$ | $\begin{gathered} 1,732 \\ (15.16 \%) \end{gathered}$ | $\begin{gathered} 927 \\ (8.11 \%) \end{gathered}$ | $\begin{gathered} 288 \\ (2.52 \%) \\ \hline \end{gathered}$ | $\begin{aligned} & 11,425 \\ & {[100 \%]} \end{aligned}$ |

Table 15 demonstrates that the elder the person, the more usual it is for him/her to have money left at the end of the week (or month), whilst younger respondents seem to face cash flow problems more frequently than their elder counterparts. However, when it comes to what the respondents do with any residual income, there is little difference between age groups as shown in Table 16. In general, they (young and elder people alike) tend to leave/put any money left over in their current account. The second most frequently used option for all is to leave/put any residual income in a savings account or investment. The only exception noted are the 18 to 25 year olds, who are more likely to spend it.

In line with the existing literature (Berthoud and Kempson 1992, Webley and Nyhus 2001, Crook 2003b, Baek and Hong 2004, Bernthal et al. 2005, Crook and Hochguertel 2006), our analysis assumes the presence of the life cycle hypothesis across the WAS respondents.

The life-cycle hypothesis which is well documented in the academic literature of personal and household debt (Baek and Hong 2004, Bryant 1990, Fan et al. 1993, Hanna et al. 1995, Kim and DeVaney 2001, Thums et al. 2008, Yilmazer and DeVaney 2005) reflects the need to place emphasis on a particular cohort of the population, the young. As discussed in Chapter I, this group is willing to borrow money by means of using credit cards, as well as obtaining short- and intermediate-term loans and taking on mortgage debt. At the same time, they are at the early stages of career development and
therefore in possession of lower disposable income than the elder individuals.

In light of the above, the chapter focuses on the younger respondents (those between 16 and 35 years of age). Summary statistics for the chosen group of focus can be found in Appendix A4 (Tables a2, a3). Comparing the latter with Tables 11 and 12 above, one notes that the younger interviewees remain optimistic -higher percentage amongst the young expects to be able to save more money in the next 12 months-, score higher in respect of mathematical ability and provide more correct answers to the risk-related questions (see Table a3 in Appendix A4) than the full sample set.

Nevertheless, they have more money problems than the entire sample set, such as: higher percentage of loan arrears and of debt being a burden, greater struggle to make the minimum payment on the credit card(s) and it is less frequently that they have money left at the end of the week/month.

With those between the age of 16 and 35 being our study's focal point, we also ensure that they have completed the full interview, receive no pension income and have one or more credit cards, which they actively use. Our sample selection can be presented in the following schematic:

## WAS wave 1

71,268: total interviewees

of those

53,298 : Individual records applicable for a full interview

of those

12,849 are between 16 and 35 years of age
1 of those

12,837 do not receive pension income


5,767 have 1 or more credit card(s)
1 of those
2,693 use their credit cards
(respondents applicable to answer the question "have you been unable to make the minimum payment on your credit card(s) at any time during the past 12 months")

Similarly, the below table includes the STATA commands used for each selection:

Table 17- STATA commands used for the selection of the respondents

| WAS wave 1 |  |  |
| :---: | :---: | :---: |
| Sample selection steps | Number of <br> respondents | STATA command |
| total interviewees | 71,268 | . ta dvhsize |
| individual records applicable for a full <br> interview | 53,298 | . ta dvilo4a |
| are between 16 and 35 years of age | 12,849 | . drop if dvilo4a<0 dvage<16\|dvage>35 |
| do not receive pension income | 12,837 | . drop if pincinp>0 |
| have 1 or more credit card(s) | 5,767 | . ta dcnum |
| use their credit cards | 2,693 | drop if dcnum<1 |

It should be noted that the observations are further reduced given required variable transformations (such as -but not limited to- dropping negatively coded responses indicating refusal to respond, non-applicability or no opinion on the question asked). Also, several explanatory variables have less than 2,693 observations.

## 3. Econometric model and estimation

The purpose of the chapter being to investigate the key drivers of credit card payment arrears amongst the 16-35 year old respondents, the dependent variable for econometric analysis is dc12mi99. It is a binary variable that examines whether the respondent has been unable to make the minimum payment on their credit cards at any time during the past 12 months. The responses to the particular question amongst the age group of focus are summarised below ${ }^{100}$ :

Table 18- Credit card payment arrears amongst the $16-35$ year old respondents

| Dependent variable: dc12mi <br> Have you been unable to make the minimum payment <br> on these cards [credit cards] at any time during the <br> past 12 montths? |  |
| :---: | :---: |
| Yes | No |
| $15.41 \%$ | $84.59 \%$ |

The minimum payment on a credit card is typically equal to a percentage of the outstanding balance or a cash amount (for instance $10 \%$ or $£ 50$ ) whichever is greater-, plus any repayment protection insurance premiums, any account supervision fee and any account-over-limit fees. Missing a minimum payment translates into a fee being automatically applied once the payment deadline date is exceeded plus interest rate on the outstanding amount. Therefore, the particular variable is an important indicator of one's credit card problems and a sign of possible financial fragility.

[^55]As dc12mi is a binary variable, we analyse it by means of a logistic regression. The main features of such a model are summarised as follows.

Let $y_{i}=\mathbf{1}$ when person $i$ has credit card problems, meaning that they have been unable to make the minimum payment on at least one credit card during the preceding twelve months; otherwise, $\boldsymbol{y}_{i}=\mathbf{0}$. We define $p_{i}=\operatorname{prob}\left(y_{i}=1\right)$, commonly termed the probability of success, regardless of context.

A linear regression model would have $p_{i}=\mathbf{a}+\Sigma_{j} \beta_{j} \mathbf{x}_{\mathbf{j}}+\varepsilon_{i}$, and thus $\hat{\mathbf{p}}_{\mathrm{i}}=\hat{\mathbf{a}}+\sum_{\mathrm{j}} \widetilde{\boldsymbol{\beta}}_{\mathrm{j}} \mathbf{x}_{\mathrm{i}}$, where ' $\sim$ ' indicates an estimate of the corresponding parameter, or a prediction of the dependent variable. A problem with this model is that it is not guaranteed to deliver all $\hat{\mathbf{p}}_{\mathbf{i}}$ in the permitted range, $\mathbf{0} \leq \hat{p}_{\mathrm{i}} \leq \mathbf{1}$.

Several binary choice models have been developed to ensure $\mathbf{0} \leq \hat{\mathbf{p}}_{\mathbf{i}} \leq \mathbf{1}$; we use the logistic regression model (also referred to as a logit model) ${ }^{101}$, defining:

$$
\emptyset_{i}=a+\sum_{j} \beta_{j} x_{j}+\varepsilon_{i} \text {, with } \emptyset_{i}=\log \left(\frac{p_{i}}{1-p_{i}}\right)
$$

The term $p_{i} /\left(1-p_{i}\right)$ is an "odds ratio" and its natural logarithm, $\emptyset_{i}$, is known as a "logit". The model is highly non-linear in its regressors, since $p_{i}=e^{\emptyset_{i}} /\left(e^{\emptyset_{i}}+1\right)$.

The choice of regressors to explain credit card delinquency can be partially guided by received wisdom and existing literature but - given the multiplicity

[^56]of questions asked in the WAS, the detail of this choice will need to be also informed by specification search amongst a set of potential theory-consistent models.

In line with key findings of the existing literature (Bertaut and Haliassos 2006, Bird et al. 1999, Castronova and Hagstrom 2004, Chien and DeVaney 2001, Danes and Hira 1990, Kim and DeVaney 2001, Lester 2005, Livingstone and Lunt 1992, Rutherford and DeVaney 2009, Spinella et al. 2005), we proceed to the model specification search by classifying the variables into five groups, which reflect one's: i) income and wealth; ii) basic demographics; iii) personal circumstances; iv) personal finance, and, v) attitudinal and psychological functions, as shown below.

Table 19- Variable categories

| Variable Groups | Variable Names |
| :---: | :---: |
| Income and wealth | Square-root equivalised income |
|  |  |


| Variable Groups | Variable Names |
| :---: | :---: |
| Personal circumstances | Female $\times$ Single Parent [interaction] Fem SnglPar |
|  | Single $\times$ Age linteraction] Single Age |
|  | Single $\times$ ILO Unemployed [interaction] Single lloUnempd |
|  | Has Dependents Dependents |
| Personal finance | Cash Flow Problems CshFlwPr |
|  | Tend to buy things on credit and pay off later OnCredit |
|  | Payments of debt are a heavy burden [self-reported] HeavyBur |
|  | Loans in arrears LnArr |
|  | Excellent mathematical ability [self-assessed] omath $e$ |
|  | Moderate mathematical ability [self-assessed] omath_m |
|  | Poor mathematical ability [self-assessed] omath_p |
| Attitudes towards money | Tend to buy things I cannot afford NotAfford |
|  | Tend to shop around for the best deals on interest rates ShopBest |
|  | $£ 1,000$ today as opposed to $£ 1,100$ in a year's time InstGrat |
|  | Guaranteed $£ 1,000$ as opposed to 1 in 5 chance of $£ 10,000$ Risk |
|  | Financial situation over next 2 years expected to improve OptFin |
|  | Tend to be more a saver than spender Saver |

Using the above categories, we construct 4 different -exploratory-models:

- Model 1 employs the "income and wealth" group and the "basic demographics" group as explanatory variables;
- Model 2 is constructed on the basis of Model 1, with the addition of variables in the "personal circumstances" group;
- Model 3 comprises the basic model (Model 1) and the "personal finance" variables, and,
- Model 4 consists of Model 1 and those variables corresponding to "attitudes towards money".

The influence of these potential determinants of credit card arrears is estimated using logit models. The results ${ }^{102}$ of the analysis of each model (where the effect of each variable category on the dependent variable of credit card arrears is examined separately) are tabulated below.

Table 20- Exploratory models ${ }^{103}$

|  | Model 1 Income and weath \& basic demographics | Model 2 <br> Model 1 and Personal circumstances | Model 3 Model 1 and Personal finance | Model 4 Model 1 and Attitudes towards money |
| :---: | :---: | :---: | :---: | :---: |
| Square-root equivalised income sqriEq_Inc | $\begin{aligned} & -0.089^{*+m} \\ & (0.0015) \\ & \hline \end{aligned}$ | $\begin{aligned} & -0.0066^{* * *} \\ & (0.0023) \\ & \hline \end{aligned}$ | $\begin{gathered} -0.0053^{* * *} \\ (0.0017) \\ \hline \end{gathered}$ | $\begin{gathered} -0.0092^{+n+\pi} \\ (0.0022) \\ \hline \end{gathered}$ |
| Square-root equivalised benefit receipts <br> sqriEq Ben | $\begin{aligned} & 0.0262^{2+3} \\ & (0.0028) \end{aligned}$ | $\begin{gathered} 0.0216^{*+* *} \\ (0.004) \end{gathered}$ | $\begin{gathered} 0.0217^{* * *} \\ (0.0033) \end{gathered}$ | $\begin{aligned} & 0.0269^{* * *} \\ & (0.0038) \end{aligned}$ |
| Square-root equivalised ISA values <br> sqrtEq_ISAval | $\begin{aligned} & -0.687^{* * * * *} \\ & (0.1798) \end{aligned}$ | $\begin{aligned} & -0.6191 \text { **** } \\ & (0.1791) \\ & \hline \end{aligned}$ | $\begin{aligned} & -0.4204^{* *} \\ & (0.1761) \end{aligned}$ | $\begin{aligned} & -0.5621^{* *} \\ & (0.2415) \end{aligned}$ |
| $\begin{aligned} & \text { Age } \\ & \text { Age } \end{aligned}$ | $\begin{gathered} -0.0747^{* * *} \\ (0.0128) \\ \hline \end{gathered}$ | $\begin{gathered} -0.0839^{* * *} \\ (0.0191) \\ \hline \end{gathered}$ | $\begin{gathered} -0.0835^{* * *} \\ (0.0146) \end{gathered}$ | $\begin{gathered} -0.0866^{+* *} \\ (0.019) \\ \hline \end{gathered}$ |
| Female Female | $\begin{gathered} -0.3756^{\text {tax**}} \\ (0.123) \end{gathered}$ | $\begin{aligned} & -0.3581^{* *} \\ & (0.1435) \end{aligned}$ | $\begin{gathered} -0.4646^{n \mathrm{ma}} \\ (0.1381) \\ \hline \end{gathered}$ | $\begin{gathered} -0.5582^{*+*} \\ (0.1791) \\ \hline \end{gathered}$ |

102 That is, the estimated coefficients and standard errors of each logit model. It should be noted that the estimated coefficients of the logistic regression provide information on the direction of the effect that each regressor has on the regressand.
${ }^{103}$ We note the possible endogeneity of some explanatory variables, particularly LnArr, HeavyBur, CshFlwPr, NotAfford. These are variables whose behaviour may correlate with the random error component of the regressand, causing inconsistency in parameter estimation. Removal of the inconsistency requires valid instrumental or indicator variables to support, respectively control-function and latent-variable methods (Wooldridge, 2010). We have left for further research the question of whether or not the WAS survey includes sufficient appropriate instruments or indicators. Here we simply report the consequences of dropping the potentially endogenous variables from the estimated model. Dropping these variables causes the following changes to our estimated models:
Model 3 (Model 1 and Personal finance): the removal of the three variables, LnArr, HeavyBur, CshFlwPr, results in the model no longer having any significant variables of Personal Finance.
Model 4 (Model 1 and Attitudes towards money): dropping the variable NotAfford, causes no severe changes other than a small drop in the pseudo R2.
Model 5 (all variables) [shown in table 21]: dropping variables LnArr, HeavyBur, CshFIwPr and NotAfford, makes Model 5 a basic demographics and income model other than the statistical significance of Saver and ShopBest (both Attitudes towards money variables).

|  | Model 1 Income and wealth \& basic demographics | Model 2 <br> Model 1 and Personal circumstances | Model 3 <br> Model 1 and Personal finance |  |
| :---: | :---: | :---: | :---: | :---: |
| Non White British NotWhBrit | $\begin{aligned} & 0.2848^{* * *} \\ & (0.1402) \\ & \hline \end{aligned}$ | $\begin{aligned} & 0.3526^{*+1} \\ & (0.1436) \\ & \hline \end{aligned}$ | $\begin{aligned} & 0.2719^{*} \\ & (0.158) \end{aligned}$ | $\begin{aligned} & \hline 0.4076^{* \prime} \\ & (0.2086) \end{aligned}$ |
| ILO Unemployed loUnempd |  | $\begin{aligned} & 0.6644^{* *} \\ & (0.3227) \\ & \hline \end{aligned}$ |  |  |
| Economically Inactive Econlnactiv |  | $\begin{gathered} -0.0074 \\ (0.2179) \end{gathered}$ |  |  |
| Degree-level (or above) qualifications Degree |  | $\begin{aligned} & -0.6699^{* * *} \\ & (0.2103) \end{aligned}$ |  |  |
| No qualifications NoQual |  | $\begin{gathered} 0.1843 \\ (0.2111) \end{gathered}$ |  |  |
| Single Single |  | $\begin{array}{r} -1.1793 \\ (0.7521) \\ \hline \end{array}$ |  |  |
| Separated Separated |  | $\begin{gathered} 0.1089 \\ (0.3232) \\ \hline \end{gathered}$ |  |  |
| Single Parent SngIPar |  | $\begin{gathered} -0.78 \\ (1.1968) \end{gathered}$ |  |  |
| Female x Degree-level qualification [interaction] Fem_Deg |  | $\begin{gathered} 0.0363 \\ (0.2963) \end{gathered}$ |  |  |
| Female $\times$ Single Parent [interaction] Fem_SnglPar |  | $\begin{gathered} 0.9965 \\ (1.1775) \end{gathered}$ |  |  |
| Single x Age [interaction] Single_Age |  | $\begin{gathered} 0.0507^{*} \\ (0.0276) \end{gathered}$ |  |  |
| Has Dependents Dependents |  | $\begin{gathered} -0.053 \\ (0.1837) \\ \hline \end{gathered}$ |  |  |
| Cash Flow Problems CshFhwr |  |  | $\begin{gathered} \hline 0.9129^{* * *} \\ (0.143) \\ \hline \end{gathered}$ |  |
| Tend to buy things on credit and pay off later <br> OnCredit |  |  | $\begin{gathered} -0.2452^{*} \\ (0.1285) \end{gathered}$ |  |
| Payments of debt are a heavy burden [self-reported] HeavyBur |  |  | $\begin{gathered} 1.1954^{* * *} \\ (0.135) \end{gathered}$ |  |
| Loans in arrears LnArt |  |  | $\begin{aligned} & 1.2682^{* * *} \\ & (0.3399) \end{aligned}$ |  |
| Excellent mathematical ability [self-assessed] omath_e |  |  | $\begin{gathered} 0.0501 \\ (0.1598) \end{gathered}$ |  |
| Moderate mathematical ability [self-assessed] omath $m$ |  |  | $\begin{gathered} 0.0042 \\ (0.1561) \end{gathered}$ |  |
| Poor mathematical ability [selfassessed] <br> omath_p |  |  | $\begin{gathered} -0.036 \\ (0.3166) \end{gathered}$ |  |
| Tend to buy things I cannot afford <br> NotAfford |  |  |  | $\begin{gathered} 0.1953 \\ (0.1744) \end{gathered}$ |
| Tend to shop around for the best deals on interest rates ShopBest |  |  |  | $\begin{aligned} & -0.379^{\text {** }} \\ & (0.1676) \end{aligned}$ |
| £1,000 today as opposed to $£ 1,100$ in a year's time InstGrat |  |  |  | $\begin{gathered} 0.096 \\ (0.2344) \end{gathered}$ |
| Guaranteed $£ 1,000$ as opposed to 1 in 5 chance of $£ 10,000$ Risk |  |  |  | $\begin{array}{r} -0.2312 \\ (0.1992) \end{array}$ |
| Financial situation expected to improve over next 2 years OptFin |  |  |  | $\begin{gathered} -0.0503 \\ (0.1821) \end{gathered}$ |
| Tend to be more a saver than spender <br> Saver |  |  |  | $\begin{gathered} -0.528^{\text {***}} \\ (0.2407) \end{gathered}$ |


|  | Model 1 <br> Income and <br> wealth \& basic <br> demographics | Model 2 <br> Model 1 and <br> Personal <br> circumstances | Model 3 <br> Model 1 and <br> Personal <br> finance | Model 4 <br> Model 1 and <br> Attudes towards <br> money |
| :---: | :---: | :---: | :---: | :---: |
| N | 2,691 | 2,690 | 2,349 | 1,359 |
| LR | 227.45 | 264.34 | 402.34 | 155.47 |
| Prob > chi2 | 0.000 | 0.000 | 0.0000 | 0.0000 |
| Pseudo R2 | 0.0983 | 0.1143 | 0.1938 | 0.1353 |

Standard errors in parentheses
*Denotes significance at the $10 \%$-level, ${ }^{* *}$ at the $5 \%-l e v e l$, and, ${ }^{* * *}$ at the $1 \%$-level

Income and wealth as well as basic demographics (Model 1) have significant effects on the likelihood of credit card arrears (inability to make the minimum payment). In particular, square-root equivalised income and ISA investments are negatively associated with the probability of having credit card payment problems, whereas receipts of benefits have a positive effect on the explained variable. The positive correlation between (square-root equivalised) benefit receipts and credit card arrears points in the direction of financial fragility amongst the benefit recipients which leads them to unmanageable debt. Earlier, we argued that the life cycle hypothesis plays a role in credit card arrears amongst the young; indeed, age (even within this age-restricted cohort) has a strong -negative- effect on the probability of being unable to make the minimum payment on credit cards. Moreover, our results suggest that White British individuals are less likely to have credit card arrears than individuals of ethnic minorities.

Of an individual's personal circumstances, marital status does not have an impact on the probability of credit card arrears, while one's employment and educational status have:

- An unemployed person (according to the definition of the International Labour Organisation (ILO)) is more likely to have credit card difficulties than someone who is in employment.
- An individual with a degree-level (or higher) qualification is less likely than a person with any other lower-level qualifications to have credit card arrears.

In light of the strong effect of the demographic variables (particularly those of age and gender which are significant at the $1 \%$-level), relevant interactions are included in Model 2; however, they do not produce statistical significance except for the interaction between Single and Age:

The Single_Age interaction carries a significant positive coefficient, indicating that the tendency for risk of delinquency to reduce with age (note the significant negative coefficient for "age") is less marked for unmarried respondents.

Not surprisingly, the personal finance category of explanatory variables (Model 3) has significant effects on the likelihood of credit card arrears, with i) cash flow problems, ii) payments of debt dubbed 'heavy burden' and iii) loans in arrears being positively associated with the probability of credit card arrears. On the contrary, those who report a tendency to buy things on credit and pay off later, are less likely to be unable to make the minimum payment on their credit cards.

Model 4 incorporates attitudinal and psychological factors, the majority of which do not achieve statistical significance in the presence of the basic income, wealth and demographic variables. This finding is in contradiction with other studies (Chien and DeVaney 2001, Lester 2005, Livingstone and Lunt 1992, Spinella et al. 2005) that underline the significance of such variables. The only exceptions are:
i) the variable that identifies those respondents with the (selfreported) tendency of shopping around for the best deals on interest rates. Such individuals are less likely to fall into credit card arrears. It can be argued that looking for the best interest rates attests the existence of a basic -at least- understanding of core financial indicators (in this case, rates of interest) and consequently financial awareness and planning. The tendency to shop around for the best rates implies active money
management in combination with average -if not strongfinancial literacy.
ii) Similarly, the individuals who admit to an inclination to be more a saver than a spender are less likely to fall into credit card arrears. This points to a more reserved use of money that prevents individuals from overspending and subsequently difficulties with their credit card payments.

The above model specification exercise shows that credit card arrears is a complex phenomenon that is best examined by means of demographic, financial and behavioural parameters that influence one's ability to make the minimum payment to his/her credit card. In order to enable such a holistic analysis on the basis of the above results, we employ a 'complete' econometric model, in which all variable groups are included together.

Table 21 below presents the estimated coefficients and standard errors of the logit Model 5 followed by Table 22 that includes the marginal effects. The marginal effects, discussed in Appendix A6, provide the change in the probability of credit card arrears with respect to a given explanatory variable. A number of post-estimation tests were also carried out as shown in Appendix A7.

Table 21- Model 5 (all variables)

| Credit Card Arrears |  |
| :---: | :---: |
| Square-root equivalised income | $-0.0069^{*}$ |
| sqriEq_Inc | $(0.0036)$ |
| Square-root equivalised benefit receipts | $0.0224^{* * *}$ |
| sqrtEq_Ben | $(0.0058)$ |
| Square-root equivalised ISA values | -0.312 |
| sqrtEq_ISAval | $(0.2399)$ |
| Age | $-0.0723^{* *}$ |
| Age | $(0.0295)$ |
| Female | $-0.5348^{* *}$ |
| Female | $(0.2227)$ |
| Non White British | $0.4042^{*}$ |
| NotWhBrit | $(0.2258)$ |


| Credit Card Arrears |  |
| :---: | :---: |
| ILO Unemployed IloUnempd | $\begin{gathered} -0.3099 \\ (0.5102) \\ \hline \end{gathered}$ |
| Economically Inactive Econlnactiv | $\begin{aligned} & -0.2784 \\ & (0.331) \end{aligned}$ |
| Degree-level (or above) qualifications Degree | $\begin{gathered} -0.3727 \\ (0.3148) \\ \hline \end{gathered}$ |
| No qualifications NoQual | $\begin{gathered} 0.1248 \\ (0.3217) \\ \hline \end{gathered}$ |
| Single Single | $\begin{gathered} 0.9033 \\ (1.1667) \\ \hline \end{gathered}$ |
| Separated Separated | $\begin{gathered} 0.3183 \\ (0.4587) \end{gathered}$ |
| Single Parent SngIPar | $\begin{gathered} -11.6066 \\ (358.1353) \\ \hline \end{gathered}$ |
| Female $\times$ Degree-level qualification [interaction] Fem Deg | $\begin{aligned} & -0.3127 \\ & (0.4354) \end{aligned}$ |
| Female x Single Parent [interaction] Fem_SngIPar | $\begin{gathered} 11.71 \\ (358.1351) \end{gathered}$ |
| Single $\times$ Age [interaction] Single_Age | $\begin{gathered} -0.019 \\ (0.0428) \end{gathered}$ |
| Has Dependents Dependents | $\begin{gathered} 0.0081 \\ (0.2907) \end{gathered}$ |
| Cash Flow Problems CshFlwPr | $\begin{gathered} 0.8291^{1 * * * *} \\ (0.201) \end{gathered}$ |
| Tend to buy things on credit and pay off later OnCredit | $\begin{gathered} -0.2602 \\ (0.1856) \\ \hline \end{gathered}$ |
| Payments of debt are a heavy burden [self-reported] HeavyBur | $\begin{aligned} & 1.1208^{* * *} \\ & (0.1902) \\ & \hline \end{aligned}$ |
| Loans in arrears LnArr | $\begin{aligned} & 0.8452^{* *} \\ & (0.4348) \end{aligned}$ |
| Excellent mathematical ability [self-assessed] omath_e | $\begin{aligned} & -0.0127 \\ & (0.2233) \end{aligned}$ |
| Moderate mathematical ability [self-assessed] omath $m$ | $\begin{aligned} & -0.2681 \\ & (0.222) \end{aligned}$ |
| Poor mathematical ability [self-assessed] omath_p | $\begin{gathered} -0.2139 \\ (0.4216) \\ \hline \end{gathered}$ |
| Tend to buy things I cannot afford NotAfford | $\begin{gathered} 0.0121 \\ (0.1964) \\ \hline \end{gathered}$ |
| Tend to shop around for the best deals on interest rates ShopBest | $\begin{aligned} & -0.3083^{*} \\ & (0.1803) \end{aligned}$ |
| $£ 1,000$ today as opposed to $£ 1,100$ in a year's time InstGrat | $\begin{array}{r} -0.1388 \\ (0.2491) \\ \hline \end{array}$ |
| Guaranteed $£ 1,000$ as opposed to 1 in 5 chance of $£ 10,000$ Risk | $\begin{gathered} -0.1009 \\ (0.2117) \\ \hline \end{gathered}$ |
| Financial situation expected to improve over next 2 years OptFin | $\begin{gathered} -0.0753 \\ (0.1962) \end{gathered}$ |
| Tend to be more a saver than spender Saver | $\begin{aligned} & -0.3098 \\ & (0.257) \\ & \hline \end{aligned}$ |
| N | 1,359 |
| LR | 248.76 |
| Prob > chi2 | 0.0000 |
| Pseudo R2 | 0.2164 |

Standard errors in parentheses

```
* Denotes significance at the \(10 \%\)-level, ** at the \(5 \%\)-level, and, *** at the \(1 \%\)-level
```

Each variable is presented in more detail below:

- Ldc12mi is the $1 / 0$ dummy variable for credit card payment arrears
- 0 : respondents have been able to make the minimum payments on their credit cards over the last 12 months,
- 1: respondents have been unable to make the minimum payment on their credit cards at any time during the past 12 months
- sqrtEq_Inc represents the square root equivalised ${ }^{104}$ income
- sqrtEq_Ben is the square root equivalised benefit receipts
- sqriEq_ISAval is the square root equivalised ISA values
- Age is the respondents' age; note that the analysis is focused on the age group of 16-35
- Female is a $1 / 0$ dummy for being female
- NotWhBrit is a $1 / 0$ dummy for non-White British respondents
- ILO Unemployed is a $1 / 0$ dummy for being unemployed according to the ILO definition
- EconInactiv is a $1 / 0$ dummy for being either economically inactive or an unpaid family worker
- Degree is a $1 / 0$ dummy for holding at least one degree or a higher level qualification
- NoQual is a $1 / 0$ dummy for having no qualifications
- Single is a $1 / 0$ dummy for being single or widowed
- Separated is a $1 / 0$ dummy for being divorced or separated
- SngIPar is a $1 / 0$ dummy variable that denotes a single (lone) parent
- Fem_Deg is an interaction between Female and Degree

[^57]- Fem_SngIPar is an interaction between Female and SngIPar
- Single_Age is an interaction between Single and Age
- CshFiwPr is a dichotomous ( $1 / 0$ ) dummy variable, where 1 indicates that the respondents never or hardly ever have money left at the end of the week/month
- OnCredit is a $1 / 0$ dummy for those who tend to buy things on credit and pay off later
- HeavyBur is a $1 / 0$ dummy variable that describes those who regard their payments of debt as a heavy burden
- LnArr is a $1 / 0$ dummy for those who have loans in arrears
- omath_e is a $1 / 0$ dummy variable indicating the respondent's selfassessed mathematical ability as excellent
- omath_m is a $1 / 0$ dummy variable indicating the respondent's selfassessed mathematical ability as moderate
- omath $p$ is a $1 / 0$ dummy variable indicating the respondent's selfassessed mathematical ability as poor
- NotAfford is a $1 / 0$ dummy for those who tend to buy things they cannot afford
- ShopBest is a $1 / 0$ dummy variable indicating those who shop around for the best deals on interest rates
- InstGrat is a $1 / 0$ dummy variable for those who choose receiving $£ 1,000$ today over $£ 1,100$ in a year's time
- Risk is a $1 / 0$ dummy variable that represents the respondents who choose a guaranteed payment of 31,000 rather than 1 in 5 chances of £10,000
- OptFin is a $1 / 0$ dummy that indicates those who expect their financial situation to improve over the next 2 years
- Saver is a $1 / 0$ dummy indicating the respondents who describe themselves more of a saver than a spender.

Table 22- Average marginal effects in Model 5

| Average marginal effects on probability of credit card arrears |  |
| :---: | :---: |
| Square-root equivalised income sqriEq_Inc | -0.0007* |
| Square-root equivalised benefit receipts sqrtEq_Ben | 0.0023*** |
| Square-root equivalised ISA values sqriEq_ISAval | -0.0313 |
| $\begin{aligned} & \text { Age } \\ & \text { Age } \end{aligned}$ | -0.0073** |
| Female Female | -0.0537** |
| Non White British NotWhBrit | 0.0406* |
| ILO Unemployed lloUnempd | -0.0311 |
| Economically Inactive EconInactiv | -0.028 |
| Degree-level (or above) qualifications Degree | -0.0374 |
| No qualifications NoQual | 0.0125 |
| Single Single | 0.0907 |
| Separated Separated | 0.032 |
| Single Parent SngIPar | -1.166 |
| Female x Degree-level qualification [interaction] Fem Deg | -0.0314 |
| Female $\times$ Single Parent (interaction] Fem_SngIPar | 1.1766 |
| Single $\times$ Age [interaction] Single_Age | -0.0019 |
| Has Dependents Dependents | 0.0008 |
| Cash Flow Problems CshFlwPr | $0.0833^{* * *}$ |
| Tend to buy things on credit and pay off later OnCredit | -0.0261 |
| Payments of debt are a heavy burden [selfreported] HeavyBur | 0.1126*** |
| Loans in arrears LnArr | 0.0849** |
| Excellent mathematical ability [self-assessed] omath_e | -0.0013 |
| Moderate mathematical ability [self-assessed] omath $m$ | -0.0269 |
| Poor mathematical ability [self-assessed] omath_p | -0.0215 |


| Average marginal effects on probability of credit card arrears |  |
| :---: | :---: |
| Tend to buy things I cannot afford NotAfford | 0.0012 |
| Tend to shop around for the best deals on interest rates ShopBest | -0.031* |
| $£ 1,000$ today as opposed to $£ 1,100$ in a year's time InstGrat | -0.0139 |
| Guaranteed $£ 1,000$ as opposed to 1 in 5 chance of $£ 10,000$ Risk | -0.0101 |
| Financial situation expected to improve over next 2 years OptFin | -0.0008 |
| Tend to be more a saver than spender Saver | 0.0311 |

The above show that one's demographic characteristics, income, financial situation, as well as attitudinal and psychological functions affect the likelihood of credit card payment arrears. For clarity, a brief discussion of the impact of each category of variables follows.
> The impact of income and wealth on credit card payment arrears One's equivalised income is negatively associated with credit card arrears, while the equivalised benefit receipts contribute positively. Though benefit receipts count as income, they are arguably also a measure of challenging personal circumstances that increase the risk of financial difficulties.
$>$ The impact of demographics on credit card payment arrears Age, even within our age-specific focus group of those aged 16 to 35 , has a negative effect on the likelihood of credit card arrears, which is consistent with the life-cycle hypothesis. Females are less likely than males to be unable to make the minimum payment on their credit card, whereas ethnic minorities are more likely to incur credit card payment arrears than white British. It is worth highlighting that the significant role of ethnicity -an important parameter for policy makers, educators and advisors- has not
been emphasised in existing research with the exception of Del-Rio and Young (2005).
> The impact of personal finance on credit card payment arrears Individuals with cash flow problems -and loan arrears, alike- are more likely to have credit card arrears. While this may be viewed as an obvious inference on the basis of existing financial hardship, there is a particular less visited- angle that lends itself to further investigation: loan arrears and cash flow difficulties may be due to habit, rather than actual financial hardship. Such behavior evidences poor management of personal finance with a subsequent spill-over effect on credit card mismanagement.

Similarly, respondents who consider their payments of debt to be a heavy burden, are more likely to have credit card payment arrears according to our econometric analysis.
> The impact of attitudes and psychology on credit card payment arrears
Our analysis has highlighted one attitudinal factor that has a significant effect on credit card arrears: the tendency to shop around for the best deals on interest rates reduces the likelihood of being unable to make the minimum payment on credit card(s), pointing to a financially savvy consumer.
$>$ The impact of personal circumstances on credit card payment arrears Employment and marital status as well as educational level show no impact on credit card arrears.

## 4. Conclusion

Using data from the $1^{\text {st }}$ wave of the Wealth and Assets Survey, this chapter examines the factors that affect credit card payment arrears and seeks
evidence to support the role of financial illiteracy and ambiguity amongst respondents aged 16 to 35 .

The results of the empirical estimation support the ramifications of the lifecycle hypothesis in respect of borrowing and debt accumulation with a consequent risk of liquidity problems during the period of young adult life, as outlined in chapter I.

Basic demographics, income, one's own financial situation and attitudes towards money are influential in explaining credit card arrears. Some variables have been noted by previous studies, some -like ethnicity- have not been highlighted previously and could lend a hand to the efforts of public and private institutions to curb credit card debt by means of targeting certain cohorts. In addition, it is argued that effective financial management is multifaceted and complex; personal financial literacy cannot be achieved solely on the grounds of mathematics education.

A considerable number of respondents, who give a positive self-assessment of their mathematical ability, do not choose the expected utility-maximising option of the risk-related questions (Tables 13 and 14). Should one attribute this seemingly irrational behaviour to the credit card market imperfections (high transaction costs, frictions and constraints to mention a few) and therefore accept it as a rational reaction to external distortions, or, should we investigate this through the prism of ambiguity?

Although we have found no empirical evidence which directly evinces the importance of ambiguity, the latter may provide the necessary platform to elucidate this seemingly irrational behaviour and therefore offer a basis of understanding how people manage their finances.

## CHAPTER V- Empirical analysis of mortgage arrears

## 1. Introduction

The objective of this chapter is to explore whether mortgage arrears and credit card default have similar causal factors. Focusing on secured debt and continuing to use the first wave of the Wealth and Assets Survey (WAS) we replicate the empirical analysis carried out in Chapter IV employing the same explanatory variables.

The chapter is organised in the following sections:

## 2. Data and summary statistics

We explain the procedure through which the two parts of the survey have been linked up, in order to facilitate the investigation of mortgage arrears. Moreover, the dependent variable is presented alongside key summary statistics, such as the relationship between self-assessed mathematical ability and mortgage arrears.
3. Econometric analysis and estimation

The same econometric modelling framework and model specification search as in Chapter IV is adopted in order to enable a straightforward comparison. The sample selection, final model and estimation output are discussed.
4. Interpretation and conclusions

The results of the credit card arrear delinquency and mortgage arrears models are compared and discussed.

All statistical analyses were conducted using STATA version 12 (Stata Corp, College Station, Texas, USA).

## 2. Data and summary statistics

Unlike the investigation of credit card arrears presented in Chapter IV, where all variables -dependent and explanatory-were taken from the individual schedule, the present analysis requires elements of both WAS datasets; namely, the individual as well as the household schedule of the WAS.

In particular, as discussed in the previous chapter, mortgage debt data is only provided in the household schedule, whereas all other variables (on income and wealth, demographics, personal circumstances, personal finance and attitudes towards money) are given in the individual schedule.

Consequently, we add the necessary variables, presented below, from the household part of the survey into the individual part using the unique household number (full STATA commands provided in the Annotated commands listing; Appendix A5). This process translates the 30,595 households (of the household schedule) into the 71,268 individuals (of the personal schedule).

The transferred variables are:

- marrs ("whether the respondent is up-to-date with repayments on mortgage")
- mdiffpy ("whether mortgage payments are a burden [self-reported]")

To provide a better picture of the two variables as an introduction to the ensuing activities, the below tables provide summary statistics of each of these variables across the raw data (i.e. 71,268 individuals).

Table 23-Summary statistics of the transferred variable marrs

| Whether up-to-date with repayments on mortgage [marrs] |  |  |
| :---: | :---: | :---: |
|  | Frequencies | STATA value label |
| Does not know | 8 | -9 |
| Refused | 2 | -8 |
| Not applicable | 40,326 | -7 |
| Up-to-date | 30,527 | 1 |
| 1 month behind | 202 | 2 |
| $2-6$ months behind | 180 | 3 |
| Over 6 months behind | 23 | 4 |
| Total | 71,268 |  |

Table 24- Summary statistics of the transferred variable mdiffpy

| Whether mortgage payments are a burden [mdlffpy] |  |  |
| :---: | :---: | :---: |
|  | Frequencies | STATA value label |
| Does not know | 150 | -9 |
| Refused | 8 | -8 |
| Not applicable | 40,697 | -7 |
| Heavy burden | 4,809 | 1 |
| Somewhat of a burden | 11,812 | 2 |
| Not a problem | 13,792 | 3 |
| Total | 71,268 |  |

- Self-assessed mathematical ability and mortgage arrears

In light of our focus on financial literacy and in line with the previous chapter, we introduce the relationship between the respondents' self-assessed mathematical ability (excellent; good; moderate; poor) and mortgage arrears.

Based on marrs, the variable that captures whether one is up-to-date with their mortgage repayments or falling behind, we create a (new) dichotomous variable that identifies whether the respondent is in mortgage arrears. This variable, Lmarrs, which is presented in more detail in the next section, is used in the below figure.

Figure 2- Mortgage arrears for the various levels of self-assessed mathematical ability


To support the interpretation of the histograms, a contingency table illustrating the incidence of mortgage arrears versus the self-assessed mathematical ability is provided below:

Table 25- Incidence of mortgage arrears versus the self-assessed mathematical ability

| Mortgage Arrears <br> (Lmarrs) | Self-assessed mathematical ability |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Excellent | Good | Moderate | Poor |
| No arrears | 4,541 | 8,162 | 3,713 | 671 |
| In arrears | 42 | 103 | 48 | 16 |
| Total | 4,583 | 8,265 | 3,761 | 687 |
| In arrears (\%) | 0.92 | 1.25 | 1.28 | 2.33 |

The evidence of this table demonstrates an apparent correlation of one's mathematical ability and his/her mortgage arrears. Notably, the incidence of mortgage arrears is largest amongst those who assess their mathematical ability as 'poor' ( $2.33 \%$ ), followed by those with a 'moderate' mathematical
ability ( $1.28 \%$ ) and those with 'good' ( $1.25 \%$ ). The respondents whose selfassessment of mathematical ability is described as 'excellent', are according to the above table- the least susceptible to mortgage debt.

- Sample selection

As our study focuses on the individuals of a specific age group (16 to 35 years of age), who completed the full interview and receive no pension income, the following sample selection is performed:

## WAS wave 1

71,268: total interviewees

of those
53,298: Individual records applicable for a full interview

of those
12,849 are between 16 and 35 years of age


12,837 do not receive pension income上
6,299 currently have mortgage repayment obligations.

Similarly, the below table includes the STATA commands used for each selection:

Table 26- STATA commands used for the selection of the respondents

| WAS wave 1 |  |  |
| :---: | :---: | :---: |
| Sample selection steps | Number of <br> respondents | STATA command |
| total interviewees | 71,268 | .ta dvhsize |
| individual records applicable for a full <br> interview | 53,298 | . ta dvilo4a <br> .drop if dvilo4a<0 |
| respondents between 16 and 35 years of <br> age | 12,849 | drop if <br> dvage $<16$ dvage $>35$ |
| do not receive pension income | 12,837 | . drop if pincinp>0 |
| currently have mortgage repayment <br> obligations | 6,299 | ta marrs <br> drop if marrs $<0$ |

It should be noted that the observations are further reduced given required variable transformations (such as -but not limited to-dropping negatively coded responses indicating refusal to respond, non-applicability or no opinion on the question asked). Also, several explanatory variables have less than 6,299 observations.

## 3. Econometric model estimation

The aim of this chapter is to identify similarities and differences between secured (mortgage) and unsecured (credit card) arrears behavior. For this reason we replicate the analysis carried out in Chapter IV following the same model specification as that employed in the aforementioned chapter.

The dependent variable for our econometric analysis of mortgage arrears amongst the 16-35 year old respondents is Lmarrs, a binary variable that investigates whether the individual's mortgage repayments are up-to-date, or have fallen behind. We analyse the regressand by means of a logistic regression, first noting that the incidence of mortgage arrears within the cohort being studied is much less than the incidence of credit card delinquency.

Table 27-Mortgage arrears amongst the 16-35 year old respondents

| Dependent variable: Lmarrs |  |
| :---: | :---: |
| Are you behind with the repayments on your mortgage |  |
| Yes | No |
| $1.5 \%$ | $98.5 \%$ |

Lmarrs is generated from the categorical variable marrs available in the household schedule of the WAS (first wave). Marrs takes the values of 1 (up-to-date with repayments), 2 (1 month behind), 3 (2-6 months behind) and 4 (over 6 months behind).

Due to the very small percentage (1.5\%) of those behind with their mortgage repayments across our sample under investigation, we have decided not to merely focus on those who are 2-6 or more than 6 months behind, but on everyone who claims not to be timely with their repayment obligations. ${ }^{105}$

To facilitate comparison, all explanatory variables used in this chapter are grouped in the manner introduced in Chapter IV. Namely, the variable groups are: i) income and wealth, ii) basic demographics, iii) personal circumstances, iv) personal finance and v) attitudes towards money, as provided below.

Table 28-Variable categories

| Variable Groups | Variable Names |
| :---: | :---: |
| Income and wealth | Square-root equivalised income sqrtEg_Inc |
|  | Square-root equivalised benefit receipts sqriEq Ben |
|  | Square-root equivalised ISA values sqriEq_ISAval |
| Basic demographics | $\begin{aligned} & \text { Age } \\ & \text { Age } \end{aligned}$ |
|  | Female Female |
|  | Non White British NotWhBrit |
| Personal circumstances | ILO Unemployed lloUnempd |
|  | Economically Inactive EconInactiv |
|  | Degree-level (or above) qualifications Degree |
|  | No qualifications NoQual |

[^58]| Variable Groups | Variable Names |
| :---: | :---: |
| Personal circumstances | Single Single |
|  | Separated Separated |
|  | Single Parent SngIPar |
|  | Female $\times$ Degree-level qualification [interaction] Fem_Deg |
|  | Female $\times$ Single Parent [interaction] Fem SnglPar |
|  | Single $\times$ Age [interaction] Single_Age |
|  | Single x ILO Unemployed [interaction] Single lloUnempd |
|  | Has Dependents Dependents |
| Personal finance | Cash Flow Problems CshFlwPr |
|  | Tend to buy things on credit and pay off later OnCredit |
|  | Mortgage payments are a heavy burden [self-reported] HeavyBur |
|  | Loans in arrears LnArr |
|  | Excellent mathematical ability [self-assessed] omath $e$ |
|  | Moderate mathematical ability [self-assessed] omath $m$ |
|  | Poor mathematical ability [self-assessed] omath_p |
| Attitudes towards money | Tend to buy things I cannot afford NotAfford |
|  | Tend to shop around for the best deals on interest rates ShopBest |
|  | $£ 1,000$ today as opposed to $£ 1,100$ in a year's time InstGrat |
|  | Guaranteed $£ 1,000$ as opposed to 1 in 5 chance of $£ 10,000$ Risk |
|  | Financial situation over next 2 years expected to improve OptFin |
|  | Tend to be more a saver than spender Saver |

Using the above categories, we construct 4 different -exploratory-models: Model 1 ("income and wealth" \& "basic demographics" as exploratory variables); Model 2 (Model 1 and "personal circumstances"); Model 3 (Model 1 and "personal finance"); Model 4 (Model 1 and "attitudes towards money").

The influence of these potential determinants of mortgage arrears is estimated using logit models. The results ${ }^{106}$ of the analysis of each model (where the effect of each variable category on the dependent variable of credit card arrears is examined separately) are tabulated below.

Table 29- Exploratory models

|  | Model 1 Income and wealth \& basic demographics | Model 2 <br> Model 1 and Personal circumstances | Model 3 Model 1 and Personal finance | Model 4 Model 1 and Attitudes towards money |
| :---: | :---: | :---: | :---: | :---: |
| Square-root equivalised income sqriEq_Inc | $\begin{aligned} & -0.0119^{n+\pi} \\ & (0.0027) \\ & \hline \end{aligned}$ | $\begin{aligned} & -0.0097^{* * *} \\ & (0.0045) \\ & \hline \end{aligned}$ | $\begin{aligned} & 0.0052 \\ & (0.01) \end{aligned}$ | $\begin{array}{r} 0.015 \\ (0.013) \\ \hline \end{array}$ |
| Square-root equivalised benefit receipts <br> sqrtEq_Ben | $\begin{aligned} & 0.0138^{*} \\ & (0.0076) \end{aligned}$ | $\begin{gathered} 0.0075 \\ (0.0085) \end{gathered}$ | $\begin{array}{r} -0.0015 \\ (0.0235) \end{array}$ | $\begin{gathered} 0.0208 \\ (0.0295) \end{gathered}$ |
| Square-root equivalised ISA values sqrtEq_ISAval | $\begin{gathered} -1.9693^{* * * *} \\ (0.6391) \end{gathered}$ | $\begin{aligned} & -0.802^{* *} \\ & (0.3445) \end{aligned}$ |  | $\begin{gathered} 0 \\ \text { (omitted) } \\ \text { [sqreq_ISAval } \\ \text { failure predicts } \end{gathered}$ |
| $\begin{aligned} & \text { Age } \\ & \text { Age } \\ & \hline \end{aligned}$ | $\begin{aligned} & 0.0448^{* * *} \\ & (0.0209) \end{aligned}$ | $\begin{gathered} -0.0174 \\ (0.0367) \\ \hline \end{gathered}$ | $\begin{gathered} 0.1212 \\ (0.0936) \end{gathered}$ | $\begin{gathered} 0.1708 \\ (0.1509) \\ \hline \end{gathered}$ |
| Female Femalo | $\begin{gathered} -0.4879^{* *} \\ (0.2292) \end{gathered}$ | $\begin{aligned} & -0.5152^{* * *} \\ & (0.2616) \\ & \hline \end{aligned}$ | $\begin{gathered} 0.003 \\ (0.7982) \end{gathered}$ | $\begin{array}{r} -0.1373 \\ (1.1477) \\ \hline \end{array}$ |
| Non White British NotWhBrit | $\begin{gathered} -0.353 \\ (0.3064) \end{gathered}$ | $\begin{gathered} -0.3529 \\ (0.3161) \end{gathered}$ | $\begin{gathered} 0 \\ \text { (omitted) } \\ \text { [NotWhBrit ! }=0 \\ \text { predicts failure } \\ \text { perfectly] } \end{gathered}$ | 0 (omitted) <br> [NotWhBrit $1=0$ predicts failure perfectiy] |
| ILO Unemployed IloUnempd |  | $\begin{gathered} 0.529 \\ (0.547) \\ \hline \end{gathered}$ |  |  |
| Economically Inactive Econinactiv |  | $\begin{gathered} 0.0873 \\ (0.4093) \end{gathered}$ |  |  |
| Degree-level (or above) qualifications <br> Degree |  | $\begin{gathered} -0.7634 \\ (0.4875) \end{gathered}$ |  |  |
| No qualifications NoQual |  | $\begin{gathered} 0.4897 \\ \langle 0.3225) \\ \hline \end{gathered}$ |  |  |
| Single <br> Single |  | $\begin{aligned} & -2.7656^{n+\pi} \\ & (1.3887) \\ & \hline \end{aligned}$ |  |  |
| Separated Separated |  | $\begin{aligned} & 1.1042 \\ & (0.7087) \\ & \hline \end{aligned}$ |  |  |
| Single Parent SngIPar |  | $\begin{gathered} 0.1516 \\ (1.2881) \\ \hline \end{gathered}$ |  |  |
| Female $\times$ Degree-level qualification [interaction] Fem_Deg |  | $\begin{gathered} 0.3581 \\ (0.6345) \end{gathered}$ |  |  |
| Female $x$ Single Parent [interaction] Fem_SngIPar |  | $\begin{gathered} -0.5059 \\ (1.2692) \end{gathered}$ |  |  |

106 That is, the estimated coefficients and standard errors of each logit model. It should be noted that the estimated coefficients of the logistic regression provide information on the direction of the effect that each regressor has on the regressand.

|  | Model 1 Income and weath \& basic demographics | Model 2 <br> Model 1 and Personal circumstances | Model 3 Model 1 and Personal finance |  |
| :---: | :---: | :---: | :---: | :---: |
| Single $\times$ Age [interaction] Single_Age |  | $\begin{aligned} & 0.1051^{* *} \\ & (0.0513) \\ & \hline \end{aligned}$ |  |  |
| Has Dependents Dependents |  | $\begin{gathered} 0.3427 \\ (0.3532) \end{gathered}$ |  |  |
| Cash Flow Problems CshFhwr |  |  | $\begin{aligned} & 0.5504 \\ & (0.874) \end{aligned}$ |  |
| Tend to buy things on credit and pay off later OnCredit |  |  | $\begin{aligned} & 1.5165^{* * *} \\ & \text { (0.7489) } \end{aligned}$ |  |
| Mortgage payments are a heavy burden [self-reported] MheavyBur |  |  | $\begin{gathered} 2.6512^{\text {*** }} \\ (0.8499) \end{gathered}$ |  |
| Loans in arrears LnArt |  |  | $\begin{aligned} & 3.4224^{* * *} \\ & (1.2668) \\ & \hline \end{aligned}$ |  |
| Excellent mathematical ability [self-assessed] omath_e |  |  | $\begin{gathered} 0.6034 \\ (0.8087) \end{gathered}$ |  |
| Moderate mathematical ability [self-assessed] omath_m |  |  | $\begin{gathered} -0.0111 \\ (0.9015) \end{gathered}$ |  |
| Poor mathematical ability [selfassessed] <br> omath_p |  |  | 0 (omitted) [Omath_p ! $=0$ predicts failure perfectiy] |  |
| Tend to buy things I cannot afford <br> NotAfford |  |  |  | $\begin{array}{r} -0.3156 \\ (1.1866) \end{array}$ |
| Tend to shop around for the best deals on interest rates ShopBest |  |  |  | $\begin{array}{r} -1.8512 \\ (1.173) \\ \hline \end{array}$ |
| £1,000 today as opposed to $£ 1,100$ in a year's time InstGrat |  |  |  | 0 (omitted) [InstGrat $=0$ predicts failure perfectly]. |
| Guaranteed $£ 1,000$ as opposed to 1 in 5 chance of $£ 10,000$ Risk |  |  |  | 0 (omitted) [Risk\|=0 predicts failure perfectly] |
| Financial situation expected to improve over next 2 years OptFin |  |  |  | 0 (omitted) \|OptFin |=0 predicts failure perfecty] |
| Tend to be more a saver than spender <br> Saver |  |  |  | 0 (omitted) [Saver $1=0$ predicts failure perfectly] |
| N | 6,291 | 6,288 | 2,441 | 412 |
| LR | 61.22 | 73.87 | 30.3 | 7.51 |
| Prob $>$ chi2 | 0.0000 | 0.0000 | 0.0008 | 0.2761 |
| Pseudo R2 | 0.0632 | 0.0763 | 0.255 | 0.1668 |

## Standard errors in parentheses

*Denotes significance at the $10 \%$-level, "* at the $5 \%-l e v e l$, and, "*" at the $1 \%$-level

The table paints a picture of varying statistical significance amongst the income and wealth variables as well as basic demographics across all four models.

- Model 1 (Income and wealth \& basic demographics)

Income and wealth as well as basic demographics -except for ethnicityhave significant effects on the likelihood of mortgage arrears. In particular, square-root equivalised income and ISA investments are negatively associated with the probability of having mortgage payment problems, whereas receipts of benefits have a positive effect on the explained variable. The positive correlation between (square-root equivalised) benefit receipts and mortgage arrears points in the direction of financial fragility amongst the benefit recipients which leads them to unmanageable debt. The results of Model 1 also suggest that women are less likely to have mortgage arrears than men. The same effects are highlighted in our econometric analysis of credit card arrears (in the preceding chapter).

It is noteworthy that age has a positive effect on the probability of being behind with the repayments on mortgage, indicating that as an individual grows older $s$ /he becomes more susceptible to mortgage arrears. The reasons for this are left as a matter for further research but we note that this is a striking difference to the impact that age has on credit card arrears (one is less likely to fall behind with his/her credit card payments with age). Similarly, ethnicity, an important explanatory variable for credit card arrears, has no statistical significance in the mortgage arrears model.

- Model 2 (Model 1 and Personal circumstances)

As in Model 1, (square root equivalised) income, (square root equivalised) ISA values and gender reduce the likelihood of a person falling behind with his/her mortgage payments. However, no other basic demographics - age
and ethinicity - or income support (square root equivalised benefit receipts) are statistically significant.

Of an individual's personal circumstances, employment and educational status do not have an impact on the probability of mortgage arrears, while one's marital status has: a married person is more likely to have mortgage difficulties than someone who is single. Marital status is not a significant regressor in the credit card arrears models.

In light of the effect of the demographic variables, relevant interactions are included in Model 2. However, they do not produce statistical significance except for the interaction between Single and Age which carries a significant positive coefficient. Nevertheless, no demographic or income and wealth variables enjoy statistical significance in this model of mortgage arrears. On the contrary, basic demographics as well as income and wealth variables are important explanatory variables for credit card arrears (Model 2).

- Model 3 (Model 1 and Personal finance)

A number of personal finance regressors are employed in Model 3. Of these the following increase the likelihood of mortgage arrears: i) tendency to buy things on credit and pay off later, ii) mortgage payments dubbed 'heavy burden' and iii) loans in arrears being positively associated with the probability of mortgage arrears. These results match the observations made in the previous chapter: these variables achieve statistical significance in the credit card arrears Model 3, too.

None of the basic demographics and income variables achieves statistical significance. What is more, variables sqrtEq_ISAval, NotWhBrit and
omath_p, are dropped by STATA for predicting failure perfectly; then STATA fits what is left of the model. ${ }^{107}$

- Model 4 (Model 1 and Attitudes towards money)

Model 4 incorporates attitudinal and psychological factors, which do not achieve statistical significance. In fact, the chi-squared statistic does not reject the null hypothesis that all variables are irrelevant. This extreme contrast with models $1-3$ is explained in part by noting that the sample size for model 4 is very much reduced, because of non-responses amongst the questions providing the attitudinal and psychological variables. This contrasts with model 4 for credit card arrears behaviour where the nonresponses do not reduce the sample size so dramatically and some attitudinal variables achieve significance, alongside the measures of income, wealth and basic demographics.

We should also note that, with the much reduced sample size, STATA drops six variables from the model to correct for under-identification - as revealed by perfect within-sample prediction of "failure" (non-arrears).

As a concluding remark, the above model specification exercise attests that there are far more differences than similarities between credit card and mortgage arrears behaviour. Nevertheless, since we set out to enable a complete comparison between secured and unsecured debt behaviour by replicating the work undertaken in Chapter IV, we attempt to estimate Model 5 , in which all variable groups are included.

Table 30 below presents the estimated coefficients and standard errors of the logit Model 5.

[^59]Table 30-Model 5 (all variables)

| Mortgage Arrears |  |
| :---: | :---: |
| Square-root equivalised income sqrtEq Inc | $\begin{gathered} -8.1804 \\ (-) \end{gathered}$ |
| Square-root equivalised benefit receipts sqriEq_Ben | $\underset{(-)}{1.2875}$ |
| Square-root equivalised ISA values sqriEq_ISAval | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| $\begin{aligned} & \text { Age } \\ & \text { Age } \end{aligned}$ | $\underset{(-)}{120.7688}$ |
| Female Female | $\begin{gathered} -430.3777 \\ (-) \\ \hline \end{gathered}$ |
| Non White British NotWhBrit | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| ILO Unemployed lloUnempd | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| Economically Inactive Econinactiv | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| Degree-level (or above) qualifications Degree | $\underset{\substack{375.6279 \\(-)}}{\substack{3 \\ \hline}}$ |
| No qualifications NoQual | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| Single Single | $\begin{gathered} 4101.168 \\ (-) \end{gathered}$ |
| Separated Separated | $\begin{gathered} 1384.288 \\ (-) \end{gathered}$ |
| Single Parent SngIPar | $\begin{gathered} -177.8407 \\ (-) \end{gathered}$ |
| Female $\times$ Degree-level qualification [interaction] Fem Deg | $\begin{gathered} 426.0429 \\ (-) \\ \hline \end{gathered}$ |
| Female $\times$ Single Parent [interaction] Fem_SngIPar | $\begin{gathered} -723.524 \\ (-) \\ \hline \end{gathered}$ |
| Single $x$ Age [interaction] Single_Age | $\begin{gathered} -120.3965 \\ (-) \end{gathered}$ |
| Has Dependents Dependents | $278.6715$ <br> $(-)$ |
| Cash Flow Problems CshFlwPr | $\begin{gathered} -211.8643 \\ (-) \end{gathered}$ |
| Tend to buy things on credit and pay off later OnCredit | $\underset{\substack{380.9781 \\(-)}}{\substack{1 \\ \hline}}$ |
| Mortgage payments are a heavy burden [self-reported] MheavyBur | $333.5817$ <br> - |
| Loans in arrears LnArr | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| Excellent mathematical ability [self-assessed] omath_e | $\begin{gathered} 234.9883 \\ (-) \end{gathered}$ |
| Moderate mathematical ability [self-assessed] omath m | $\begin{gathered} -3.2564 \\ (-) \\ \hline \end{gathered}$ |
| Poor mathematical ability [self-assessed] omath $p$ | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| Tend to buy things I cannot afford NotAfford | $\begin{gathered} -496.1475 \\ (-) \end{gathered}$ |
| Tend to shop around for the best deals on interest rates ShopBest | $-451.8571$ <br> (-) |


| Mortgage Arrears |  |
| :---: | :---: |
| $£ 1,000$ today as opposed to $£ 1,100$ in a year's time InstGrat | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| Guaranteed $£ 1,000$ as opposed to 1 in 5 chance of $£ 10,000$ Risk | 0 (omitted) |
| Financial situation expected to improve over next 2 years OptFin | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| Tend to be more a saver than spender Saver | $\begin{gathered} 0 \\ \text { (omitted) } \end{gathered}$ |
| N | 325 |
| LR | 43.13 |
| Prob > chi2 | - |
| Pseudo R2 | 1.0000 |

Standard errors in parentheses

* Denotes significance at the $10 \%$-level, ${ }^{* *}$ at the $5 \%$-level, and, *** at the $1 \%$-level

It is apparent that the estimation of the above model is not working: there are far too many dropped variables, which signals that the model is underidentified. Moreover, the pseudo R2 is 1.0000 and none of the remaining variables (across the very few observations) is statistically significant. ${ }^{108}$

## 4. Conclusion

The chapter examines the possible driving forces of mortgage arrears. Its purpose is to identify the similarities and differences between secured and unsecured debt behaviour by replicating the work undertaken in the preceding chapter IV (empirical analysis of credit card delinquency).

We have found that the WAS data suggests some noticeable differences between the determinants of arrears in secured vs. unsecured debt

[^60]servicing. Further investigation of the determinants of mortgage arrears that draws on the existing literature on secured debt might illuminate some of these differences. With the focus of this study being credit card delinquency, this is treated as a matter for future research.

Moreover, it should be noted that the two modelling exercises are not applied to precisely the same sample. Whilst the age range is the same in both cases, the sample in Chapter IV is restricted to those having one or more credit cards whereas in Chapter V the sample is restricted to those with mortgage repayment obligations.

It could be argued that credit cards are more readily available than mortgages, implying that a sample of mortgage holders will reflect filtering decisions made by mortgage providers. Whether or not as a result of sample selection, it is noteworthy that the attitudinal and psychological factors which achieve some significance in the modelling of credit card delinquency do not appear relevant in the case of mortgage arrears. It might therefore be interesting, as a matter for additional research, to repeat the modelling for a sample of credit card holders with mortgages.

## CONCLUSION

The study examines consumer debt decisions and credit card delinquency in the UK. We share the views of Brown et al. (2005b) that debt is determined on the individual rather than the household level and carry out our analysis accordingly.

Our empirical investigation is focused on credit card debt, a particular instance of debt where financial management is a personal activity. Credit cards play an important role in our increasingly cashless society and are thought to reflect consumers' behavioural traits, as well as their socioeconomic and demographic context (Bertaut and Haliassos 2006).

UK research has lagged behind the US because of the limited availability of relevant datasets. The launch of the Wealth and Assets Survey (WAS) dataset might support us to close the gap. The data used in our study are from wave 1 of the WAS. To our knowledge, and excepting a report to the Department for Business, Innovation and Skills, ${ }^{109}$ the WAS has not yet been a basis for published research in the area of consumer debt.

Since our concern is with young persons, due to their susceptibility to excessive borrowing and consecutively debt, we restrict our sample to the 16-35 age group and examine the factors that affect credit card payment arrears. Some of the results of the empirical estimation are in line with existing literature. In particular, the analysis:

[^61]- Validates the life-cycle hypothesis in respect of borrowing and debt accumulation with a consequent risk of liquidity problems during the period of young adult life.
- Underscores the complexity of consumer debt; our results show that four groupings of variables -basic demographics, wealth and income, one's own financial situation and personal circumstances- are influential in explaining credit card arrears.
- Some variables have been noted by previous studies, some -like ethnicity- have not been highlighted previously and could lend a hand to the efforts of public and private institutions to curb credit card debt by means of targeting certain cohorts.
- It is argued that effective financial management is multi-faceted and complex; personal financial literacy cannot be equated with numeracy. This feature is of considerable relevance for policy.

Do our findings have policy implications? First and foremost it is advisable that the Government promotes financial education across the population with emphasis on young adults, particularly males without Higher Education and ethnic minorities. Policy makers should acknowledge the presence of uncertainty in consumer debt decisions and incorporate seminars on risk awareness in the educational system and labour market.

The empirical significance that we have found for age and Higher Education in reducing the propensity for credit card delinquency suggests that such educational initiatives may be worthwhile substitutes. Decision making techniques, such as scenario planning, can familiarise consumers with debt, introduce the element of downside risks and worst-case scenarios in
people's decision making process and therefore help the consumers improve their money management skills and avoid potential debt traps.

A notable feature of the discussion is the ramifications of the global financial crisis of 2007/08. Recent figures released from the British Bankers' Association (BBA) reveal that in order to leverage their suffering balance sheets, consumers found refuge in the housing market given the historically low interest rates. According to the BBA: a) unsecured credit has grown (credit card debt was up by $£ 76 m$ in August 2013) and b) mortgage approvals have reached levels not seen since $2009 .{ }^{110}$ It can be argued that both developments are partly owed to Government action and specifically to the Funding for Lending Scheme ${ }^{111}$ (launched by the Government and the Bank of England last year), and the Help to Buy; a programme announced in March this year that subsidises home purchases. ${ }^{112}$

While financial fragility persists, poor money management can accentuate the hardship of those who have borrowed beyond their means, live on low income, are unemployed or have limited job security. Alongside its efforts to stimulate the economy, the Government is expected to offer adequate information and protection for fragile consumers to make well informed decisions. At a time when higher house prices in the UK are tempting a new generation of consumers into debt, national education and training strategies should treat financial literacy as a prerequisite for credit agreements and a protective mechanism against the debt trap.

[^62]It is also important to audit the credit market, invigorate competition and minimise imperfections that may lead to unrealised expectations and distort consumer debt decisions. On the $9^{\text {th }}$ of September 2013 the Financial Conduct Authority (FCA) announced they will conduct a market study into the cash savings market rates. ${ }^{113}$ The FCA intends to i) explore the dynamics across the financial services markets and the consumers; ii) identify key consumer needs, including the ease of access and type of information required for them to make informed choices. The core aim of the study is to monitor the financial services markets and evaluate whether competition is working effectively, e.g. in the best interest of consumers.

The ease of access to the financial markets also concerns the Insolvency Service and the Ministry for Employment Relations and Consumer Affairs. ${ }^{114}$ The draft Deregulation Bill ${ }^{115}$, which is currently before Parliament, offers an incentive (reduced financial risks) to banks that offer accounts to undischarged bankrupts in England and Wales. ${ }^{116}$ Admittedly, the level of strictness of the regulation on individual insolvency may play a role in an individual's attitude towards money management; however, it cannot possibly eradicate genuine financial hardship stemming from unaccounted for contingencies. The latter require mechanisms, such as scenario planning, that help individuals consider the downside risks and avoid bankruptcy altogether.

[^63]Our study also considers the principles of decision making under uncertainty, with emphasis on incalculable risk (ambiguity). It is noteworthy that a considerable number of respondents, who give a positive self-assessment of their mathematical ability, do not choose the expected utility-maximising option of the risk-related questions of the WAS. Should one attribute this seemingly irrational behaviour to the credit card market imperfections and therefore accept it as a rational reaction to external distortions, or, should we investigate this through the prism of ambiguity?

Although we have found no empirical evidence which directly evinces the importance of ambiguity, the latter may provide the necessary platform to elucidate this seemingly irrational consumer behaviour and therefore offer a basis of understanding how people manage their finances. Future research on the use of planning horizons in decision making under ambiguity and the quantification of the impact of ambiguity on debt decisions may offer further insight.

The debt-fuelled consumer spending was one of the chief factors that resulted in the recent global financial crisis. It is very much in the power of (financial) education to remind consumers of the mistakes in the not-sodistant past.

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## APPENDICES

## A1. Decision making under uncertainty and agents' expectations

## a) Decision making under uncertainty

Chapter III looks into decision making under uncertainty. Uncertainty is a fact of life; therefore, an individual's choices and, ultimately, decisions regarding credit consumption are characterised by uncertainty over the outcome that will be eventually realised. Uncertainty is subdivided into (subjectively or objectively) calculable risk and incalculable ${ }^{117}$ risk, also known as ambiguity ${ }^{118}$.

- Calculable risk

Calculable risk describes situations in which the decision-maker can clearly identify the possible states of nature relevant to the choice she faces, e.g. roulette gambling. In most such cases, where simple ${ }^{119}$ decisions are

[^64]involved, the aspects of the possible states of nature are bimodal; for example, a job applicant will get the job or not; a student will pass the exam or not. In other cases, however, possible states of nature can extend along a single dimension, i.e. the range of possible returns to an investment.

The study of choice under calculable risk normally commences by 'considering a setting in which alternatives with uncertain outcomes are describable by means of objectively known probabilities defined on an abstract set of possible outcomes' (Mas-Colell et al. 1995, p. 167). It is also assumed that the decision maker has a rational preference relation over these uncertain prospects; in particular, the von Neumann-Morgenstern ${ }^{120}$ expected utility theorem, allows us to, under certain conditions, represent preferences ${ }^{121}$ by the expected utility form.

However, 'the assumption that uncertain prospects are offered to us with known objective probability is rarely descriptive of reality' (Mas-Colell et al. 1995, p. 168). Effectively, 'in some contexts [e.g. credit consumption], the odds of various outcomes are not at all clear, and what a consumer chooses depends very critically on what she subjectively assesses as the odds of the outcomes' (Kreps 1990, p. 98). One, therefore, needs to turn to a richer theory, 'where uncertain prospects are functions from 'state of nature' to

[^65]prizes, and where probabilities arise (if at all) subjectively' ${ }^{\prime 122}$, in order to examine real-life ${ }^{123}$ phenomena.

- Incalculable risk: ambiguity

Unlike calculable risk, ambiguity ${ }^{124}$ (incalculable risk), arises in messy situations, where the variety of possible actions may be infinite. Generally speaking, when people face a range of possible actions (versus a simple 'yes/no' decision) the information relevant to guide their actions grows more complex, as they cannot specify ex ante all the possible states of nature that might influence their decisions, such as choosing to take up and ultimately repaying a personal loan.

According to Einhorn and Hogarth (1986), ambiguity, defined as 'an intermediate state between ignorance and risk' (p.229), is affected by: 1) the amount of information, 2) the quality of evidence ('ambiguity will generally be high when evidence is unrealistic and conflicting', p. 229), and, 3) the clarity of the causal process ('ambiguity will generally be high when the causal process generating outcomes is poorly understood', p. 229). The authors also distinguish between attitudes to ambiguity -'ambiguity preference' and 'ambiguity avoidance'-, while emphasising that the size of the probability

[^66](and, similarly, the size of the payoff) of an unambiguous choice can affect one's acceptance or rejection of an ambiguous alternative. ${ }^{125}$

We identify two main types of consumers: the myopic (less sophisticated and financially inexperienced) and the sophisticated ones (realists). The former type refers to those who, in the presence of ambiguity, underestimate the factors that can go wrong; this attitude inevitably results in excessive debt. Hence, consultancy is required. The realists form well-grounded decisions and have realistic expectations, although they may/may not be eventually realised. Optimists, due to the nature of their decisions and expectations, would often not consider debt consolidation options, even if they could benefit from them.

- Modelling ambiguity

Einhorn and Hogarth (1986, pp. 230-235) suggest that people use an 'anchoring-and-adjustment' strategy (i.e. an initial probability, $p$, is used as an 'anchor', i.e. starting point, and adjustments are made for ambiguity, resulting in the judged probability, $S(p)$.) The main components of the model are:

- $\mathbf{k}$ : the net effect of the adjustment process; $S(p)=p+k$ (where $k$ lies in the interval $-p \leq k \leq 1-p$
- $\beta$ : attitude towards ambiguity (the relative weighting of (imagined) probabilities that are higher or lower than the anchor), $\beta \geq 0$
- $\theta$ : amount of ambiguity, $0 \leq \theta \leq 1$
and the proposed functional form of the model:

$$
S(p)=p+\theta\left(1-p-p^{\beta}\right)
$$

[^67]
## OR

$$
S(p)=(1-\theta) p+\theta\left(1-p^{\beta}\right)
$$

The above model is static; allowing for one's obtaining more information (where new information reduces ambiguity without changing the anchor probability) results in the model's extension to:

$$
S(p)_{t}=p+\frac{\vartheta}{v}\left(1-p-p^{\beta}\right)
$$

(where $v$ denotes the amount of new information acquired in time period $t$ ) 'Indeed, as $v$ gets very large, $S(p)_{t}$ approaches $p$. This also means that complementary probabilities will approach additivity as $v$ increases since:'

$$
S(p)_{1}+S(1-p)_{4}=1+\frac{\theta}{v}\left[1-p^{\beta}-(1-p)^{\beta}\right]
$$

## b) Agents' expectations

The chapter considers two main agents; the consumers and the creditsuppliers ${ }^{126}$ (i.e. financial institutions, such as banks). Each agent's decision-

[^68]making is based upon her preferences and expectations ${ }^{127}$. The latter can be categorised as:
i) Unfounded or Well-founded, and,
ii) Unrealistic or Realistic

## - Unfounded vs Well-founded expectations

An agent's beliefs over state-contingent outcomes and their respective probabilities constitute his/her expectations.

Consequently, one's expectations are considered to be well-founded ${ }^{128}$ when she has correctly identified both the state-contingent outcome and estimated its respective probability. It should be highlighted that correct identification entails both consistency of beliefs and accuracy of expectations.

Achieving consistency among both agents' expectations is relatively straightforward in the context of a model, as one can assign the appropriate mechanism and assumptions regarding the agents' behaviour; however, in real-life situations, -due to mainly, randomness- measuring whether one's expectations and beliefs are right or wrong is often problematic (as they cannot be objectively evaluated). What is more, one cannot afford to ignore

[^69]the fact that the two agents possibly form different expectations based on different levels of information, different beliefs and objectives.

Although it is often adequate to model the agents individually, i.e. each making his/her own choices subject to certain constraints, sometimes the opportunities available to one agent, e.g. the customer, or the valuation of the results may depend crucially on how the other agent acts, e.g. the creditsupplier. Hence, agent interaction must be modelled accordingly, in order to reflect consumer-consumer or consumer-supplier interdependence. This highlights why certain actions can become unattractive as a result of the other agent's potential or, even, actual reactions.

For instance, if one applies for a personal loan of a certain amount, it might be a) rejected due to low credit scoring (since the mechanism of estimating one's tendency towards default is only available to banks) and no alternatives are offered, b) rejected, but an alternative loan on a higher APR than the one advertised is offered, c) accepted for the amount requested, d ) accepted for less amount ...etc. This simple real-life example shows that the interaction (game) amongst agents must be accounted for in the analysis.

It can be thus argued that the model of interaction between the main agents, consumers and credit suppliers, can be divided into three parts: a theory of decision-making under ambiguity, a theory of expectations and consistency, and a theory of the adjustment of expectations in light of a revised plan given the reaction of the other agent.

## A2. Debt settlement options

When debt becomes unmanageable the individual is presented with a number of debt settlement options, such as Debt Management Plans, Individual Voluntary Arrangements, Debt Relief Orders and bankruptcy. England and Wales seem to have a rather comprehensive regulatory framework in place which is flexible enough to adopt changes, such as the $1^{\text {st }}$ of April 2004 bankruptcy law amendment which reduced the normal duration of bankruptcy from 2-3 years to 12 months.

There were 25,006 individual insolvencies in England and Wales in the first quarter of 2013, a decrease of $12.9 \%$ on the same period a year ago. ${ }^{129}$ The total number was made up of:

- 6,663 bankruptcies (which were down 27.0\% on the corresponding quarter of the previous year),
- 7,219 Debt Relief Orders (DROs) (which were down 8.6\% on the corresponding quarter of the previous year), and,
- 11,124 Individual Voluntary Arrangements (IVAs) (which were down $4.9 \%$ on the corresponding quarter of the previous year). ${ }^{130}$

[^70]It should be noted that the Fast-Track Voluntary Arrangements (FTVAs) and the DROs are options given to those individuals who are either bankrupt or are facing bankruptcy, respectively. Consequently, their introduction has influenced the total bankruptcy rates. More specifically, according to The Insolvency Service, '[B]ankruptcy numbers have been impacted by the introduction of DROs from April 2009, amongst other factors. Numbers of DROs are higher than total bankruptcies for the third quarter, while Bankruptcy Orders have been lower than IVAs for the last eight quarters.' ${ }^{131}$

The following figure illustrates the individual insolvencies in England and Wales between 2003Q1 and 2013Q1, in total (total individual insolvencies) as well as per debt settlement option, i.e. bankruptcy orders, individual voluntary arrangements and debt relief orders).

Figure a1- Individual insolvencies in England \& Wales
Thousands, not seasonally adjusted


Source: Insolvency Service
Total individual insolvencies for Q2 2009 onwards include Debt Relief Orders, which came into force on 6 April 2009
${ }^{131}$ Available at:
http://www.insolvencydirect.bis.gov.uk/otherinformation/statistics/201305/index.htm [accessed: 27/08/2013].

Repaying one's loans or debt is dependent upon the legal framework of the country in question (e.g. how easy it is to file for bankruptcy; how severe the implications of doing so would be). The ensuing sections outline the debt settlement options ${ }^{132}$ available to the residents of England and Wales. These are:

- Debt Management Plans (DMPs)
- Administration orders
- Individual Voluntary Arrangements (IVAs)
- Debt Relief Orders (DROs)
- Fast-Track Voluntary Arrangements (FTVAs)
- Other debt repayment options, such as debt consolidation loans, remortgage, further borrowing or secured loan.
a) Debt Management Plans (DMPs) ${ }^{133}$

Office of Fair Trading-licensed debt management companies may act as an intermediary between the debtor and her creditors, a service for which fees ${ }^{134}$ may apply. The typical process is as follows: after collecting information about the debtor's financial situation, the debt management company specifies the size of the monthly payments and consequently contacts the creditors to reach a settlement on behalf of the debtor. In doing so they negotiate ${ }^{135}$ the following items:

[^71]i) reduction in the overall level of debt;
ii) freeze interest charges;
iii) reschedule the debts to be paid off over a longer period of time;
iv) try to prevent the creditor from taking legal action.

Once the repayment amount is agreed, the debtor makes frequent -mostly monthly- payments to the debt management company, which it in turn distributes to the creditors. It should be underlined that only unsecured debts are eligible for a debt management plan, which can be cancelled in case repayments are missed.
b) Administration orders ${ }^{136}$

An administration order can be introduced only if there is a county court or High Court judgment against an individual and she cannot pay it in full. In this case and given that a) the amount owed is less than $£ 5,000$ and b) there are at least two creditors involved, the individual can apply via the administration order form. Once approved and coordinated by the court, monthly payments should be made to the local court, which then distributes the money across the creditors. This arrangement incurs a fee each time a payment is made, which cannot exceed $10 \%$ of the total debt.

Once an administration order is in place, details of it are entered on the Register of Judgments, Orders and Fines. The entry, which is removed after approximately six years from the date it was first created, is marked as 'satisfactory' once the debt is paid off in full.

[^72]c) IVA: Individual Voluntary Arrangements ${ }^{137} 138$

An IVA is an alternative to bankruptcy ${ }^{139}$ introduced by Part VIII of the Insolvency Act 1986. It enables a debtor, through her Insolvency Practitioner, to make a proposal to her creditors in order to reach a settlement. Should the proposal be approved by $75 \%$ of the creditors, the IVA then stands as a contract that binds all parties -even those creditors who opposed to the IVA- and prevents any further action.

In light of her income, assets, size of debt and creditors, parameters which determine the amount and length of the IVA, the debtor makes regular payments to the insolvency practitioner who then allocates the money to the creditors. Although the IVA is added to the Individual Insolvency Register, the entry is deleted 3 months after the IVA concludes. ${ }^{140}$

The costs of an IVA tend to comprise a set-up fee as well as a handling fee per payment. The status of all IVAs taken out in England and Wales between 1990 and 2011 is shown in the below graphical illustration.

[^73]Figure a2- Individual Voluntary Arrangements by year of registration and outcome status as at September 2012, England \& Wales


Source: Insolvency Service, September 2012
d) Debt Relief Orders ${ }^{141}$

Debt Relief Orders (DROs) are one way to deal with one's debts if she owes less than $£ 15,000$, has little residual income -less than $£ 50$ per month-, does not own her home and has less than $£ 300$ worth of assets. To be eligible, the applicant must also have lived or worked in England and Wales within the last 3 years and not have applied for a DRO within the last 6 years.

A DRO is authorised by the Official Receiver, i.e. the officer of the bankruptcy court (as mentioned above, DROs can be given only to those

[^74]who are facing bankruptcy), but the individual is required to apply through an authorised debt adviser, who helps her with the paperwork. If an individual receives a DRO:
i) her creditors cannot recover their money without the court's permission
ii) she is usually freed ('discharged') from her debts after 12 months.

However, a DRO comprises a set of rules, similar to those of bankruptcy, referred to as 'restrictions'. The latter regulate certain aspects of the debtor's professional and financial choices. ${ }^{142}$
e) Fast-track Voluntary Arrangements ${ }^{143}$

Fast-track Voluntary Arrangements (FTVAs) are an option available to those already made bankrupt. Their core element is selling one's assets to pay her debt and therefore cancel the bankruptcy order. The process is coordinated by an Official Receiver, whose fees comprise: a) $£ 315$ paid prior to the FTVA application and b) $15 \%$ of the total amount raised towards the repayment of the outstanding debt.

Once the latter is repaid, i) the bankruptcy (court) order is annulled, ii) any assets not already sold or no longer needed towards the debt repayment are

[^75]returned to the individual, and iii) the FTVA is entered in the Individual Insolvency Register and shall be removed three months after it terminates.
f) Other debt repayment options
i) Debt consolidation loan (unsecured) ${ }^{144}$

A borrower, who usually has multiple high interest debts causing her to pay significant amounts in monthly payments, can take out a new loan to pay off all of the existing loans. This loan is at a lower (e.g. 8.9\%) interest rate than, for example, credit cards (typically 17.6\%) and is paid off over a long period of time, hence the monthly payments are lower than the combined monthly payments on a number of smaller credit card debts and loans. Since this type of loan, which is offered by commercial banks, is not secured against a property the borrower does not need to be a home owner.
ii) Re-mortgage, further borrowing or secured loans If an individual has a property which is worth more ${ }^{145}$ than both the mortgage and other debts secured ${ }^{146}$ against it, it is possible to release this equity to raise a lump sum of cash that can be used to settle outstanding debt. Similar to a consolidation loan, the outcome is that all debts are now brought together as one larger debt, and all monthly payments are now covered by one smaller monthly payment.

There are 3 main ways to release this equity:

[^76]a. Further borrowing from an existing mortgage
b. Remortgage to a new mortgage with a larger borrowed sum
c. Keep the existing mortgage and take out a new loan secured against the equity in the property.
g) Bankruptcy ${ }^{147}$

An individual can file for bankruptcy if she finds herself insolvent (i.e. unable to pay off the debts that she has run up). ${ }^{148}$ Similarly, in case one owes more than $£ 750$ to her creditor, the latter have the right to apply to the court to make her bankrupt. Bankruptcy is regarded as an extreme option as it has a number of rules, referred to as the 'bankruptcy restrictions'. These are financial and social implications that one would wish to avoid, such as repossessions, limited or no access to credit and restrictions in one's career options.

If the bankruptcy petition is accepted by the court -and the individual is made bankrupt-, she is allocated a 'trustee', who is either an Official Receiver (an officer of the bankruptcy court), or, an Insolvency Practitioner (an authorised debt specialist). ${ }^{149}$ The trustee gathers information and evidence about the bankrupt's creditors, assets, residual income as well as her background and household information and manages the bankruptcy on the basis of the following three elements:

[^77]i) The normal bankruptcy period is 12 months ${ }^{150}$
ii) The proceeds from the sale of the bankrupt's assets are used to pay off her debts
iii) (In case the funds raised from the sale of assets do not sufficiently cover the bankruptcy debts and the individual has residual income,) further contributions will be made from her income on a monthly basis.

It can be argued that the bankruptcy law has a twofold impact on consumer behaviour. Firstly, it affects one's attitude towards debt. That is, depending on how severely the legal system punishes those who default, a consumer will repay her loan, or not. Secondly, the bankruptcy law can affect other forms of consumer behaviour, such as one's career options, one's decision to file (or not) for bankruptcy, as well as one's debt portfolio diversification.

Recently attention was drawn to the fact that undischarged bankrupt individuals cannot open a bank account in England and Wales after the Insolvency Service indicated that "only one high street bank offers a basic account to applicants who are undischarged bankrupts". ${ }^{151}$ With a current account being viewed as a bare necessity nowadays, it is felt that the legislation should facilitate the particular cohort to take part in day-to-day transactions by improving its access to bank accounts.

In this respect, a public consultation titled 'Bank Accounts for Bankrupts' was initiated in November 2011 (and concluded in February 2012) with the

[^78]banking sector calling for an amendment of the insolvency legislation pertinent to their interaction with bankrupt individuals, as reported in the Government response. ${ }^{152}$ Consequently, a change which "reduces financial risks for banks that offer accounts to undischarged bankrupts in England and Wales is now before Parliament as part of the draft Deregulation Bill", according to Jo Swinson, Minister for Employment Relations and Consumer Affairs. ${ }^{153154}$

Even though the duration of bankruptcy is often a subject of public debate, the effect of bankruptcy laws on consumers' attitude towards default in the UK has not been investigated yet. Nevertheless, two papers (Gropp et al (1997) and Grant (2000)) explicitly assess bankruptcy law in different US states. Grant (2000) concludes that reducing the punishment of bankruptcy makes consumption smoother, and therefore helps insure households against income risk.

This section summarised the various debt settlement options available to individuals in the UK with emphasis placed on those living in England and Wales due to their homogeneous insolvency legislation. The bankruptcy process was summarised and an account of the latest developments was

[^79]provided, in an attempt to sketch out the framework that governs individual insolvency and highlight any topical issues. Admittedly, the level of strictness of the regulation on individual insolvency may play a role in an individual's attitude towards money management, however it cannot possibly eradicate genuine financial hardship stemming from unaccounted for contingencies. The latter require mechanisms that help individuals consider the downside risks.

## A3. Target groups (the Thoresen Review of GFA)

## A. Most Vulnerable ${ }^{155}$

| Number of UK Adults | 7.5 Million |
| :---: | :---: |
| Vulnerability | Multiple drivers of vulnerability: <br> - Lack of access to commercial advisers. <br> - Poor planning ahead. <br> - Very limited savings or protection. <br> - Limited financial portfolio and therefore limited knowiedge of products. <br> - Difficulty making ends meet and over-indebtedness (almost half). <br> - Many of those working have no pension. <br> - One in five may have literacy problems. <br> - $\quad 50 \%$ live in areas with high levels of multiple deprivation. |
| Expected GFA needs | Approximately half of this group may be expected to require either crisis intervention or support from specialist agencies. <br> Others expected to need help with pre-crisis managing debt and budgeting. <br> Personal Account prospects. |
| Demographics | - Average incomes $60 \%$ of national average. <br> - All household incomes < $£ 40,000$ after tax. <br> - Approximately $\mathbf{2 0 \%}$ have no financial products (yet). <br> - On average hold 1 banking/saving product types. <br> - $30 \%$ no bank account, $70 \%$ aged under $45,8 \%$ aged over 65. <br> - Slightly less likely than average to be working but more likely to be working part time. <br> - Slightly more female than male. <br> - Many more singles, separated and divorced than average; only $25 \%$ married. Approximately $\mathbf{2 5 \%}$ single parents. <br> - Higher than average in Wales, Scotland, Northern Ireland and in England in northwest, northeast and London. |
| Demographics | - Lower education levels than average ( $20 \%$ with $A$ Levels and above). <br> - $<20 \%$ own their home, half in social housing. |

[^80]
## B. Regular Users ${ }^{156}$

| Number of UK Adults | 11.7 Million |
| :---: | :---: |
| Vulnerability | Vulnerability driven primarily by: <br> - Not being adviser prospects (majority). <br> - Not being experienced at choosing products. <br> - Some lack of savings. <br> - Over-indebtedness (one in three). <br> - Showing signs of not being good at planning ahead. <br> - More than one in three with low scores on making ends meet. <br> However, generally good at keeping track of money and many have some savings. <br> One in ten may have literacy problems and $\mathbf{> 2 0 \%}$ live in areas with high leveis of multiple deprivation. |
| Expected GFA needs | Some crisis intervention but majority could gain help with interpreting products, managing debt, increasing savings, budgeting. <br> Personal Account prospects. |
| Demographics | - On average, incomes slightly lower than national average- almost half with incomes between $£ 10 k-£ 30 k$ after tax. Approximately $5 \%$ with higher incomes. <br> On average hold 2 banking/savings product types. <br> Younger than average, 62\% aged under 45, 16\% aged over 65. <br> Slightly more likely than average to be working full time. <br> Slightly more female than male. <br> More singles and divorced than average but $>\mathbf{4 0 \%}$ married. <br> >15\% single parents. <br> Higher than average in northwest, northeast, west Midlands and London. <br> Slightly higher than average non-white. <br> Slightly lower education levels than average. <br> <50\% own their own house, more social housing and more private renting than average. |

[^81]
## C. Infrequent Users ${ }^{157}$

| Number of UK Adults | 20.7 Million |
| :---: | :---: |
| Vulnerability | Vulnerability driven primarily by: <br> - Not being adviser prospects (about two-thirds). <br> - Not being experienced at choosing products or not keeping track of their money. <br> - Some over-indebtedness (around one third). <br> - Some lack of savings. <br> - At upper end of scores, some struggling to make ends meet. <br> However, generally good at planning ahead and staying informed. <br> A small number have literacy problems and one in ten live in areas with high levels of multiple deprivation. |
| Expected GFA needs | Many of this group are capable of finding information and advice without the support of GFA. <br> They do, however, need help in understanding products and some money management techniques. <br> Focus on jargon busting. |
| Demographics | - Incomes higher than national average- fewer very low incomes than least vulnerable but also very fewer very high incomes. <br> - On average hold 4 banking/savings product types. <br> - Age more typical of population: 45\% aged under 45, 22\% aged over 65. <br> - Slightly more likely than average to be working full time. <br> - Slightly more female than male. <br> - Slightly more likely to be married than average and with dependent children. <br> - Broadly geographical spread. Ethnic mix closer to population average. <br> - Slightly higher education levels than average. <br> - $70 \%$ own their own house, less social housing than average. |

[^82]D. Occasional Users ${ }^{158}$

| Number of UK Adults | 5.6 Million |
| :---: | :---: |
| Vulnerability | Vulnerability driven primarily by: <br> - Some lack of access to commercial advice. <br> - Poor at keeping track of their money. <br> Otherwise no significant signs of vulnerability. <br> Consequences of subsequent poor financial decision-making unlikely to be significant for many (due to relatively high level of saving). <br> Not at risk due to poor financial capability. <br> No strong evidence of poor decision-making. |
| Expected GFA needs | Majority will not require targeted support from GFA. <br> However, this group includes many approaching or in retirement. <br> Some support may be required in complex areas such as annuity purchase/equity release. |
| Demographics | Typically higher income and/or wealth (although 1:3 have household income $<£ 10,000$ p.a. after tax). <br> On average hold 7 banking/savings product types. <br> Older 60\% aged over 55. <br> Half have retired, most of remainder in full time work. <br> More male than female. <br> Predominantly married (but most no longer have dependent children). <br> More likely than average to live in SE, SW, east of England or Yorkshire. Less likely than average to live in London, NE or Wales. <br> Few non-white individuals. <br> 60\% A-Level or above. <br> $>90 \%$ own their own house ( $>30 \%$ no mortgage). |

[^83]
## A4. Tables

Table a1- Demographic characteristics of applicable profiles (of the full sample; WAS wave 1)

| Applicable profiles | $\begin{aligned} & \text { Total number } \\ & 53,298 \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { Women } \\ & 36,598 \\ & \hline \end{aligned}$ | $\begin{array}{\|l\|} \hline \text { Men } \\ 34,668 \\ \hline \end{array}$ |
| :---: | :---: | :---: | :---: |
| Age | Average sample age 40 | Women's average age $41$ | Men's average age $39.5$ |
| In the workforce | Total number $41,699$ | Women (16-59 years of age) 20,527 | Men (16-64) 21,172 |
| In employment (employed or selfemployed) | $\begin{aligned} & \hline \text { Total number } \\ & 30,493 \\ & \\ & \frac{16-59(\mathrm{w}) / 64(\mathrm{~m})}{28,809} \\ & \frac{60+(\mathrm{w}) / 65+(\mathrm{m})}{1,684} \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { Women } \\ & 14,467 \\ & \frac{16-59}{13,374} \\ & \frac{60+}{1,093} \\ & \hline \end{aligned}$ | $\begin{array}{\|l} \hline \text { Men } \\ 16,026 \\ \\ \frac{16-64}{15,435} \\ \frac{65+}{591} \\ \hline \end{array}$ |
| Ethnicity | White British 61,093 | Asian or Black British $5,617$ | $\begin{aligned} & \text { Other } \\ & 4,558 \end{aligned}$ |
| Educational Qualifications | 36,166 have at least one educational qualification for which they have received a certificate |  |  |
|  | 11,771 of the above 36,166 have a degree or higher qualification |  |  |

Table a2- Signs of financial fragility (chosen sample of 16-35 year olds; WAS wave 1)

| Have you been unable to make the minimum payment on your credit card(s) at any time during the past 12 months? | Yes $15.41 \%$ | No $84.59 \%$ |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Do you think it is likely that you will save any money in the next 12 months? | Yes 39.54\% |  |  |  |  |
| Are you having any difficulty paying off the overdraft(s) on accounts at present? ${ }^{159}$ | Yes <br> 35.13\% | No |  |  |  |
| Whether has arrears on loans | $\begin{aligned} & \hline \text { Yes } \\ & 1.06 \% \\ & \hline \end{aligned}$ | $\begin{array}{\|l\|} \hline \text { No } \\ 98.94 \% \\ \hline \end{array}$ |  |  |  |
| Have you ever sought any help or advice because of debt? ${ }^{160}$ | $\begin{aligned} & \text { Yes } \\ & 8.71 \% \end{aligned}$ | $\begin{aligned} & \hline \text { No } \\ & 91.29 \% \end{aligned}$ |  |  |  |
| How much are the payments of debts a burden ${ }^{161}$ | A heavy burden <br> 13.16\% | Somewhat of a burden 29.95\% | Not a problem at all $56.89 \%$ |  |  |
| In the past 12 months, how often have you had money left at the end of the week/month | Always <br> 23.38\% | Most of time <br> 18.17\% | Sometimes <br> 20.14\% | Hardly ever <br> 20.70\% | Never <br> 17.56\% |

${ }^{159}$ Please note that this question is only addressed to those respondents who have an overdraft facility in their current accounts.
160 The question is only asked to those who claim to be in debt.
${ }^{161}$ Ditto, the question is only asked to those who claim to be in debt.

| What do you <br> mainly do with the <br> money left over? | Put it <br> intol <br> leave it <br> in <br> current <br> account | Spend it | Put it into/ <br> leave it in <br> savings <br> account/ <br> investments | Leave it in <br> current <br> account, <br> then put it <br> into savings/ <br> investments | Keep it in <br> purse <br> wallet for <br> the next <br> week/ <br> month |
| :--- | :--- | :--- | :--- | :--- | :--- |
| $42.12 \%$ | $15.06 \%$ | $30.38 \%$ | $10.76 \%$ | $1.68 \%$ |  |

Table a3- Money choices and self-assessment of mathematical ability (chosen sample of 16-35 year olds; WAS wave 1)

| Choice between a guaranteed payment of one thousand pounds and a one in five chance of winning ten thousand | ```Guaranteed payment of GBP 1,000 73.81%``` |  | $\begin{gathered} \hline \text { One in five chance of } \\ \text { GBP } 10,000 \\ 26.19 \% \\ \hline \end{gathered}$ |  |
| :---: | :---: | :---: | :---: | :---: |
| Which would you choose: receiving a thousand pounds today or one thousand one hundred pounds in a year's time | $\begin{gathered} \text { GBP 1,000 today } \\ 77.41 \% \end{gathered}$ |  | GBP 1,100 in a year$22.59 \%$ |  |
| Self-assessment of mathematical ability | Excellent <br> 27.79\% | 48.34\% | Moderate $20.58 \%$ | Poor <br> $3.29 \%$ |

## A5. Annotated commands (STATA version 12) [for Chapter IV]

ta dvhsize
Checking the size of the survey sample
ta dvilo4a
Checking the number of the individuals eligible for the full interview
drop if dvilo4a<0
Removing the respondents who did not complete the full interview
drop if dvage<16|dvage>35
Excluding anyone less than 16 and over 35 years of age
drop if pincinp>0
Removing anyone who receives pension income
drop if denum<1
Removing any respondents with no credit cards
gen Ldc12mi=1 if dc12mi==1
replace Ldc12mi=0 if dc12mi==2
Generating $1 / 0$ dummy variable for credit card payment arrears, Ldc12mi (based on existing binary variable dc12mi that takes values 1 and 2)
ge b8=bamt8*52 if $b p d 8==1$
Benefit 8: annualise all weekly receipts of benefit 8 (and include them in the new variable, b8)
replace b8=bamt $8 * 13$ if $b p d 8==4$
Benefit 8: annualise all receipts of benefit 8 made every four weeks (and include them in the new variable, b8)
replace $b 8=0$ if $b p d 8==-7$
Benefit 8: all non-applicable cases are re-coded as zero-value receipts (of benefit 8)
ge b13=bamt13*52 if bpd13==1
Benefit 13: annualise all weekly receipts of benefit 13 (and include them in the new variable. b13)
replace b13=bamt13*26 if bpd13==2
Benefit 13: annualise all bi-weekly receipts of benefit 13 (and include them in the new variable, b13)
replace $b 13=0$ if bpd13==-7
Benefit 13: all non-applicable cases are re-coded as zero-value receipts (of benefit 13)
ge b17=bamt17*52 if bpd17==1
Benefit 17: annualise all weekly receipts of benefit 17 (and include them in the new variable, b17)
replace b17=bamt17*26 if bpd17==2
Benefit 17: annualise all bi-weekly receipts of benefit 17 (and include them in the new variable, b17)

## replace $b 17=$ bamt $17 * 13$ if bpd $17==4$

Benefit 17: annualise all receipts of benefit 17 made every four weeks (and include them in the new variable, b17)
replace b17=bamt17*12 if bpd17==5
Benefit 17: annualise all monthly receipts of benefit 17 (and include them in the new variable, b17)
replace $b 17=$ bamt $17 * 1$ if bpd17==52
Ensuring that all annual receipts of benefit 17 are included the new variable, b17
replace $b 17=0$ if $b p d 17==-7$

Benefit 17: all non-applicable cases are re-coded as zero-value receipts (of benefit 17)
ge b18=bamt18*52 if bpd18==1
Benefit 18: annualise all weekly receipts of benefit 18 (and include them in the new variable, b18)
replace b18=bamt18*26 if bpd18==2
Benefit 18: annualise all bi-weekly receipts of benefit 18 (and include them in the new variable, b18)
replace b18=bamt18*13 if bpd18==4
Benefit 18: annualise all receipts of benefit 18 made every four weeks (and include them in the new variable, b18)
replace b18=bamt18*12 if bpd18==5
Benefit 18: annualise all monthly receipts of benefit 18 (and include them in the new variable, b18)
replace b18=bamt18*6 if bpd18==7
Benefit 18: annualise all bi-monthly receipts of benefit 18 (and include them in the new variable, b18)
replace b18=bamt18*4 if bpd18==13
Benefit 18: annualise all receipts of benefit 18 made every three months (and include them in the new variable, b18)
replace b18=bamt18*1 if bpd18==52
Ensuring that all annual receipts of benefit 18 are included the new variable, b18
replace b18=bamt18*2 if bpd18==26
Benefit 18: annualise all bi-annual receipts of benefit 18 (and include them in the new variable, b18)
replace $b 18=0$ if $b p d 18==-7$

## Benefit 18: all non-applicable cases are re-coded as zero-value receipts (of benefit 18)

## ge Tben=b8+b13+b17+b18

Generating total annual value of benefit receipts, Tben

## ge Tinc=Tben+dvalinet

Generating total -annual- income (by adding up total annual value of benefit receipts, Tben, and total net annual earnings, dvallnet)

## ge sqrt_hhSize=sqr(dvhsize)

Generating the square root of household size

## ge eq_Inc=Tinc/sqrt_hhSize

Computing equivalised income by diving total annual income by the square root of household size

```
ge sqrtEq_Inc=sqrt(eq_Inc)
```

Creating the square root of equivalised income

## ge Ben=Tben/Tinc

Generating annual benefit receipts as a share of (annual) income

## ge eq_Ben=Tben/sqrt_hhSize

Computing equivalised benefit receipts by diving the total annual value of benefit receipts by the square root of household size

```
ge sqrtEq_Ben=sqrt(eq_Ben)
```

Creating the square root of equivalised benefit receipts

## ge |SAval=dvisaval/1000

Generating the total annual value of ISAs, ISAval; the new variable's measurement unit is thousands of -British- pounds (instead of pounds)

## ge eq_ISAval=ISAval/sqrt_hhSize

Computing equivalised ISA values by diving the total annual ISA values by the square root of household size

```
ge sqrtEq_ISAval=sqrt(eq_ISAval)
Creating the square root of the equivalised ISA values
```


## gen Female=1 if sex==2 <br> replace Female=0 if sex==1

Generating $1 / 0$ dummy variable for the respondent being female, Female (based on existing binary variable sex that takes values 1 and 2)
rename dvage Age
Rename the WAS variable for age, dvage, to Age

## drop if edlevel<0

Removing the negative values (i.e. don't know and refused) from the variable edlevel, which captures the respondent's level of highest educational qualification
gen Degree=edlevel==1
gen OthrQual=edlevel==2
gen NoQual=edlevel==4
Based on the education variable (edlevel), a dummy variable is created for each state: respondent has qualification -degree level of above- (Degree); respondent has qualification -other level- (OthrQual); respondent has no qualifications (NoQual)

```
gen InEmplnt=dvilo4a==1
gen lloUnempd=dvilo4a==3
gen EconInactiv=dvilo4a==2|dvilo4a==4
```

Based on the employment status variable (dvilo4a), a dummy variable is created for each state: respondent is in employment (InEmpint); respondent is unemployed according to the International Labour Organisation [ILO] definition (IloUnempd); respondent is economically inactive (EconInactiv)

## gen NotWhBrit=1 if ethnic>1 <br> replace NotWhBrit=0 if ethnic $==1$

Generating $1 / 0$ dummy variable for non-White British respondents, NotWhBrit (based on existing categorical variable ethnic, where value 1 corresponds to 'White British'; all values greater than 1 indicate other ethnical backgrounds)
gen Married=dvmrdf==1| dvmrdf==2| dvmrdf==7| dvmrdf==8
gen Single=dvmrdf==3| dvmrdf==4
gen Separated=dvmrdf==5|dvmrdf==6
Based on the marital status variable (dvmrdf), a dummy variable is created for each state: respondent married/cohabiting/same sex couple/civil partner (Married); respondent single/widowed (Single); respondent divorced/separated (Separated)

## gen SnglPar=1 if singpar==1 <br> replace SngIPar=0 if singpar==2

Generating $1 / 0$ dummy variable for the respondent being a lone parent, SngIPar (based on existing binary variable singpar that takes values 1 and 2)

## gen Fem_Deg=Female*Degree

Generating an interaction between Female and Degree
gen Fem_SngIPar=Female*SngIPar
Generating an interaction between Female and SngIPar [single parent]
gen Single_Age=Single*Age
Generating an interaction between Single and Age

## drop if oleft<0

Removing the negative values (i.e. don't know) from the variable oleft, which observes how often the respondent has had money left over at the end of the month in the past 12 months. Namely, it monitors cash flow
gen CshFIwPr=1 if oleft==4 | oleft==5
replace CshFlwPr=0 if oleft==1|oleft==2|oleft==3|oleft==6

Generating $1 / 0$ dummy variable for one having cash flow problems, CshFIwPr (based on existing ordinal variable oleft, where values 4 and 5 point to large and very large cash flow problems respectively, while values $1,2,3$ and 6 indicate little to no such difficulties)

```
ge OnCredit=1 if ocredi1==1 | ocredi1==2 | ocredi2==1 | ocredi2==2
ocredi3==1 | ocredi3==2
replace OnCredit=0 if ocredi1>2 | ocredi2>2 | ocredi3>2
Generating \(1 / 0\) dummy variable '[I] tend to buy things on credit and pay off later', OnCredit, (based on existing ordinal variables ocredi1, ocredi2 and ocredi3)
```


## drop if dburd<0

Removing the negative values (i.e. don't know) from the variable dburd, which observes whether payments of debt are a heavy burden according to the respondent

## ge HeavyBur=1 if dburd==1 replace HeavyBur=0 if dburd>1

Generating $1 / 0$ dummy variable for one finding his/her debts a 'heavy burden', HeavyBur (based on existing ordinal variable dburd, where value 1 corresponds to 'heavy burden'; all values greater than 1 indicate lesser degrees of financial hardship)

## gen LnArr=1 if dvinar==1 <br> replace LnArr=0 if dvinar==2

Generating 1/0 dummy variable for having 'loans in arrears', LnArr (based on existing binary variable dvinar that takes values 1 and 2)

## drop if omath<0

Removing the negative value ('I don't know') from the variable omath that monitors the respondent's self-assessment of his/her mathematical ability

```
gen omath_e=omath==1
gen omath_g=omath==2|omath==5
gen omath_m=omath==3
gen omath_p=omath==4
```

Based on the self-assessed mathematical ability (omath), a dummy variable is created for each level: excellent (omath_e); good (omath_g); moderate (omath_m); poor (omath_p)

```
ge NotAfford=1 if obuy1==1| obuy1==2 | obuy2==1 |obuy2==2| obuy3==1|
obuy3==2
```

replace NotAfford=0 if obuy1>2 |obuy2>2| obuy3>2

Generating $1 / 0$ dummy variable '[l] tend to buy things I cannot afford', NotAfford, (based on existing ordinal variables obuy1, obuy2 and obuy3)

## drop if oshop<0

Removing the negative values (e.g. refused to respond) from the variable oshop that checks whether the respondent tends to shop around for the best deals on interest rates

```
gen ShopBest=1 if oshop==1|oshop==2
replace ShopBest=0 if oshop>2
Generating \(1 / 0\) dummy variable '[I] tend to shop around for the best deals on interest rates', ShopBest (based on existing ordinal variable oshop)
```

```
drop if oriskc<0
drop if oriskc==3
Removing the negative values (i.e. refused to respond) as well as any spontaneous
responses of 'no opinion' [allocated value 3] from the variable oriskc
```

gen InstGrat=1 if oriskc==1
replace InstGrat=0 if oriskc==2

Generating $1 / 0$ dummy variable for the choice of ' $£ 1,000$ today as opposed to $£ 1,100$ in a year's time', InstGrat (based on existing categorical variable oriskc)

## drop if oriska==3

Removing the spontaneous responses of 'no opinion' [allocated value 3] from the variable oriska
gen Risk=1 if oriska==2

```
replace Risk=0 if oriska==1
```

Generating $1 / 0$ dummy variable for the choice of 'guaranteed $£ 1,000$ as opposed to 1 in 5 chance of $£ 10,000$, Risk (based on existing categorical variable oriska)

## gen OptFin=1 if osituat==1 <br> replace OptFin=0 if osituat>1

Generating $1 / 0$ dummy variable for one's financial situation expected to improve over the next two years, OptFin (based on existing ordinal variable osituat)

```
ge Saver=1 if osaver1==1 | osaver1==2 | osaver2==1 | osaver2==2 |
osaver3==1 | osaver3==2
replace Saver=0 if osaver1>2 | osaver2>2 | osaver3>2
Generating \(1 / 0\) dummy variable '[l] tend to be a saver than a spender', Saver, (based on existing ordinal variables osaver1, osaver2 and osaver3)
```


## Annotated commands (STATA version 12) [for Chapter V]

## As per above with the changes/additions of:

describe
Person schedule [master dataset] overview: number of variables and observations; variable sorted by -none-.

## sort hholdno

Sorting the master dataset by household number [match variable], in order to enable the transfer of the required variables from the household schedule based on the match variable
describe
Confirming that the above was executed correctly; i.e. data sorted by our match variable, hholdno
merge m:1 hholdno using "C:IUsers\Admin\Documents\UKDA-6415stata8_selstata8_selwas_w1_household.dta", keepusing(mdiffpy marrs)
describe
Using the universal matching variable (hholdno), we add two variables from the household schedule [using dataset] onto the person schedule [master dataset].

It should be noted that STATA command merge is appropriate for longitudinal data like ours, whilst $m: 1$ refers to our many-to-one merge on household number.
ta dvhsize
Checking the size of the survey sample

## ta dvilo4a

drop if dvilo4a<0
Checking the number of the individuals eligible for the full interview
Removing the respondents who did not complete the full interview
drop if dvage<16|dvage>35
Excluding anyone less than 16 and over 35 years of age
drop if pincinp>0
Removing anyone who receives pension income
ta marrs
drop if marrs<0
Checking variable marrs (whether up-to-date with repayments on mortgage) and removing the negative values (e.g. refused to respond; don't know)
ge Lmarrs=1 if marrs $==2 \mid$ marrs $==3 \mid$ marrs $==4$
replace Lmarrs=0 if marrs==1
Generating $1 / 0$ dummy variable for mortgage arrears, Lmarrs (based on existing categorical variable marrs that takes values $1,2,3$ and 4)
drop if mdiffpy<0

Removing the negative values (e.g. refused to respond; don't know) from the variable mdiffpy, which observes whether mortgage payments are a burden according to the respondent
ge MheavyBur=1 if mdiffpy==1
replace MheavyBur=0 if mdiffpy>1
Generating $1 / 0$ dummy variable for one finding his/her mortgage payments a 'heavy burden', MheavyBur (based on existing ordinal variable mdiffpy, where value 1 corresponds to 'heavy burden'; all values greater than 1 indicate lesser degrees of financial hardship).

## A6. Marginal effects

As discussed in section 3 of chapter IV, we use the logistic regression model $\emptyset_{i}=a+\sum_{j} \beta_{j} x_{j}+\varepsilon_{i}$ with $\emptyset_{i}=\log \left(\frac{p_{i}}{1-p_{i}}\right)$. Because of the model's nonlinearity, the estimated slope coefficients on the regressors, the $\widehat{\boldsymbol{\beta}}_{\mathrm{j}}$, do not show the marginal effects (namely, the response of the probability of success to marginal changes in each of the explanatory variables), as would be the case with a linear regression model. In fact, the estimated marginal effects in a logistic model are not constants - as in the linear model, but rather depend upon the values assumed for the regressors. For continuous regressors, we can show this as follows:
with $\widehat{\emptyset}_{i}=\hat{a}+\sum_{i} \hat{\beta}_{j} x_{j}$

It is common practice, and the default option with STATA, to calculate these marginal effects with the continuous regressors set equal to their sample means, i.e.:

$$
\begin{aligned}
\partial \hat{\mathrm{p}}_{\mathrm{m}} / \partial x_{\mathrm{k}} & =\frac{\widehat{\hat{\beta}}_{\mathrm{k}}}{\left(1+e^{-\hat{\sigma}_{m}}\right)\left(1+e^{\hat{\rho}_{m}}\right)} \\
& \quad \text { with } \widehat{\emptyset}_{m}=\hat{a}+\sum_{j} \hat{\beta}_{j} \bar{x}_{j} \text { and } \hat{p}_{m}=\left(1+e^{-\hat{\sigma}_{m}}\right)^{-1}
\end{aligned}
$$

Where regressors are not continuous, for example ordinal or binary explanatory variables, then derivatives are undefined and marginal effects must therefore be understood differently. In this study we have several binary regressors, for which we will follow STATA's default option for binary regressors by defining marginal effects to be the extent to which success
probability changes when the binary regressor switches values, with all other regressors at their sample mean values, namely:

$$
\begin{aligned}
& \Delta \hat{p}_{\mu} / \Delta x_{k}=\hat{p}_{\mu, 1}-\hat{p}_{\mu, 0} \quad \text { with } \quad \hat{p}_{\mu, s}=\left(1+e^{-\hat{\boldsymbol{v}}_{\mu, s}}\right)^{-1} \quad \text { and } \\
& \bar{\phi}_{\mu, s}=\hat{a}+\sum_{j \neq k} \hat{\beta}_{j} \bar{x}_{j}+\hat{\beta}_{k} s
\end{aligned}
$$

This study also employs some interaction variables, i.e. regressors that are constructed as the multiplication of two basic explanatory variables. This necessitates additional attention to what might be meant by marginal effects. Where two binary regressors, say $\boldsymbol{x}_{k}, \boldsymbol{x}_{\boldsymbol{l}}$, are interacted to create $x_{n}=x_{k} \times x_{l}$, then we can define:

$$
\begin{aligned}
& \Delta \hat{\mathrm{p}}_{\mu} / \Delta x_{k}=\hat{\mathrm{p}}_{\mu, 1}-\hat{\mathrm{p}}_{\mu, 0}, \text { with } \hat{p}_{\mu, s}=\left(1+e^{-\hat{\sigma}_{\mu, s}}\right)^{-1} \\
& \text { and } \widehat{\emptyset}_{\mu, s}=\hat{a}+\sum_{j \neq k, j \neq n} \hat{\beta}_{j} \bar{x}_{j}+\hat{\beta}_{k} s+\hat{\beta}_{n} s \times \bar{x}_{l}
\end{aligned}
$$

To evaluate the marginal effect for $\boldsymbol{x}_{\boldsymbol{k}}$, the interacting variable, $\boldsymbol{x}_{\boldsymbol{k}}$, is set equal to its sample mean. This same definition can also be applied if $\boldsymbol{x}_{\boldsymbol{k}}$ is binary whilst $\boldsymbol{x}_{\boldsymbol{l}}$ is continuous but if $\boldsymbol{x}_{\boldsymbol{k}}$ is continuous whilst $\boldsymbol{x}_{\boldsymbol{l}}$ is binary then we define:

$$
\begin{aligned}
\partial \hat{\mathrm{p}}_{m} / \partial x_{k}= & \frac{\tilde{\beta}_{k}+\tilde{\beta}_{n} \bar{x}_{i}}{\left(1+e^{-\hat{\sigma}_{m}}\right)\left(1+e^{\hat{\theta}_{m}}\right)} \\
& =\frac{\tilde{\beta}_{k}}{\left(1+e^{-\hat{\hat{\delta}}_{m}}\right)\left(1+e^{\hat{\theta}_{m}}\right)}+\bar{x}_{i} \frac{\tilde{\beta}_{n}}{\left(1+e^{-\hat{\sigma}_{m}}\right)\left(1+e^{\hat{\theta}_{m}}\right)}
\end{aligned}
$$

Here, the marginal effects that STATA reports for $\boldsymbol{x}_{\boldsymbol{k}}$, the variable of interest, and $\boldsymbol{x}_{\boldsymbol{n}}$, the interaction term, are added, with the latter being weighted by $\overline{\boldsymbol{x}}_{\boldsymbol{i}}$.

The above treatment of marginal effects in the presence of interactions might be improved, in principle, by recognising that, except for interactions between uncorrelated variables, $\bar{x}_{n} \neq \bar{x}_{k} \times \bar{x}_{l}$ but this detail does not seem to be commonly taken into account.

## A7. Post-estimation tests

Table a4- Classification table and summary statistics
Logistic model for Ldc12mi

| Classified | True |  | ~D |
| :---: | ---: | ---: | ---: |$\quad$ Total

Classified + if predicted $\operatorname{Pr}(D)>=.5$
True $D$ defined as Ldc12mi != 0

| Sensitivity | $\operatorname{Pr}(+1 \mathrm{D})$ | 27.948 |
| :---: | :---: | :---: |
| Specificity | $\operatorname{Pr}(-1 \sim D)$ | 97.758 |
| Positive predictive value | $\operatorname{Pr}(\mathrm{D} \mid+)$ | 68.678 |
| Negative predictive value | $\operatorname{Pr}(\sim \mathrm{D} \mid-)$ | 88.488 |
| False + rate for true $\sim$ D | $\operatorname{Pr}(+1 \sim D)$ | 2.258 |
| False - rate for true D | $\operatorname{Pr}(-1 \mathrm{D})$ | 72.068 |
| False + rate for classified + | $\operatorname{Pr}(\sim \mathrm{D} \mid+1$ | 31.338 |
| Ealse - rate for classified - | $\operatorname{Pr}(\mathrm{DI}-)$ | 11.528 |
| Correctly classified |  | 87.278 |

STATA version 12

Figure a3- Sensitivity/Specificity graph


STATA version 12

Figure a4- ROC (Receiver Operating Characteristic) curve


STATA version 12

Table a5- Classification table and summary statistics (cut-off point for positive predictions set at 30\%


Classified + if predicted $\operatorname{Pr}(\mathrm{D})>=.3$
True D defined as Ldc12mi !=0

| Sensitivity | $\operatorname{Pr}(+1 \mathrm{D})$ | 49.02 t |
| :---: | :---: | :---: |
| Specificity | $\operatorname{Pr}(-1 \sim D)$ | 90.568 |
| Positive predictive value | $\operatorname{Pr}(\mathrm{DI}+)$ | 47.858 |
| Negative predictive value | $\operatorname{Pr}(\sim D \mid-)$ | 90.964 |
| False + rate for true $\sim$ D | $\operatorname{Pr}(+\mid \sim D)$ | 9.448 |
| False - rate for true D | $\operatorname{Pr}(-1 \mathrm{D})$ | 50.988 |
| False + rate for classified + | $\operatorname{Pr}(\sim \mathrm{D} \mid+)$ | 52.158 |
| False - rate for classified | $\operatorname{Pr}(\mathrm{D} \mid-)$ | 9.048 |

Correctly classified


[^0]:    ${ }^{1}$ Apart from the report of Bryan et al. (2010) to the Department for Business, Innovation and Skills.

[^1]:    2 UK Debt Statistics from Credit Action, September 2013. Available at: http://www.creditaction.org.uk/helpful-resources/debt-statistics.html [accessed: 30/09/13].
    ${ }^{3}$ International Monetary Fund (IMF). Available at:
    http://www.imf.org/external/pubs/t/weo/2012/02/weodata/weorept.aspx?pr.x=67\&pr.y=10\&s $\mathrm{y}=2010$ \&ey=2017\&scsm=1\&ssd=1\&sort=country\&ds=.\&br=1\&c=112\&s=NGDP_R\&grp=0\&a [accessed: 30/09/13].

[^2]:    ${ }^{4}$ An earlier version of this chapter was published as Theodorakopoulou, V. (2009) Consumer Debt Decisions The Role of Ambiguity. Intemational Journal of Economic Issues, Issue 2(2), July-December 2009, pp. 241-261, ISSN 0974-603X.

[^3]:    ${ }^{5}$ With the exception of the working paper of Del-Rio and Young (2005) for the Bank of England which finds ethnicity to be one of the factors that exert a significant impact on unsecured debt problems.

[^4]:    ${ }^{6}$ UK Debt Statistics from Credit Action. Available at: http://www.creditaction.org.uk/helpful-resources/debt-statistics.html [accessed: 05/10/2013].

[^5]:    ${ }^{7}$ (Brown and Taylor 2005, p. 19).
    ${ }^{8}$ Data from credit bureaus or credit suppliers (banks) is referred to as administrative. "Such data can offer information as to whether debt is denied and whether it is repaid, and they do offer precise information as to the amounts of credit issues, reducing problems of measurement errors that typically trouble survey data." (Bertola and Hochguertel 2007, p.134)

[^6]:    ${ }^{9}$ The lender-side (industry) data used, was extracted from the Federal Reserve Board's Statistical Release G.19: Consumer Credit, and Nilson Reports.

[^7]:    ${ }^{10}$ Similarly, Karlan and Zinman (2008) observe underreporting in South African samples.

[^8]:    ${ }^{11}$ Lawrence (1995) claims that the default option must be accounted for in models of consumption since defaulting can have significant effects on both individual consumption and bank behaviour. The author extends the existing consumption models by relaxing the assumption of full repayment; in this way, an individual has the option of defaulting as a result of -for example- low (future) income.

[^9]:    ${ }^{12}$ Bertaut and Haliassos (2006) explain one's decision to revolve debt whilst holding a considerable amount of assets on the basis of the 'accountant-shopper' model. Their study is reviewed in section 4.2.1 of this chapter.

[^10]:    ${ }^{13}$ FACS contains a much larger sample of families with children than the OdS.

[^11]:    ${ }^{14}$ Particularly those using UK data.
    ${ }^{15}$ (Whitley et al. 2004, p. 13).
    ${ }^{16}$ (Whitley et al. 2004, p. 17).

[^12]:    ${ }^{17}$ According to this model, 'shocks to household balance sheets increase the amplitude of fluctuations in consumer spending by tightening or unbinding collateral constraints.' (Bridges et al. 2006a, p. 2).
    ${ }^{18}$ Credit cards, a form of unsecured debt, are also referred to as 'open-ended' credit. If a person is unable to pay off the outstanding balance in full, she must pay any amount equal to or greater than the minimum amount required by the card issuer in subsequent months until the balance is cleared (Sullivan et al. 2000). This differs from closed-end credit (e.g. an installment loan), where the amount borrowed must be repaid in a given number of equal payments.

[^13]:    ${ }^{19}$ The NMG Research was carried out by NMG Consulting on behalf of the Bank of England. The same survey is repeated in 2005, 2006 and 2008. It should be noted that the 2006 NMG Research survey is enhanced in the sense that it also investigates whether respondents feel constrained by the amount they can borrow due to either feeling discouraged to apply in the first place, or being prevented from borrowing because of high borrowing rates or, even, unavailability of credit. In addition, respondents are asked about their views on bankruptcy as well as whether they find their existing debt to be a burden (a similar question is asked by the BHPS, waves 5,10 and 15). Those who report problems with paying off their debts are asked for the cause of these difficulties.

[^14]:    ${ }^{20}$ A formal analysis maximises the discounted life-time utility stream subject to the life-time income constraint. Opportunities for saving / dis-saving make the mathematical problem inter-temporal, so that the first-order condition becomes an "Euler equation" in this case a difference equation in consumption.

[^15]:    ${ }^{21}$ For the Netherlands the authors use the DNB Household Survey (DHS), for Italy the Survey of Household Income and Wealth (SHIW), for the US the Survey of Consumer Finances (SCF) and for Spain the (Bank of Spain's) Survey of Household Finances (EFF).
    ${ }^{22}$ Such as the number of children at different ages, marital and occupational status, level of education and gender.

[^16]:    23 Particularly, in order to explore and compare the characteristics of constrained households across countries and over time, the authors entertain random effects probit models for both the Netherlands and Italy, a probit for Spain and pooled probits for the US.

[^17]:    ${ }^{24}$ It must be noted that age has no effect in Spain.

[^18]:    ${ }^{25}$ US data on consumer bankruptcy is obtained from the Department of Justice as well as the AOUSC (Administrative Office of the US Courts); the latter is a common (available to the public) source for this type of data.
    ${ }^{26}$ The dramatic changes in the US banking industry of the late 1970s continued throughout the 1980s until the early 1990s.
    ${ }^{27}$ The largest, since 1978, change in the US bankruptcy law took place in 2005.

[^19]:    ${ }^{28}$ Livingstone and Lunt (1992), and Kim and Devaney (2001) find income positively related to the amount of debt, whereas income is negatively related to debt according to Zhu and Meeks (1994). The impact of age, gender and marital status is viewed as unclear (Norvilitis et al. 2003, Robb and Sharpe 2009).

[^20]:    ${ }^{29}$ Particularly the ordered ranking of responses (known as GHQ12) is regarded as a reliable measure of psychological well-being.

[^21]:    ${ }^{30}$ Clark (2003) and Clark and Oswald (1994).

[^22]:    ${ }^{31}$ '[C]hronic debtors are a small group and are distinguished by having more limited economic and social resources [...].' (ibid, p. 423).
    32 The BHPS respondents are asked: 'Looking ahead, how do you think you will be financially a year from now, will you be: Better off, Worse off than you are now, Or about the same?'

[^23]:    ${ }^{33}$ (Davis 1992, p. 4).

[^24]:    ${ }^{34}$ Available at:
    http://www.theukcardsassociation.org.uk/wm_documents/2013\%20Q1\%20Statistical\%20Rel ease\%20-\%20FINAL.pdf [accessed: 28/08/2013].
    ${ }^{35}$ Available at: http://www.creditaction.org.uk/assets/PDF/statistics/2013/august-2013.pdf [accessed: 28/08/2013].
    36 Available at: http://www.creditaction.org.uk/helpful-resources/debt-statistics.html [accessed: 05/10/2013].
    ${ }^{37}$ According to the British Bankers' Association (BBA) the total outstanding balance 'on all personal loans was GBP 34.5 billion in December, marking the lowest figure seen since August 1999 and almost half its pre-financial crisis peak'. Available at:

[^25]:    http://www.telegraph.co.uk/finance/personalfinance/9824152/Personal-loan-debt-hits-14-year-low.html [accessed: 26/08/2013]).
    ${ }^{38}$ Available at:
    http://www.telegraph.co.uk/finance/personalfinance/borrowing/loans/10096271/Personal-loans-at-record-low-of-4.9pc.html [accessed: 26/08/2013].
    ${ }^{39}$ The amount one can borrow depends on where one studies and lives, a well as the year of her studies; repayments start in April, after the course is completed.
    ${ }^{40}$ Available at:

[^26]:    http://www.bankofengland.co.uk/statistics/Documents/ms/articles/art1jul12.pdf (p. 1) [accessed: 27/08/2013]
    41 Available at: www.parliament.uk/briefing-papers/SN01079.pdf (p. 10) [accessed: 27/08/2013].
    ${ }^{42}$ Available at: www.creditaction.org.uk/helpful-resources/debt-statistics.html [accessed: 27/08/2013].
    ${ }^{43}$ With effect from October 2013, CreditAction was renamed to The Money Charity. http://themoneycharity.org.uk/about/name/ [accessed: 01/11/13]).

[^27]:    44 Available at: www.creditaction.org.uk/helpful-resources/debt-statistics.html [accessed: 27/08/2013]
    ${ }^{45}$ Available at: http://www.babusinesslife.com/Ideas/Economics/Building-something-Consider-your-best-and-worst-case-scenarios.html [accessed: 20/09/2013].

[^28]:    ${ }^{46}$ The chapter was written -and published- amidst the financial crisis of 2007/08. In order to maintain consistency across its key arguments and findings, relevant data of that time are used. Recent figures of debt and credit are presented in Chapter II.
    ${ }^{47}$ The New York Times, 22/03/2008, 'Debt-Gorged British Start To Worry That The Party Is Ending'. Available at:
    http://www.nytimes.com/2008/03/22/business/worldbusiness/22debt.html?pagewanted=all\& _r=0 [accessed: 01/09/2013].
    48 The Times, $16 / 04 / 2008$, 'Thousands to have usual credit lines cut off'. Available at: http://www.thetimes.co.uk/tto/business/industries/banking/article2156890.ece [accessed: 01/ 09/2013].

[^29]:    49 The Times, $16 / 04 / 2008$, 'Thousands to have usual credit lines cut off'. Available at: http://www.thetimes.co.uk/tto/business/industries/banking/article2156890.ece [accessed: 01/ 09/2013].
    ${ }^{50}$ The Times, 03/04/2008, 'Householders in a rush to the bank as big price rises empty their wallets'. Available at: http://www.thetimes.co.uk/to/money/borrowing/article2204345.ece [accessed: 01/09/2013].
    ${ }^{51}$ Financial Times, 02/06/2008, 'Mortgage approvals suffer steep fall'. Available at: http://www.ft.com/cms/s/0/58947b98-3108-11dd-bc93-
    000077b07658.html?siteedition=uk\#axzz2fehBHMqk [accessed on 10/09/2013].
    52 The Times, 03/04/2008, 'Householders in a rush to the bank as big price rises empty their wallets'.
    ${ }^{53}$ Telegraph, 04/05/2009, 'Economic downturn 'twice as bad as feared". Available at: http://www.telegraph.co.uk/finance/financetopics/recession/5272560/Economic-downturn-twice-as-bad-as-feared.html [accessed on 04/05/2009].

[^30]:    54 Financial Times, 29/05/2008, 'Uncomfortable truths for a new world of them and us'. Available at:
    http://www.ft.com/cms/s/0/36674e8e-2d9c-11dd-b92a-000077b07658.htm|\#axzz2gzdxEcAe [Accessed: 01/09/2013].

[^31]:    ${ }^{55}$ A review of the frameworks for understanding decision-making under uncertainty is given in Appendix A1.

[^32]:    56 'Risk as true Uncertainty', in Knight's own words.

[^33]:    57 'Risk may fail to be calculable for 2 basic reasons: Firstly, it may not be possible to assign a unique subjective probability distribution to different scenarios for the future. Secondly, it may be difficult to associate a unique outcome to each scenario.' Spanjers (2008, pp. 3-4).
    ${ }^{58}$ Ambiguity is distinguished into strategic ambiguity, which '[...] does not refer to the environment in which decisions are made, but rather to the choice of strategies by the others [other players]' (Spanjers 2008, p. 10), and state ambiguity that '[...] refers to ambiguity about the environment [i.e. the exogenous economic environment, the state of nature] in which the interaction takes place' (Spanjers 2008, p. 10). It must be noted that this chapter employs ambiguity in its general sense; no distinction between strategic and state ambiguity will be entertained at this stage.
    ${ }^{59}$ As in Eichberger and Kelsey (2007) and Spanjers (1999/08, Part III).

[^34]:    ${ }^{60}$ Decision making under ambiguity involves a significant lack of knowledge; this means that the functional form is completely unknown, and often that the relevant variables are unknown.

[^35]:    ${ }^{61}$ Contemporary examples of ambiguity may include: 'global warming, the BSE-crisis, bird flu, the Gulf War, the South-East Asian crisis, New Economy technologies and the impact of 9/11'. See Spanjers (2008, p. 87).
    ${ }_{82}$ 'Ambiguity seeking' at low probabilities and 'ambiguity avoidance' at moderate to high probabilities. See Einhorn and Hogarth (1986, pp. 233-237).

[^36]:    ${ }^{63}$ For the maxmin expected utility see Gilboa and Schmeidler (1989) and for non-additive expected utility see Schmeidler (1982/89) and Gilboa (1987).

[^37]:    ${ }^{64}$ The key types of credit consumption and personal debt are presented in Chapter II, where the downside risks that correspond to each type of credit, are also outlined.

[^38]:    ${ }^{65}$ Based on Bank of England figures the number of mortgages approved for house purchases fell from 63,000 in March [2008] to 58,000 in April [2008]- 55 per cent below the peak of almost 130,000 in late 2006 and the lowest since such records began in 1999.' Financial Times, 02/06/2008, 'Mortgage approvals suffer steep fall'. Available at: http://www.ft.com/cms/s/0/58947b98-3108-11dd-bc93-
    000077b07658.html?siteedition=uk\#axzz2fehBHMqk [accessed on 10/09/2013].

[^39]:    ${ }^{66}$ The Times, 25/03/2008, 'Debt charities cast a wary eye on waters as loan sharks circle'. Available at: http://www.thetimes.co.uk/tto/business/industries/banking/article2156756.ece [accessed: 01/09/2013].
    ${ }^{87}$ The Times, 03/04/2008, 'Householders in a rush to the bank as big price rises empty their wallets'. Available at: http://www.thetimes.co.uk/to/money/borrowing/article2204345.ece [accessed: 01/09/13].
    ${ }^{68}$ Appendix A3 reviews the available debt settlement options and the individual bankruptcy framework in England and Wales.
    в9 The Telegraph, 20/05/2008, 'Credit crisis sees banks refusing more small loans'. Available at: http://www.telegraph.co.uk/finance/markets/2790276/Credit-crisis-sees-banks-refusing-more-small-loans.html [accessed: 01/09/2013].

[^40]:    ${ }^{70}$ With effect from 1 April 2013 the Financial Services Authority (FSA) was abolished and replaced by two organisations, the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA). (http://www.fsa.gov.uk/about/what/reg_reform [accessed: 01/03/2013]).
    71 The FSA baseline survey is thought to be 'the most comprehensive database of consumer financial behavior, capability and attitudes in the UK.' (Thoresen 2007, p. 36).
    72 (Thoresen 2007, p. 36).
    ${ }^{73}$ (Wells 2007, p. 3).
    74 'The indicators chosen to identify 'those most vulnerable to...' were selected following discussions with experts in the Personal Finance Research Centre, FSA, DWP, HMT and others, who helped refine the indicators and suggest alternatives.' (Wells 2007, p. 6).
    ${ }^{75}$ See Thoresen (2008, p.26).

[^41]:    ${ }^{78}$ The occasional users represent consumers who are both confident and capable to access and make use of the service; as a result fewer resources will be required to attract this group of people to the service.

[^42]:    77 Horizon effects describe 'an ordinal shift in our range of awareness' (Jennings 2009, p.11). The longer the planning horizons, the more limited our rational bounds. However, planning horizons are viewed as a game of chess; '[...] the better one apprehends the game -and the opponent's style of play- the further ahead are effects seen. The move horizon in chess is like the planning horizon in choice: the better we understand the world -in how it works as a complex system- the more efficient our use of resources in the pursuit of ends.' (Jennings 2009, p.11).

[^43]:    78 Denial of credit of more than GBP250 and freedom to become a company director are cleared after one year.

[^44]:    79 The Telegraph, 22/10/2007, 'Savings tsar on mortgages and pensions'. Available at: http://www.telegraph.co.uk/finance/markets/2818094/Savings-tsar-on-mortgages-andpensions.html [accessed: 01/10/2013].

[^45]:    ${ }^{80}$ Available at: http://www.rbs.com/news/2008/12/natwest-branches-to-offer-free-impartial-financial-guidance.html [accessed: 01/10/2013].

[^46]:    ${ }^{81}$ Available at: http://www.rbs.com/news/2008/12/natwest-branches-to-offer-free-impartial-financial-guidance.html [accessed: 01/10/2013].
    82 The particular work is titled Thoresen Review of generic financial advice and is cited extensively in the present chapter.

[^47]:    ${ }^{83}$ (Thoresen 2008, p. 2).
    ${ }^{84}$ (Thoresen 2008, p. 8).
    ${ }^{85}$ (Thoresen 2008, p. 29).

[^48]:    ${ }^{86}$ 'There are many organisations that have the capacity to develop into specialist Money Guidance accredited partners, such as The Pensions Advisory Service (TPAS) and TaxAid.' (Thoresen 2008, p. 51).
    ${ }^{87}$ [ [...] two-thirds of people surveyed want a service that helps them 'make their own decisions' and around a half agreed strongly that the service should not 'sell or recommend specific products.' (Thoresen 2008, p. 43).

[^49]:    ${ }^{88}$ Having reviewed a total of 537 refereed and credit card-related journal articles from 8 databases published between 1969 and 2012, Mansfield et al. (2013) underline the abundance of literature in the area of consumer credit card attitude and behaviour over the past four decades and highlight further research opportunities in - but not limited to- the area of "card acquisition/debt accumulation decisions". (ibid, p. 81).
    ${ }^{89}$ All credit cards are issued by financial institutions affiliated to the Visa, Mastercard, or, American Express organisations, which brand each credit card. Their respective circulation volumes are shown below:

    - Visa: 277 million credit cards in the United States and 518 million cards in the rest of the world (as of 31/03/2013).
    Visa Operational Performance Data for Q1 2013 (reported 01/05/2013). Available at: http://investor.visa.com/phoenix.zhtml?c=215693\&p=quarterlyearnings [accessed: 09/08/2013]
    - MasterCard: 178 million credit and charge cards in the United States and 544 million cards in the rest of the world (as of 31/03/2013).
    MasterCard Q1 2013 Financial Results, Operational Performance (reported May 1, 2013). Available at:
    http://investorrelations.mastercardintl.com/phoenix.zhtml?c=148835\&.p=irol-
    newsArticle\&ID=1813555\&highlight [accessed: 09/08/2013].
    American Express: $\mathbf{5 2 . 1}$ million credit cards in the United States and 51.1 million in the rest of the world (as of 31/03/2013).
    American Express Q1 2013 Financial Results, Earnings Supplement (reported 17/04/2013). Available at:
    http://ir. americanexpress.com/Cache/1001174735.PDFPY=\&O=PDF\&D=\&fid=1001 174735\&T=\&iid=102700 [accessed: 09/08/2013].

[^50]:    ${ }^{90}$ Available at: http://www.theukcardsassociation.org.uk/news/UKPlasticCards2013.asp [accessed: 25/09/13].
    ${ }^{91}$ Available at:
    http://www.theukcardsassociation.org.uk/2012-facts-
    figures/credit_charge_card_figures_2012.asp [accessed: 09/08/2013].

[^51]:    ${ }^{92}$ Based on dc12mi, the variable that captures whether one has been unable to make the minimum payment on her credit card over the last 12 months, we create a binary variable that identifies whether the respondent is in (credit card) arrears. This variable, Ldc12mi, which is presented in more detail over the next sections, is used in the charts.

[^52]:    ${ }^{93}$ Office for National Statistics. Social Survey Division, Wealth and Assets Survey, Wave 1, 2006-2008: Special Licence Access [computer file]. 6th Edition. Colchester, Essex: UK Data Archive [distributor], April 2011. SN: 6415.

[^53]:    ${ }^{94}$ Asian or Black British respondents take up $7.88 \%$ of the full sample; all other non-British ethnicities are 6.4\% of the dataset.
    95 Moreover, 26 interviewees were reported with negative earnings. These are believed to be losses experienced by respondents who reported self-employed income.

[^54]:    ${ }^{96}$ Please note that this question is only addressed to those respondents who have an overdraft facility in their current accounts.

[^55]:    ${ }^{99}$ Note that dc12mi takes the values of 1 and 2 in the dataset; for the purpose of our econometric analysis we transform it to Ldc12mi, the $1 / 0$ dummy variable of credit card payment arrears (see Appendix A5).
    100 Table 11 shows the responses of the full sample, whereas Table a2 (Appendix A4) focuses on the age group under investigation.

[^56]:    101 (Cramer 2011).

[^57]:    104 In line with recent OECD publications (OECD 2008, OECD 2011), we use the square root equivalence scale throughout, which divides household income by the square root of household size.

[^58]:    ${ }^{105}$ We acknowledge that according to the Council of Mortgage Lenders (CML) the more widely used measure of mortgage arrears reports the number of households/individuals more than 3 months (or 6 months, or 12 months) in arrears. Nevertheless, the CML use another method, which records the number of households whose arrears amount to $2.5 \%$ (or $5 \%$, or $7.5 \%$ or $10 \%$ ) of the total outstanding balance on their mortgage. To the best of our knowledge, the WAS does not provide such information.

[^59]:    107 "Logit automatically checks the model for identification and, if it is underidentified, drops whatever variables and observations are necessary for estimation to proceed." Available at: http://www.stata.com/manuals13/rlogit.pdf [accessed: 01/08/2014].

[^60]:    ${ }^{108}$ We have tried to re-run the model by completely removing the dropped variables, but logit iterates infinitely; this points to nonconvergence. According to STATA's manual "[I]t happens when you have a covariate pattern (or patterns) with only one outcome and there is collinearity when the observations corresponding to this covariate pattern are dropped."
    Available at: http://mum.stata.com/manuals13/hogit.pdf [accessed: 01/08/2014]

[^61]:    109 (Bryan et al. 2010); the report is available online at:
    https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/31897/11-747-over-indebtedness-in-great-britain-analysis.pdf [accessed: 01/09/2013].

[^62]:    110 Available at: http://www.bba.org.uk/media/article/august-2013-figures-for-the-high-street-banks/press-releases/ [accessed: 01/10/2013].
    111 The scheme offers cheap finance to banks as long as they increase their lending.
    112 Available at: www.telegraph.co.uk/finance/personalfinance/consumertips/household-bills/10330711/Consumer-credit-rises-for-first-time-in-four-years-BBA.html [accessed: 01/10/13].

[^63]:    ${ }_{113}$ Available at: http://www.fca.org.uk/news/fca-to-carry-out-market-study-into-cash-savings [accessed: 01/10/13].
    ${ }^{114}$ Available at: http://insolvency.presscentre.com/Press-Releases/Change-of-law-to-help-more-bankrupts-open-bank-accounts-69054.aspx [accessed: 30/08/2013].
    ${ }^{115}$ The draft Deregulation Bill is available online at:
    http://www.official-documents.gov.uk/document/cm86/8642/8642.pdf
    [accessed: 02/10/2013].
    ${ }^{166}$ More information under Appendix A2.

[^64]:    117 'Risk may fail to be calculable for two basic reasons: Firstly, it may not be possible to assign a unique (subjective) probability distribution to different scenarios for the future. Secondly, it may be difficult to associate a unique outcome to each scenario.' (Spanjers 2008, p. 86).
    ${ }^{118}$ Ambiguity distinguishes between strategic ambiguity (" $[.$.$] ] does not refer to the$ environment in which decisions are made, but rather to the choice of strategies by the others [other players].' (Spanjers 2008, p. 94) and state ambiguity ('[...] refers to ambiguity about the environment [i.e. the exogenous economic environment, the state of nature] in which the interaction takes place.' (Spanjers 2008, p. 94). It should be noted that this study employs ambiguity in its general sense; in other words, no distinction between strategic and state ambiguity will be entertained at this stage.
    119 The challenge in many simple choices does not lie in specifying the straightforward and easily identifiable outcomes but in assigning ex ante probabilities to their occurrence; hence the use of a probability distribution. Dealing with calculable risk requires one to identify the alternatives she could face, assign probabilities to them and, consequently, plan her actions.

[^65]:    120 John von Neumann and Oskar Morgenstern with their 'Theory of Games and Economic Behavior' (1944) formally incorporated risk to the economic theory. In particular, the theory of von Neumann-Morgenstern models uncertain prospects as probability distributions, interchangeably referred to as lotteries and gambles, over a given set of prizes; 'that is, the probabilities of various prizes are given as part of the description of the object- probabilities are objective' (Kreps 1990, p. 71). That implies that 'the probabilities -numerical expressions of likelihood- are given exogenously' (Kreps 1990, p. 98). Hence, it becomes apparent that such situations are characterised by risk.
    ${ }^{121}$ Preferences and choices are also represented by taking expected utilities in Savage's theory of subjective probability as well as in Anscombe and Aumann's theory. See Savage (1954), Anscombe and Aumann (1963).

[^66]:    ${ }^{122}$ (Kreps 1990, p. 71).
    ${ }^{123}$ 'In real world applications, there may be no objective probability for a random event.' (Kreps 1990, p. 73).
    ${ }^{124}$ Decision making under ambiguity involves significant lack of knowledge. Decision making under ambiguity means that the functional form is completely unknown, and often that the relevant explanatory variables are unknown. In the absence of more solid theories as to how (strategic) ambiguity arises and develops, we consider beliefs that describe the level of ambiguity as an exogenously given characteristic of each individual player' (Spanjers 2008, p. 95).

[^67]:    ${ }^{125}$ Einhorn and Hogarth (1986, pp. 233-237), refer to "ambiguity seeking" at low probabilities and "ambiguity avoidance" at moderate to high probabilities (for positive payoffs).

[^68]:    ${ }^{126}$ The analysis focuses on credit-suppliers of advanced financial markets and, in particular, the UK financial market; notions, such as microfinance and informal credit markets (borrowing from family and friends) are, therefore, not included in the investigation of borrowers' attitude towards repayment. Nevertheless, it is worth highlighting Grant and Padula (2005), who found that households that are likely to have access to informal credit markets are significantly more likely to default than other types of households.

[^69]:    ${ }^{127}$ According to Attanasio and Weber (1994), expectations must be carefully considered as they are significant in the way changes in the economic environment translate into changes in borrowing behaviour.
    ${ }^{128}$ Well-founded expectations can be also presented by introducing the concept of prospects, $P$. 'Assume that the individual assigns a probability $\pi_{s}$ to state of the world $s$, and denote the vector of probabilities by $\pi=\left(\pi_{,}, y\right)=\left(\pi_{1}, \ldots, \pi_{s}, y_{1}, \ldots, y_{s}\right)$. Changing the probability vector $\pi$, or the income vector $y$ (or both) produces a different prospect. Another term for a prospect would be a probability distribution of incomes. [...] [C]hoice between alternative actions or decisions is equivalent to choice between alternative prospects' (Gravelle and Rees 2004, p. 448).

[^70]:    129 The United Kingdom consists of three separate jurisdictions or law districts: a) England and Wales, b) Scotland, and, c) Northern Ireland. For consistency reasons, all statistics provided in this section are relevant to England and Wales.
    Therefore, The Insolvency Service provides the statistics of insolvencies in Scotland and Northern Ireland separately, arguing that 'as they are covered by separate legislation, there are some differences in definition, and policy responsibility for them lies within the devolved administrations.' Available at:
    http://www.insolvencydirect.bis.gov.uk/otherinformation/statistics/201305/index.htm [accessed: 27/08/2013].
    ${ }^{130}$ Available at:
    http://www.insolvencydirect.bis.gov.uk/otherinformation/statistics/201305/index.htm [accessed: 27/08/2013].

[^71]:    132 Available at: http://www.bis.gov.uk/insolvency/personal-insolvency/bankruptcy-what-is-bankruptcy/what-alternatives-bankruptcy [accessed: 27/08/2013].
    133 Available at: https://www.gov.uk/options-for-paying-off-your-debts/debt-managementplans [accessed: 27/08/2013].
    134 A set up fee and/or a handling fee per payment may be charged.
    ${ }^{135}$ Although they will endeavour to get the best result possible, there is no guarantee that they will be successful in these negotiations.

[^72]:    ${ }^{136}$ Available at: https://www.gov.uk/options-for-paying-off-your-debts/administration-orders [accessed: 27/08/2013].

[^73]:    ${ }^{137}$ Available at:
    http://www.insolvencydirect.bis.gov.uk/otherinformation/statistics/IVAs/ivas.htm [accessed: 27/08/2013].
    138 Available at: https://www.gov.uk/options-for-paying-off-your-debts/individual-voluntaryarrangements [accessed: 27/08/2013]
    ${ }^{139}$ The IVA was designed initially to be a more convenient means for processing individual insolvency cases without incurring the excessive costs and court time involved in bankruptcy. As such there are many elements that are similar to bankruptcy, but the process is simpler and the outcome less severe.
    140 The IVA can be cancelled if the scheduled repayments are not honoured.

[^74]:    141 Available at: https://www.gov.uk/options-for-paying-off-your-debts/debt-relief-orders [accessed: 27/08/2013]

[^75]:    142 The individual who gets a DRO must not:

    - borrow more than $£ 500$ without telling the lender about the DRO
    - act as the director of a company
    - create, manage or promote a company without the court's permission
    - manage a business without telling those she does business with about the DRO

    Available at: https://www.gov.uk/options-for-paying-off-your-debts/debt-relief-orders [accessed: 27/08/2013].
    143 Available at: https://www.gov.uk/options-for-paying-off-your-debts/fast-track-voluntaryarrangements [accessed: 27/08/2013].

[^76]:    144 Available at: http://www.moneysupermarket.com/loans/debt-consolidation-loans/ [accessed: 01/10/2013].
    145 If the value of a property has gone up since purchase, or significant payments have been made into the mortgage over time.
    ${ }^{146}$ The main difference between an unsecured and a secured loan is that under a secured loan the property is offered as collateral, guarantee, for the debt. That is to say that if the secured debt is not paid then the lender can force sale of the property in order to get their money back.

[^77]:    ${ }^{138}$ This section also focuses on England and Wales since the bankruptcy process is different in Scotland and Northern Ireland.
    Available at: https://www.gov.uk/bankruptcy/overview [accessed: 27/08/2013].
    ${ }^{148}$ It should be noted that bankruptcy is not the same as default; Gross and Souleles (2002) argue that bankruptcy differs from default by using information on delinquency from the records of a US credit-card company.
    ${ }^{149}$ Available at: https://www.gov.uk/bankruptcy/your-assets [accessed: 29/08/2013].

[^78]:    ${ }^{150}$ Prior to the amendments to the UK bankruptcy law (Enterprise Act 2002), which took place on the $1^{\text {st }}$ of April 2004, bankrupts would be automatically discharged after 2 to 3 years. The changes led to a reduction in the duration of bankruptcy, making the standard period of bankruptcy 12 months.
    151 Available at: http://insolvency.presscentre.com/Press-Releases/Change-of-law-to-help-more-bankrupts-open-bank-accounts-69054.aspx [accessed: 30/08/2013].

[^79]:    152 "Evidence submitted in response to the consultation indicates that only $27 \%$ people are able to retain their bank account on the making of a bankruptcy order. $55 \%$ of bankrupts will struggle temporarily and then get a new account. $18 \%$ will not be able to get a bank account of their own." Available at:
    http://www.bis.gov.uk/assets/insolvency/docs/insolvency\%20profession/consultations/bank-accounts-nov-2011/bank\%20account\%20for\%20bankrupts\%20-\%20response.pdf [accessed: 30/08/13, p. 4].
    153 Available at: http://insolvency.presscentre.com/Press-Releases/Change-of-law-to-help-more-bankrupts-open-bank-accounts-69054.aspx [accessed: 30/08/2003].

    154 The proposed change can be found under Schedule 5, Part 5: Bankruptcy, paragraph 301, p. 49 of the draft Deregulation Bill; available online at: http://www.official-documents.gov.uk/document/cm86/8642/8642.pdf [accessed: 02/10/2013].

[^80]:    155 (Thoresen 2008, p. 26)

[^81]:    ${ }^{156}$ (Thoresen 2008, p. 26)

[^82]:    ${ }^{157}$ (Thoresen 2008, p. 26)

[^83]:    ${ }^{158}$ (Thoresen 2008, p. 26)

