Optimism and Portfolio Choice

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Abstract

This study develops three heuristics to measure financial optimism: financial expectation, a priori optimism, and a posteriori optimism. This paper finds that financial optimism has a significant positive effect on risk taking behaviour. Optimistic investors choose risky portfolios over risk-free portfolios for their investments and have higher personal debt borrowing. We use more than six million observations from the British Household Panel Survey covering the period 1991 to 2007 in our analysis. Optimistic, pessimistic and neural respondents have significantly different demographic characteristics. Optimists are significantly younger, more likely being male, have higher educational qualifications, more likely to have business ownership, borrow more personal debt and take on a larger mortgage than pessimists. However they also have a lower accumulated financial wealth and higher average unemployment rate than people who are pessimistic or neutral towards their financial situation.

1. Introduction

Optimistic bias in decision making is among the most robust findings in research on social perceptions and cognitions over the last two decades (Helweg-Larsen and Shepperd 2001). Various data suggest that people tend to be unrealistically optimistic about the future (Weinstein 1980). Surveys concerning automobile accidents (Robertson 1977), crime (Weinstein 1977), and disease (Harris and Guten 1979) find that many people believe their risk is less than average, but a few think their risk is greater than average. When people are asked to predict the outcome of social and political events, their predictions tend to coincide with their preferences (McGuire 1960). Even for purely chance events such as a guess of heads or tails, people sometimes display optimistic biases (Langer and Roth 1975).

According to Manglik (2006), research on behavioural biases, such as optimism, in financial decision making began to gather momentum in economics only in the seventies. Scholars began to identify a pattern of anomalies in the financial markets such as size effect and momentum effect. Initially, behavioural finance theory was considered as incomplete and 'no theory', while rational choice is considered normatively superior by traditional economists (Manglik, 2006). Only recently has financial behaviour and its impact on economic theory become an accepted fact, and various dimensions of behavioural theory been explored. Behavioural issues are proved to affect the financial market. For example, Shefrin and Statman (1985) find that mental accounting, regret aversion, and self-control are the behavioural biases that lead to the disposition to sell winners too early and ride losers too long in financial markets. Barber and Odean (2001) discover men lower their returns more than women because they are overconfident and trade excessively. Coval and

Shumway (2005) find self-attribution bias, representativeness bias, and loss aversion do exist among Chicago Board of Trade (CBOT) proprietary traders and these behavioural issues have an impact on prices and increase volatility though it only last a short interval.

Among recent studies on the impact of behavioural issues on the economy, optimism is understood to have effects on many economic phenomena (Puri and Robinson, 2007). Optimism can affect corporate management financial decisions and entrepreneurs' behaviour (March & Shapira 1987; Gervais, Heaton, and Odean, 2002; Heaton, 2002; Hackbarth, 2007); it has influences on asset management and investors, affecting asset pricing and causing under- and over-reaction of stock prices to events (Lee, Shleifer, and Thaler, 1991; Barberis, Shleifer and Vishny 1998); it plays an important role for the existence of financial intermediation (Coval and Thakor, 2005); and optimism has impact on consumer expenditures (Kacperczyk and Kominek, 2002).

However there is little evidence on the role that optimism plays in household portfolio choice. As one of the four macroeconomic sectors[1], the household sector is the primary participant on the buy side of the product market and the financial market, as well as the sell side of the resource markets (Welch and Welch 2006). In this paper, our objective is to examine the effect of optimism on household portfolio choice by employing data from the British Household Panel Survey (BHPS).

The only empirical paper studying optimism and household economic choice is Puri and Robinson (2007). Our research differs from Puri and Robinson (2007) in three aspects: measurement of optimism, research focus and data. Puri and Robinson (2007) use life expectancy miscalibration to measure individuals' optimism. However, we believe using life

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[1] They are the household sector, business sector, government, and the foreign sector (Salvatore and Diulio 1995)

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expectancy miscalibration as the measurement of optimism would not fully capture optimism in one's financial situation. It is possible that investor optimism in investment decisions will change with movements in financial markets and general economy but life expectancy miscalibration might be independent from the economic cycle and remain relatively stable throughout one's life time. Therefore, we develop three heuristics of optimism, which are financial expectation, a priori optimism and a posteriori optimism, to measure the effect of financial optimism. This study will focus on the effect of optimism on household portfolio choice, instead of the effect of optimism on a series of economic decisions and attitude toward life events which include vocational choices, expectation of retirement, attitude towards remarriage, etc as in Puri and Robinson (2007). Focusing on only household portfolio choice is consistent with our heuristics for financial optimism since we believe it is more accurate to study the effect of optimism heuristics within each life domain separately. Moreover, this study will employ UK household data which has not been used before in similar studies and covers a longer period from 1995 to 2005 than Puri and Robinson (2007) who used US data from 1995 to 2001.

We believe that this study has four major contributions. (1) We develop three heuristics to measure optimism only in financial situations. The measurements of optimism are innovative and have never been used before in any other research linking optimism and household portfolio choice. (2) This paper fills a void in published research on the effect of optimism on household portfolio choice, and this research attempts to strengthen the relationship between psychology and economics. (3) Since the household sector is one of the four primary sectors in the macro-economy, research findings from studying optimism of household portfolio choice can help society to recognize the allocation of household finances. This study has implications in trying to rationalise normal individuals' investment behaviour as well as helps individuals realize the positive and negative functions of optimism. (4) This study employs

UK household data which has not been used in any previous research on the relationship between optimism and household portfolio choice, therefore it provides interesting results which can be compared to that from Puri and Robinson (2007), who conducted a similar study in the US.

2. Literature Review

This literature review section contains an overview of the existing published literature on optimism and household demographics that influence household portfolio choice. The first half of this section introduces the concept of optimism and discusses the effect of optimism in decision making based on papers from psychology and economics and points out the lack of a large scale study on the effects of optimism on household portfolio choice. The second half of the literature review examines a series of household demographic variables that have been proven to influence household portfolio choice. These demographical effects will be controlled in our study in order to analyse the effect of optimism on household portfolio choice which is the main focus of this research.

2.1 Optimism

This section reviews a number of seminal studies on optimism in psychology and finance, and its implications on economic decision making. Researchers have also studied the positive and negative effects of optimism. Weinstein and Lyon (1999) claim optimism about reaching goals could sustain motivation and help individuals to overcome obstacles. But at same time, optimistic biases lead to the neglect of risks and could do harm. They find research in public health often finds that people who believe that their risk is lower than their peers are less likely to take precautions than those who acknowledge personal risk. In assessing the likelihood of future negative events, it is not so much that individuals believe that negative events will not happen, but rather that these events are unlikely to happen to them (McKenna 1993). Tennen and Affleck (1987) suggest if one has positive expectancies about the future, then there is little tendency to worry about the potentially negative consequences

of a risky decision.

2.1.1   Definition of Optimism

In financial economics, optimistic individuals are defined as those who bias or overestimate the probability of good outcomes and underestimate the probability of negative outcomes, therefore leading to more risk taking behaviour in financial decision-making (Kahneman and Lovallo, 1993; Heaton, 2002).

In psychology, unrealistic optimism refers to the propensity for individuals to believe that they are less likely than the average person to experience negative events (Weistein, 1980; Aucote & Gold, 2005). Helweg-Larsen and Shepperd (2001) defined optimistic bias as the tendency for people to report that they are less likely than others to experience negative events and more likely than others to experience positive events.

An individual who is optimistically biased judges his or her own risk as less than the risk of others. Such errors in judgment of expecting others to be victims of misfortune but not themselves, and thinking themselves as invulnerable are labelled as unrealistic optimism by Weinstein (1980) based on his studies. Weistein (1980) conducted two studies that investigated the tendency of people to be unrealistically optimistic about future life events. In Study 1, 258 college students estimated how much their own chances of experiencing 42 events differed from the chances of their classmates. Overall, they rated their own chances to be above average for positive events and below average for negative events. In Study 2, students were asked to list the factors that they thought influenced their own chances of experiencing eight future events. Then such lists were read by a second group of students, the amount of unrealistic optimism shown by this second group for the same eight events

decreased significantly. This indicated people are unrealistically optimistic because they focus on factors that improve their own chances of achieving desirable outcomes and fail to realize that others may have just as many factors in their favour.

2.1.2   Measures of Optimism

Among a variety of methods for assessing the broader concept of optimism, the most common method in detecting the optimistic bias involves having participants estimate their likelihood of experiencing an event relative to an appropriate peer or peer group such as the average person of the same age and sex (Helweg-Larsen and Shepperd, 2001). These estimates are typically assessed either directly or indirectly (Weinstein and Klein 1996).

When optimistic bias is assessed directly, a participant makes a single comparative risk estimate of his or her likelihood of experiencing a future event relative to a target's likelihood of the same event. The target is usually "an average other" of the similar age and gender. When optimistic bias is assessed indirectly, the participant makes two estimates with one estimate of his or her own likelihood and a separate estimate of the target's likelihood of a future event. Subtracting the two estimates creates a comparative risk estimate. (Klein and Helweg-Larsen 2002)

Some evidence suggests that the direct method tends to produce greater bias than the indirect method and that fewer response choices on the scale result in greater bias than a greater number of response choices (Helweg-Larsen and Shepperd, 2001). Covey and Davies (2004) argue that the direct measure focuses respondents primarily on their own state rather than on the difference between themselves and their peers.

In our study, using survey data from the BHPS enable us to employ a vast sample from the real world rather than an experiment. However, the data from the BHPS does not provide information regarding respondents comparing their own risks to others. Therefore, we will focus on the optimistic view of individuals' own future events instead of their perception of risk compared to their peers, similar to the definitions of optimism in most studies in corporate and consumer finance. We will use 'financial expectation' and construct 'a priori optimism' and 'a posteriori optimism' using answers for financial expectation from the BHPS as the heuristics of optimism. In this way, the optimism in one's financial situation could be fully captured.

2.1.3   Determinants of Optimism

Helweg-Larsen and Shepperd (2001) examine determinants that affect the direction and size of the optimistic bias. In their paper, optimistic bias reflects a difference between two estimates: personal risk estimates and target risk estimates. They label moderators that affect people's personal estimates as personal risk moderators, and label moderators that affect people's estimates of the average person's risk as target risk moderators. They find that personal risk moderators - people experiencing a sad mood, dysphoria, state or trait anxiety, low control, or impending feedback are less optimistically biased than people not experiencing these states, traits, or situations. As for the target risk moderators, people were less optimistic when comparing themselves with a target that was psychologically close to them, similar, or specific than when comparing themselves with a target that was psychologically distant, dissimilar, or ambiguous. These conclusions are consistent with earlier findings by Johnson and Tversky (1983) who state if someone is in a good mood, they are more likely to be optimistic in the evaluation of information and investment. Good (bad) moods will increase (decrease) the likelihood of investing in risky assets, such as stocks.

2.1.4   Optimism in Financial Economics

Traditionally, economics theories have been developed on the basis of the 'rational man' assumption, i.e. when presented with a set of alternatives, individuals will select the option offering greatest utility to them (Manglik, 2006). However, over the years, academics have identified behavioural patterns that limit individuals' ability to make rational decisions when making financial decisions. Kahneman and Krueger (2006) point out that people often make inconsistent choices, fail to learn from experience and depart from rational economic models when it comes to maximizing utility. Brunnermeier and Parker (2005) suggest that people are more likely to remember better outcomes and they will perceive these outcomes as more likely in the future, leading to optimistic biases in beliefs.

The literature in this section provides evidence that individuals who work as business professionals or participate in the capital market consistently make incorrect assessments of probabilities, and particularly, individuals often overestimate the probability of good outcomes in financial decision-making (Heaton, 2002; Camerer and Lovallo, 1999; Rosen, 2003; Lee, Shleifer, and Thaler, 1991). We suspect that the optimistic bias that affects corporate managers, entrepreneurs, and asset managers are likely to influence normal households in a very similar way. As optimistic business and finance professionals choose risky investment opportunities, households with an optimistic expectation of their future financial situation might also make less prudent, more risky portfolio choices.

2.1.4.1 Corporate Finance

a)   Corporate Executives & Entrepreneurs

March and Shapira (1987) explore the relationship between the classical rational formation of risk taking and conceptions of risks held by corporate managers. They conclude that managers' decisions are affected by the way their attention is focused on critical performance targets and managers may overestimate the probability of success and underestimate the risk of a decision.

Heaton (2002) states managers are "optimistic" when they systematically overestimate the probability of good firm performance and believe capital markets undervalue their firm's risky securities therefore they may decline positive net present value projects that must be financed externally. Optimistic managers might also invest in negative net present value projects even when they are loyal to shareholders.

Hackbarth (2007) found that optimistic managers overestimate corporate assets' growth rate and underestimate the assets' riskiness. They tend to choose higher debt levels and issue new debt more often compared to otherwise identical unbiased managers. Since the managers believe that equity is more underpriced than debt, equity is the last resort for funding projects following internal capital and debt.

Camerer and Lovallo (1999) propose that optimistic bias in relative ability is one explanation for the high amount of business start ups and failures. They created an experimental setting with basic features of business entry situations. In the experiments, most subjects who enter think the total profit earned by all entrants will be negative, but their own profit will be positive. These findings are consistent with the prediction that optimistic bias leads to excessive business entry.

Cooper, Woo and Dunkelberg (1988) surveyed 2,994 new entrepreneurs. The respondents perceived the chances for success for other similar business as relatively good while the chances for their own business as extremely high. They find optimists are systematically associated with a number of characteristics. Male entrepreneurs are found to be more optimistic than female business owners. Entrepreneurs with less than a high school education as well as higher than high school education are both more optimistic than high school graduates. Those who had started their firms are more optimistic than those who inherited, purchased, or owned a franchised business.

Nofsinger (2005) argue that when social mood is high and more people are optimistic, some of these people will start businesses. When social mood is low and most people are pessimistic, thus fewer entrepreneurs have the confidence to start a business. Hence, the number of business starts reflects the level of social mood.

b)   Mergers

If a CEO is optimistic enough about his firm's future performance that he fails to reduce his personal exposure to company-specific risk[1], Malmendier and Tate (2005) classify him as overconfident. They find overconfident CEOs are more likely to conduct mergers than rational CEOs, because they overestimate the returns to their investment projects and view external funds as overly costly.

Mitchell and Mulherin (1996) study mergers and conclude that mergers occur in waves, and mergers cluster by industry within each wave. Nofsinger and Kim (2003) argue that merger

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[1]   Managers who hold options all the way to expiration (typically 10 years)

waves are due to the high social mood[1] that causes more CEOs to be optimistic. In other words, mergers waves are one result of a social mood cycle and increased optimism leads to more mergers.

Rosen (2003) examines the effects of mergers on bidding firms' stock prices. He finds evidence of merger momentum, i.e. bidder stock prices are more likely to increase when a merger is announced during merger waves or if the overall stock market is doing better. He connects manager optimism with investor optimism and states that investor optimism also affects the market reaction to a merger and merger waves might reflect swings in investor optimism as much as the conditions of the merging firms or the economy.

The literature examined in this section illustrates evidence that individuals often overestimate the probability of good outcomes in financial decision-making. As managers and entrepreneurs, who are influenced by optimism and have an optimistic view of future performance or growth of the business, decide on a risky business strategy, households with an optimistic expectation of their future financial situation might also make more risky portfolio choices.

2.1.4.2 Financial Markets

a)   Initial Public Offerings

Lowry (2003) finds that investor sentiment is one of the important determinants of IPO volume. Rajan and Servaes (1997) examine data on analyst for a sample of initial public offerings completed between 1975 and 1987. They find that analysts are optimistic about the

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[1] "Social mood" in this study is defined as "The general level of optimism/pessimism in society is reflected by the emotions of financial decision-makers" by Nofsinger (2005)

earnings potential and long term growth prospects of recent IPOs. More firms complete IPOs if analysts are particularly optimistic about the growth prospects of recent IPOs

Lowry and Schwert (2002) find that more firms go public after observing high initial IPO returns for other firms. They illustrate that as the mood improves, both investors and private firm owners become more optimistic. IPO initial returns will be high at a time of increased optimism. However, the resulting IPO issues will experience a time lag because it takes time for private firms to find an underwriter and go through the registration process with the Securities and Exchange Commission. If the social mood decreases quickly, some IPOs that are in the registration process will be cancelled. Therefore, IPO volume should increase gradually during times of optimism and decline sharply when optimism decreases.

b)   Asset Pricing

Lee, Shleifer, and Thaler (1991) examine the influence of investor sentiment on asset prices. They argue that fluctuations in discounts of closed-end funds are driven by changes in individual investor sentiment and closed-end fund discounts are a measure of the sentiment of individual investors. Closed-end funds frequently trade at a discount which is normally between 10-20% from net asset value (NAV). However, this discount can vary substantially over time. Individual investors are the most active type of investor in closed-end funds, and they also actively participate in small company stocks and IPOs. Lee et al. (1991) examine small firm returns, discounts, and IPO activity, and find them to be highly correlated. When sentiment investors are optimistic, they are willing to take more risk and buy stocks. Their buying influences closed-end fund prices, which decrease discounts. Their buying also moves small company stock prices and encourages investment banks to take more firms public.

Barberis, Shleifer and Vishny (1998) present a model of how investors form expectations of future earnings. Their model predicts that stock prices overreact to consistent patterns of good or bad news. After the announcements of series of good news, the investor becomes overly optimistic that future news announcements will also be good and hence overreacts, causing stock prices to increase. If subsequent news contradicts his optimism, the investor will achieve lower returns. Barberis et al. (1998) also predicts stock prices underreact to earnings announcements. They suggest that investors might use annual earnings numbers over five to seven years to estimate the growth rate in reality. If earnings have grown rapidly over the past five years, an investor might become over-optimistic about the future growth rates. Holding the estimated long-run growth rate of earnings constant, investors might underreact to the quarterly earnings announcement.

c)   Stock Market Bubbles

According to Nofsinger (2005), a high level of optimism in society implies more optimistic investors. Many investors will buy stocks, trade and respond to IPOs excessively. He points out that capital markets throughout history have experienced episodes of widespread elated speculation followed by steady or sometimes sharp declines. Usually, speculative bubbles are inflated by the high optimism of investors. The peak of this optimism is characterized by emotional decisions instead of rigorous evaluation. When rational evaluation indicates that stock prices have become too high, the emotion of optimism becomes a stronger influence in the decision-making process. Investors hold higher risk portfolios, buy more stocks, and become more active in trading. The stock market rises and eventually becomes overvalued, relative to historical averages. Eventually, this over optimistic mood begins to decline. The previous degree of optimism proves unfounded. As the optimistic bias fades, rational

evaluation becomes more influential. Prices are viewed as too high and investors stop buying. As a result, the stock market crashes. If social mood drops to a very low level, then pessimism will drive prices below historical averages. Thus, investor optimism/pessimism drives speculative asset bubbles and crashes.

The effect of optimism on financial markets has been examined from various perspectives in this section. Optimistic forecasts from financial analysts and an optimistic social mood encourage initial public offerings. Investors' optimism affects asset pricing and cause stock price over- and under-reaction. Eventually, when the level of optimism in society reaches a peak, stock prices are overpriced, thus causing market bubbles followed by crashes. However, the majority of these research studies do not focus on the investment behaviour of households but rather on the behaviour of financial professionals or the effects of aggregated level of investors' optimism. A study on optimism based on the household sector is omitted.

2.1.4.3 Household Financial Choice

a)   Consumer Expenditure

For household study, majority of the research tends to concentrate on the correlation between consumer sentiment and consumption (Kacperczyk and Kominek, 2002). Acemoglu and Scott (1994) and Carroll, Fuher and Wilcox (1994) show that increases in consumer sentiment are associated with increases in household expenditures. Optimism in society leads to economic activities that will be later measured as economic expansion (Nofsinger, 2005). Kacperczyk and Kominek (2002) construct a two-period model of an economy with two industries. Their model suggests that equilibria with higher levels of

sentiment (such as optimism) are characterized by higher economic growth, higher production growth and higher proportion of investments in industries. They also show empirically that changes in sentiment predict future economic growth using U.S. data. Specifically, sentiment has a significant positive impact on industry growth, aggregate economic growth as well as levels of investment in different industries. Their results show that while the impact of consumer sentiment on future growth indicators tends to last only for short periods (one to two quarters), the impact of investor sentiment is more enduring (up to four years).

b)   Household Portfolio Choice

The household sector is not only the primary participant on the buy side of the product market and sell side of the labour market, but also on the buy side of the financial market (Welch and Welch 2006). Therefore, a study on correlation between optimism and household portfolio choice should not be neglected. Tennen and Affleck (1987) claim that a potential drawback to optimism may be a greater tendency to choose risky portfolios. The reasoning is that if one has positive expectancies about the future, then there is little tendency to worry about the potentially negative consequences of a risky decision. Optimists might have a less powerful incentive to overcome their optimistic views and limit their risky decisions even though risky investments may lead to loss of wealth. According to Gollier (2005) positive thinking implies a mental manipulation of the objective probability distribution of assets returns. The negative effect of positive thinking is that this manipulation of beliefs is likely to affect the asset allocation of the investor. Yet no published empirical paper focuses explicitly on the relationship between optimistic expectation and household portfolio choices.

The only empirical paper addressing optimism and general individual economic choice is

Puri and Robinson (2007). Puri and Robinson (2007) study optimism and economic choices using the Survey of Consumer Finance (SCF). The survey does not ask respondents about optimism directly, but it asks respondents how long they expect to live. Puri and Robinson (2007) compare respondents' self-reported life expectancy to that implied by actuarial tables and use life expectancy miscalibration as their measure of optimism. They find that optimists work harder, expect to retire later, are more likely to own stocks and save more. They also find that moderate optimism correlates to reasonably sensible economic decisions while extreme optimism correlates to seemingly irrational decisions.

However, we believe optimism in different life domains or different decisions making processes may not be the same. In other words, if one is optimistic about her life expectancy and health, it doesn't necessary mean one is optimistic about her financial situation and will invest more in the capital market. Though Puri and Robinson (2007) claim their "measure of optimism correlates with generalized positive expectations about the economy ... correlates with the individual's positive expectations of future income growth", we believe that their measure would not fully capture the optimism in individuals' financial situation. It is possible that life expectancy miscalibration is independent from the economic cycle and remains relatively stable throughout the life time while investor optimism in investment decisions will change with the ups and downs of financial markets therefore leading to different financial decisions.

Therefore, our research will be different from Puri and Robinson (2007) in three aspects: measurement of optimism, research focus and data. Puri and Robinson (2007) use life expectancy miscalibration to measure individuals' optimism. However, we believe using life expectancy miscalibration as the measurement of optimism would not fully capture optimism in one's financial situation. Therefore, we develop three heuristics of optimism,

which are financial expectation, a priori optimism and a posteriori optimism, to measure the effect of financial optimism only. This study will focus on the effect of optimism on household portfolio choice instead of on a series of economic decisions and attitude toward life events as in Puri and Robinson (2007) whose study includes individuals' marriage decisions, retirement plans, and vocational choices. Focusing on only household portfolio choice is consistent with our heuristics for financial optimism since we believe it is more accurate to study the effect of optimism within each life domain. Moreover, this study will employ UK household data which has not been used before in similar studies and covers a longer period from 1995 to 2005 than Puri and Robinson (2007) who used US data from 1995 to 2001.

2.1.5   Summary

Previous published literature demonstrates evidence that individuals, including corporate managers and financial professionals, consistently overestimate the probability of good outcomes but under estimate the risk in financial decision-making. However, there is little evidence of optimism affecting household portfolio choice. We suspect normal households are also affected by optimism and optimism might lead to choices of risky portfolios. We will use three heuristics to measure financial optimism and eventually test the effect of optimism on portfolio choice at both individual and household level.

2.2 Demographic Determinants in Household Portfolio Choices

Demographics are the statistical characteristics of human populations. Studies have shown that a number of demographics such as age, gender, marital status, wealth, income, home and business ownership, occupation, and education level have an influence on individuals' portfolio choices (Morin and Suarez, 1983; Sunden and Surette, 1998; Cohn, Lewellen, Lease, and Schlarbaum, 1975; Heaton and Lucas, 2000; Giofré, 2009; Lusardi, 2003). Some of these demographics such as age represent the influence of life-cycle effects and the investor's life-cycle plays a prominent role in portfolio selection behaviour (Morin and Suarez, 1983).

Research on the effects of demographics on portfolio choice was based on samples drawn from various countries and these research findings are clear and statistically significant. The majority of research supports a positive relationship between risky asset ownership and wealth, income and education level, but a negative relationship between risky asset ownership and age. Female investors are less likely to invest in risky assets and marriage status affects individuals' portfolio choices. Ownership of businesses and house has a negative effect on risky asset holdings. Finance related occupation also leads to an increase of stock ownership. There are mixed results on whether health status affects portfolio choice.

In the following sections, we will categorize demographics into three sections - (1) Personal Characteristics; 2) Wealth and Income; and (3) Employment Profile. We will also provide a literature review on the effect of each of the researched demographic variables in the three sections. These demographic variables will be used as control variables in the analysis of this study to isolate the effect of a particular psychological factor - optimism, on portfolio

choice.

2.2.1 Personal Characteristics

Effects of personal demographics on household portfolio choices are well researched. We will use age, gender, marital status, ethnic group, household size, and health condition as control variables.

(a) Age

The effects of individuals' life-cycle play an important role in individuals' financial choices (Morin and Suarez, 1983). Current financial wealth is likely to vary over the investor's life-cycle along with changing financial needs (Leece, 1999). The Life-cycle Hypothesis assumed that households strive to maximize their utility of future consumption (Ando and Modigliani 1957). Life-cycle Hypothesis is based on the idea that people tailor their consumption patterns to their needs at different ages, limited only by the resources available over their lives (Deaton, 2005). The hypothesis suggests people borrow or live off endowments in the early years, save and pay off debt in mid life, and live off savings in retirement (Stevens, 2004). This theory has important applications in macroeconomics, such as national saving depends on the rate of growth of the economy, and aggregate saving is determined by economic as well as demographic factors including the age structure of the population and the life expectation (Deaton, 2005; Ando & Modigliani, 1957).

As age structure represents different stages of human life-cycle, its influences on individual portfolio choice are constantly investigated by researchers. Morin and Suarez (1983) conduct an empirical investigation of the demand for risky assets of individual Canadian households

using data from the 1970 Survey of Consumer Finances. Their results indicate that the investor's life-cycle plays a prominent role in portfolio selection behaviour with risk aversion increasing uniformly with age, as evidenced by the decreasing slope coefficients across age groups[1]. Particularly, in the low wealth group, the data suggest a pattern of increasing relative risk aversion. However, a slight decrease is found among wealthy households. They conclude that wealth remains as the most important variable but that investor life-cycle also plays a very important role.

Riley and Chow (1992) examine the hypothesized relationships between risk tolerance and various variables. Their findings indicate that risk aversion decreases with age but only up to a point. After age 65 (retirement), risk aversion increases significantly. Bakshi and Chen (1994) study the relationship between demographics and capital market returns as well as investments choices using annual economic data[2] for the period 1900-1990. They find a positive relationship between risk aversion and age. They also find an investor's asset mix changes with the life-cycle. When the population age, the aggregate demand for financial investments rises relatively compare to the demand for housing.

Viceira (2001) examines how retirement affects optimal portfolio choice and finds the optimal allocation to stocks is larger for employed investors than for retired investors. Increasing idiosyncratic labour income risk[3] raises investors' willingness to save and reduces their stock portfolio allocation towards the level of retired investors. His research shows that the optimal portfolio allocation to stocks is positively related to both expected labour income growth and expected retirement. Cocco, Gomes, and Maenhout (2005) find that the proportion of wealth invested in equities decreases with age. This is driven by the fact that their labour income

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[1] 5 age groups in total, including under 35 years of age, 35 to 44, 45 to 54, 55 to 64, and over 65 years of age
[2] This dataset include demographic data, historical housing prices, and data on capital market returns that are available from a number of data sources, such as S&P500 index and CITIBASE (1992)
[3] Risk of retirement for age or permanent disability reasons that is independent of the business cycle

profile is downward sloping. With an increase in age, they found an investor shifts his financial portfolio towards the risk-free asset. Cocco et al. (2005) claim their results support the investment advice given by popular finance books and financial counsellors, namely to shift the portfolio composition towards relatively safe assets as one ages.

Contrary to above findings, Wang and Hanna (1998) find decreasing risk aversion as people age by using 1983-89 panel of the Survey of Consumer Finances. Despite the different sample data those researchers were using, the contradictory findings are more likely to be the outcomes caused by different methodologies they employed. First, Morin and Suarez (1983) excluded housing from the definition of net worth while Wang and Hanna (1998) included the value of real estate as risky assets. Second, Wang and Hanna (1998) use a heteroscedastic Tobit model instead of Ordinary Least Squares regression to avoid heteroscedasticity because they believe the Tobit model is more suitable in handling censoring.

In this research, age will be used as a control variable and is defined as "age at date of interview". Age is expected to have a negative effect on investment in risky portfolios.

(b)   Gender

A number of studies investigate the gender differences in investment behaviour and have demonstrated that women invest their asset portfolios more conservatively than men, and they exhibit less financial risk-taking behaviour (Bajtelsmit & VanDerhei, 1997; Hinz, McCarthy, & Turner, 1997).

Bajtelsmit, Bernasek, and Jianakoplos (1999) estimate the coefficient of relative risk aversion based on the allocation of wealth into defined contribution pensions using data from the 1989

Survey of Consumer Finances. They find women are less likely than men to invest in risky assets such as stocks.

We will control gender effects of the respondent in this study. We expect males are more likely to invest in risky portfolios than females.

(c)   Marital Status

Cohn, Lewellen, Lease, and Schlarbaum (1975) find a negative correlation between risky asset ownership and marital status. Their analysis indicates that married individuals appear to invest smaller proportions of their portfolios in risky assets than do single individuals when other conditions, such as age, income, wealth, etc, being equal.

Riley and Chow (1992) find that individuals who have never married display a slightly lower risk aversion than married individual while widowed and separated individuals being the most risk averse among all three categories.

Bertocchi, Brunetti, & Torricelli (2009) find that single women in Italy have a lower propensity to invest in risky assets than married females and males based on data from the 1989-2006 Bank of Italy Survey of Household Income and Wealth. They find that towards the end of the sample period, a reduction in the gap between women with different family status was observed. This phenomenon can be explained by changes of women's perception of marriage - fewer women view marriage as a sort of safe asset. Their results suggest that the behaviour of women has been shaped by the transformation of the structure of family and society over the years.

Sunden and Surette (1998) examines whether workers differ systematically by gender in the allocation of assets in retirement plans by using data from the 1992 and 1995 Surveys of Consumer Finances (SCF). They find single women and married men are less likely than single men to choose a portfolio made up largely by stocks. Married women are more likely than single women to allocate assets in a portfolio consisting mainly bonds. They conclude that investment decisions seem to be driven by a combination of gender and marital status.

Lyons and Yilmazer (2006) investigate into married couples' investment behaviour by employing data from the 1995, 1998, and 2001 Survey of Consumer Finances (SCF). Their results show that married women who have more control over the financial resources in the household are less likely to invest in risky assets. Also, women who are married to relatively older men are less likely to take on risk with their portfolios. There is little evidence that the characteristics of the wife, such as age, education level and occupation, affect the husband's investment decisions.

We will categorize respondents who are married and living as couple into married group, who are never been married, widowed, divorced and separated into unmarried group. The effect of marital status on portfolio choice seems complicated and vague based on previous literatures, therefore it is hard to predict what impact this variable would have on portfolio choice in this research.

(d)   Ethnic Group

Soest and Kapetyn (2006) find in their American study that Hispanics and in particular, non-whites hold less financial and non-financial assets than others, while non-whites also have higher debts. However, the effect of ethnicity is not main focus in their study but this

finding suggests ethnicity might have some influence on household portfolio choices since it has effects on household financial conditions.

All the respondents will be grouped into white or non-white. Based on the indication of Soest and Kapetyn (2006), white respondents might have higher financial wealth and more likely to invest in risky assets but such effect might not be significant.

e)   Health Condition

Rosen and Wu (2003) analyze data from 1990s' Health and Retirement Study (HRS) and find that health is a significant predictor of both the probability of owning different types of financial assets and the share of financial wealth held in each asset category. Poor health may influence an individual's marginal utility of consumption, her degree of risk aversion, and the variability of her labour income. Through these channels poor health is associated with a smaller share of financial wealth held in risky assets and a larger share in safe assets. However, Love and Smith (2007) question the connection between investor health condition and portfolio choice. By analysing data in newer waves of the HRS compared to Rosen and Wu (2003), Love and Smith (2007) find there is no statistically significant relationship between any of their health measures and household portfolio decisions after accounting adequately for the effects of unobserved heterogeneity. They suggest that the empirical relationship between health and portfolio choice is far less clear than previous studies conclude.

Health status over the last 12 months before the interview will be controlled. The answer of "excellent, good, fair" will be considered as healthy and "poor or very poor" will be taken as unhealthy. We expect health has a positive impact on risky asset holdings in this research.

f)   Household Size

In the analysis of determinants for the percentage of total assets invested in risky assets, family size is the second most important determinant next to wealth for households with less than $175,000 in assets according to Cohn, Lewellen, Lease, and Schlarbaum (1975). They also reveal that households with only one member invest 21% more funds in risky assets than households with more than one member.

The number of persons in the household when the interview took place will be controlled. It is not clear if household size would have a negative effect on choosing risky portfolios.

2.2.2   Wealth and Income

a)   Wealth

Cass and Stiglitz (1972) have analyzed theoretically the effects of changes in wealth on risk-bearing behaviour in the presence of multiple risky assets. Empirical results yield by Cohn, Lewellen, Lease, and Schlarbaum (1975) proved that wealth is the most important determinant of household risky asset ownership among all demographics. As wealth increases, relative risk aversion decreases and the proportion of assets invested in risky instruments increases. Furthermore, this effect seems to hold throughout the entire range of wealth from households with total assets under $100,000 to over $350,000. Alessie, Hochguertel, and Soest (2000) find a strong positive relationship between wealth and ownership of risky assets, which is consistent with Cohn, et al. (1975).

Morin and Suarez (1983) also find evidence that that wealth remains as the most important

variable in determining household risky assets holdings. An increasing in relative holdings of risky assets with wealth level is well supported by the Canadian data. The conclusion holds whether wealth is defined exclusive of housing or whether housing is defined as a riskless asset. The only exception to this finding is that when attention is restricted to the lower wealth[1] population, a negative relationship is found between relative risky asset holdings and wealth. One explanation for this result is that the absence of any asset data on pension funds, life insurance, and other social benefits of a contractual nature is likely to be more relevant in the lower wealth groups and such exclusion of contractual savings data could lead to a biased result.

Peress (2004) investigates wealth effect from a perspective of information. He argues that cost of information deters less wealthy household from stock trading. He demonstrates that information generates increasing stock returns, decreasing absolute risk aversion and wealthier households are more likely to be able to afford costly information, therefore stocks are less risky for wealthier households and they invest a larger fraction of their wealth in risky assets. Ait-Sahalia, Parker, and Yogo (2004) also find that low net worth households do not participate in the stock market.

We will use household total savings, total investments, and house value as wealth controls. It is expected higher the financial wealth an individual has higher the investment in her risky assets.

b)   Income

According to Cohn et al (1975), regression results show that the risky-asset fraction of the

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[1] $1-12,500

portfolio is positively correlated with income. Brown and Taylor (2005) find that there is a positive association between financial assets and wage growth with this relationship becoming more pronounced over time. Palme, Sundén, and Söderlind (2005) show that the risk level of Swedish households' portfolio is positively related to income. But the relationship is actually somewhat U-shaped: participants with the lowest income take on as much risk as those with the highest income, which indicate that they are not diversifying their overall portfolio.

Cardak and Wilkins (2009) study various risk factors, such as labour income and health risk, and their influence on household asset allocation by using data collected by the Household, Income and Labour Dynamics in Australia (HILDA) survey. They measured labour income risk by the coefficient of variation of household labour income over the five years following the initial survey. This measurement can account for the potential unobserved source of labour income uncertainty such as family structure changes. As a result, they find households reduce risky assets as a proportion of household financial asset portfolio when they face greater labour income risks which could be rising from poor health condition.

We will include level of individual income and household income of the respondent as income controls. They expect a positive relationship between income and investment in risky portfolios.

c)   Home Ownership

The majority of published research has documented a negative relationship between the ownership of home and risky assets ownership due to liquidity constraint.

Yao and Zhang (2005) find housing choice has a significant impact on portfolio choice. Their

results show that investors owning a house hold a lower equity proportion in their net worth which includes bonds, stocks, and home equity. This reflects the substitution effect of home equity for risky stocks. Furthermore, following the policy of always renting leads investors to overweigh in stocks, while following the policy of always owning a house causes investors to underweight in stocks. Cocco (2005) concludes that due to the large investment needed for housing, younger investors have limited financial wealth to invest, which reduces their equity market participation. Shum and Faig (2006) also find that stock ownership is negatively correlated with holdings and willingness of investing in financial and non-financial assets, such as such as invest in own home.

Whether a respondent has home ownership, the value and purchase of her property and the total amount of her outstanding mortgage on all the property she owns are our control variables. A negative effect of home ownership on investment in risky asset is expected.

2.2.3   Employment Profile

a)   Business Ownership

Faig and Shum (2002) argue that entrepreneurs invest less in risky assets because of liquidity constraint. This indicates that entrepreneurs may choose a safe financial portfolio to ensure a smooth continuation of their business projects. Individuals are more risk averse in their portfolio choice when financial assets are used to fund projects that have a substantial penalty for discontinuation or under investing in the final stages. In other words, once an individual has committed an initial investment in a project, he faces unfavourable consequences due to the lack of liquidity if the project is either abandoned or is continued on an inappropriate scale. Faig and Shum (2002) find that personal projects, such as a private business, have negative

influence on risky assets holdings. Similar to Heaton and Lucas (2000), they find that households that are saving to invest in their own businesses have significantly safer financial portfolios. However Heaton and Lucas (2000) explain the reason of entrepreneurs holding safe portfolios is to diversify the idiosyncratic risk of their businesses.

We will look into whether the respondent is self-employed to control the effect of business ownership. It is possible business ownership has a negative impact on risky portfolio holdings.

b)   Occupation

Christiansen, Joensen, and Rangvid (2007) apply detailed education information of individuals and find economists have a high probability of investing in stocks due to informational advantages among the Danish population. One potential explanation to this phenomenon is that some investors are better able to gather and understand information about investment opportunities and stock markets than others; therefore their effective costs of stock market participation are lower. As a result, they will have a higher probability of participating in the stock market.

In this paper, the effects of respondents with finance or economy related occupations will be isolated. Whether the respondent is unemployed or having a permanent contract will be used as employment controls. We expect people who have finance related occupation are more likely to invest in risky assets.

c)   Education

Wang and Hanna (1998) find that higher the education the higher risky asset proportion among investors' wealth. Cohn et al (1975) also claim higher education level leads to higher portion of risky asset holdings. Riley and Chow (1992) find asset allocation to equity tends to increase with education. However, they suggest that education, income and wealth are all highly correlated, so the positive relationship between education and risky asset allocation may be a function of wealth rather than education. Lusardi (2003) finds low-education families hold neither high returns assets (stocks, IRAs, business equity) nor basic assets such as checking accounts. The effects of education might be due to less educated individuals have worse numeracy and knowledge of inflation and interest or knowledge about financial market products. The lack of understanding of economics and finance is a significant deterrent to stock ownership (Rooij, Lusardi and Alessie, 2007).

To control for education the respondents will be divided into two groups: individuals with and without a first degree or above. It is expected in this research that highly educated people are more likely to invest in risky portfolios since they have a better knowledge and understanding of the financial market and investment tools.

2.2.4   Summary

As we can see from the literature in section 2.2, demographics jointly affects household portfolio choices. The relationship between demographics and portfolio choice are relatively well researched. Research on the effects of demographics on portfolio choice was based on samples drawn from various countries and these research findings are statistically significant. The majority of research supports a positive relationship between risky assets ownership and income, wealth and education level but a negative relationship with age. Female investors are less likely to invest in risky assets and marriage status affects investors' portfolio choices.

Business and home ownership home has a negative effect on risky assets holdings. In this research, the effects of demographic variables are expected to be consistent with findings in previous literature.

By employing data from the British Household Panel Survey, Leece (1999) reveals joint influences of demographic and wealth related variables including age, income, property ownership, and saving patterns on risky assets holdings. Using the same dataset, we plan to control the effects of such demographic variables in this analysis. Age, gender, marital status, ethnic group, household size, health condition, wealth, income, home and business ownership, occupation, and education level are going to be used as control variables in our research so we can isolate the effect of optimism on household portfolio choice.

3. Research Hypothesis

Previously published literature discussed in chapter 2 demonstrated that optimism affects people's decision making. Individuals, including corporate managers and financial professionals, consistently overestimate the probability of positive outcomes and therefore decide on risky business strategies or choose risky investment opportunities. There is a wide spectrum of research on optimism in corporate finance to capital markets. However, there is little research on the role of optimism play in household portfolio choice. We believe normal households are also affected by optimism, which may lead to choices of risky portfolios and develop a research hypothesis as follows.

Hypothesis: Individuals who are optimistic about their financial situation prefer to invest in riskier portfolios.

We develop three heuristics to measure financial optimism, namely financial expectation, a priori optimism and a posteriori optimism. These heuristics of optimism and the definitions of portfolio choice will be given in details in the data and methodology chapter.

4. Data and Methodology

4.1 Data

We investigate the effect of optimism on portfolio choice at the individual and household level in the UK using the British Household Panel Survey (BHPS). The BHPS has followed the same representative sample of households in the UK population from 1991 to present. About 11,000 individuals from 5,500 households drawn from 250 areas of Great Britain are interviewed each year as part of the survey. More than six millions of observations generated from the survey that are relevant and are employed in this study. The survey is conducted by the Institute for Social & Economic Research and is available through the UK Data Archive at the University of Essex. Information about personal debt and investments is only available from the 1995, 2000, and 2005 waves of the BHPS as respondents were asked about their investment portfolio only in these three waves. Most of the demographic variables are measured on an annual basis.

4.2 Definitions of Optimism

In psychology, optimistic bias is defined as people's tendency to believe that their own risks are less than the risks of their peers (Weinstein and Lyon, 1999). This definition is based on miscalibration of probabilities generated by respondents when comparing themselves to peers under experimental conditions. In our study, using survey data give us the advantages of employing a vast sample and real world situations rather than an artificial experiment. However, the data from the BHPS does not provide information regarding respondents

comparing their own risks to others. Therefore, we will not focus on individuals' perception of risk compared to their peers, but use questions related to the optimistic view of their own future events to develop the heuristics to measure optimism, similar to the following definition of optimism in most studies in corporate and consumer finance.

In finance, irrational optimism refers to individuals often overestimate the probability of good outcomes in financial decision-making (Heaton, 2002; Camerer and Lovallo, 1999; Rosen, 2003; Lee, Shleifer, and Thaler, 1991). In studying the effect of optimism on household portfolio choice, Puri and Robinson (2007) use life expectancy miscalibration as a measure of optimism for each individual in the sample. But we suspect that optimism in different life domains or different decisions making processes may not be the same. If one is optimistic about her life expectancy and health, it doesn't necessarily mean that she is optimistic about her financial situation and will invest more in the capital market. Though Puri and Robinson (2007) claim their measure of optimism correlates with positive beliefs about future economic conditions, we suspect that Puri and Robinson's (2007) measure might not fully capture investor optimism on future financial situation but rather is a heuristic of general optimism in all decision making processes. It is likely that investor optimism in investment decisions will change with movements in financial markets and general economy but life expectancy miscalibration might be independent from the economic cycle and remain relatively stable throughout the life time. Further research clearly needs to be conducted to evaluate the efficacy of general optimism heuristics in measuring optimism in specific finance related decision making processes.

4.2.1   Heuristics of Optimism

We use three heuristics of optimism all of which directly measures financial optimism and we

do not suggest that these are measures of optimism in decision making in other domains or events although this would be an interesting line of future research.

4.2.1.1 Financial Expectation

In the BHPS, respondents have been asked the following two questions regarding their opinion on the financial situation every year since 1991.

Question 1: Looking ahead, how do you think you will be financially <u>a year from now</u>, will you be <u>Better off</u>, <u>worse off</u> than you are now, Or about the same?

Question 2: Would you say that you yourself are <u>Better off</u>, or <u>worse off</u> financially than you were <u>a year ago</u>, Or about the same?

We develop the heuristics of optimism based on the above questions. If t is the current year, we denote C_{t-1}^t as the change in financial situation during the past year. As the respondent has received these C_{t-1}^t historical returns in the past year, we assume C_{t-1}^t as the rational expectation of returns in year t. The respondent's financial expectation for the year ahead made in the current year t is denoted as E_t^{t+1}. Financial expectation (E_t^{t+1}) is our first heuristic of optimism.

4.2.1.2 A Priori Optimism

Based on the above assumption that C_{t-1}^t as the rational expectation of returns in year t, and optimism being the overestimation of probabilities of a positive outcome, *a priori optimism*, denoted as O_t^-, defined as follows,

$$O_t^- = E_t^{t+1} - C_{t-1}^t \qquad \text{(Equation 1)}$$

This definition is a priori as respondent's opinion for E_t^{t+1} is gathered before information about year *t* has been exposed. A priori optimism indicates an investor is either irrationally optimistic (pessimistic) since she disregards her historical return (C_{t-1}^t), or she is rationally optimistic (pessimistic) if she has information that is not revealed in the survey therefore not known to us, or it could represent a mixture of both scenarios. A positive score of O_t^- indicates an investor is optimistic (irrationally or rationally), a negative score means she is pessimistic (irrationally or rationally), and a zero score implies she is a neutral respondent.

4.2.1.3 A Posteriori Optimism

A posteriori optimism, denoted as O_t^+, is our optimism heuristic about year *t* after information from year *t* has been exposed (with C_t^{t+1} gathered in year *t+1*).

$$O_t^+ = E_t^{t+1} - C_t^{t+1} \qquad \text{(Equation 2)}$$

A posteriori optimism represents irrational optimism or the effect of unexpected information exposed in year *t*. A posteriori optimism implies an investor is either irrationally optimistic (pessimistic) since her actual return (C_t^{t+1}) is smaller (greater) than her expected return (E_t^{t+1}), or/and she is rationally optimistic (pessimistic) if E_t^{t+1} is rational expectation based on the information she had at the beginning of year *t* and the difference between E_t^{t+1} and C_t^{t+1} is in fact due to the effect of unexpected information exposed during year *t*. A positive score of O_t^+ indicates an investor is optimistic (irrationally or rationally), a negative score means she is pessimistic (irrationally or rationally), and a zero score implies she is a neutral

respondent.

4.2.2 Frequency Distribution of Heuristics of Optimism

4.2.2.1 Financial Expectation

Financial expectation is one of our heuristics for optimism. We use an index to represent financial expectation (E_t^{t+1}) given in Question 1, (Looking ahead, how do you think you will be financially <u>a year from now</u>, will you be <u>Better off</u>, <u>worse off</u> than you are now, Or about the same?). A respondent's financial expectation is coded as 2 if his/her answer to Question 1 is 'Better off', and 1 if the answer is 'About the same' or 'Don't know', and coded as 0 if he/she answers 'Worse off'.

Similarly to Question 1, we use an index to represent change in financial situation (C_{t-1}^t) given in Question 2 (Would you say that you yourself are <u>Better off</u>, or <u>worse off</u> financially than you were <u>a year ago</u>, Or about the same?). A respondent's change in financial situation is coded as 2 if his/her answer to Question 2 is 'Better off', and 1 if the answer is 'About the same' or 'Don't know', and coded as 0 if he/she answers 'Worse off'.

[Insert Table 1 here]

Just over a quarter of the sample, 25.8% believe they will be financially better off for the next year throughout 17 year survey period. The majority (64.4%) think their financial situation remains about the same and 9.8% expect to be financially worse off. About the same percentage of people answer 'better off' when predicting and evaluating financial situation (25.8% and 26.0%) in a certain year. However, more than double the percentage of the

respondents think they are financially worse off (21.6%) compared to a year ago than the percentage of respondents expect to be worse off for the next year (9.8%), which means people seem a lot less pessimistic when they look forward to the next year's future financial situation than when they evaluate the past year. Year 2000 sees the highest percentage of people believing they will be financially better off for the year ahead compared to year 1995 and year 2005.

4.2.2.2 A Priori Optimism

A priori optimism is our second heuristic of optimism defined as the difference between financial expectation for the year ahead and the actual financial changes for the past year $(O_t^- = E_t^{t+1} - C_{t-1}^t)$.

A positive value of a priori optimism means the respondent is optimistic either rationally or irrationally about next year's financial situation while a negative value means the respondent is pessimistic. A value equals to zero indicates the respondent is neutral in her attitude towards next year's financial situation.

[Insert Table 2 here]

From 1991 to 2007, 24.4% of respondents are optimistic while 17.9% are pessimistic, which means there are 6.5% more optimists than pessimists if we use a priori optimism as our measure. The majority (57.7%) remains neutral. Among optimistic respondents, 6.8% believe their financial situation for the year ahead will be better off but their perception of change in financial situation for the past year is worse off. 17.6% think they are going to be better off in the next year while they think their financial situation remains the same compared to a year

ago, or they think they will be about the same financially for the next year while in the past year they become worse off. The percentage of respondents who have a positive score for a priori optimism remain constant throughout the wave 1995, 2000, and 2005.

4.2.2.3 A Posteriori Optimism

A posteriori optimism is our third heuristic of optimism defined as the difference between financial expectation for the year ahead and the actual financial changes for that year $(O_t^+ = E_t^{t+1} - C_t^{t+1})$.

A positive value of a posteriori optimism means the respondent is optimistic either rationally or irrationally about next year's financial situation while a negative value means the respondent is pessimistic. A value equals to zero indicates the respondent is neutral in her attitude towards next year's financial situation.

[Insert Table 3 here]

From 1991 to 2007, 25.5% of respondents are optimistic while 17.2% are pessimistic. There are 8.5% more optimists than pessimists if we use a posteriori optimism as our measure. The majority (57.3%) remains neutral. Among optimistic respondents, 4.8% believe their financial situation for the year ahead will be better off but their perception of change in financial situation for the past year is worse off. 20.7% think they are going to be better off in the next year while they think their financial situation remains the same compared to a year ago, or they will be about the same for the next year while in the past year they become worse off financially. The percentage of respondents who have a positive score for a posteriori optimism remain constant throughout the wave 1995, 2000, and 2005.

4.3 Definitions of Portfolio Choice

4.3.1 Investment Choice

Cohn et al. (1975) state that the designation of risk-free and risky assets is a delicate matter. The important question, however, is not so much whether an asset is riskless, but whether the individual in his portfolio planning regards the stream of benefits the asset provides as free of relevant uncertainty. In this study, savings accounts and checking accounts are treated as risk-free assets while stocks and investments in funds are treated as risky assets following the existing literature (Riley and Chow, 1992; Viceira, 2001; Cocco et al., 2005; Puri and Robinson, 2007). However, the treatment of bonds and residential properties could be tricky as scholars vary in their opinions over the classification of bonds and properties.

Government and corporate bonds are regarded as riskless assets by Cohn et al. (1975)[1] while Friend and Blume (1975) and Morin and Suarez (1983) considered bonds as risky assets. Based on the principals of macroeconomics, bonds carry credit risk which is the risk that the issuer will default or be unable to make further principal or interest payments. Affected by the current credit crunch and economic downturn which could easily extend into 2011, the default rate of U.S. corporate bonds could soar to seven times higher compare to 2005 to 16% by the end of 2009[2] whilst the default rate in the Europe is expected to research 14.7% this year[3]. As for US government bonds, although no defaults occurred after the credit crunch, the cost of insuring against a US government default has risen by 25 times in just over a year. This is due to the increase in the credit risk component of US Treasuries

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[1] Cohn et al. (1975) treated government bonds and corporate bonds as riskless and risky assets respectively, in other words, they have two definitions for risky assets.
[2] http://seekingalpha.com/article/121141-default-rates-on-corporate-bonds-next-phase-of-the-credit-crunch
[3] http://www.bloomberg.com/apps/news?pid=20601090&sid=aVGhdWg8VN0k

and similar trends have been evident in the UK and German government bond markets.[1] Based on these factors, government and corporate bonds will be regarded as risky assets in this study.

As for the classification of properties, Graves (1973) and Cohn et al. (1975) classify housing as a riskless asset because of the low uncertainty of the real stream of benefits it provides but Friend and Blume (1975) regard properties as risky assets. The number of homes in the UK repossessed by lenders rose last year by 54% to 40,000 and this figure is expected to reach about 75,000 this year in 2009.[2] Under the current property market environment, since the number of unemployed people is reaching over two million[3] homeowners are more likely to default on their mortgage payment and consequently lose their homes and initial deposits. We believe under the current economic condition, properties could either be risk-free or risky assets for an investor depending on her planning horizon. Because there is not enough information indicating each investor's planning horizon in the survey or predicting the probability of default on mortgage, we are not able to decide if property is risky or risk-free asset for individuals but only treat property as a component of individuals' total wealth. Like in Cohn et al. (1975), two definitions of wealth will be used, namely total wealth (TW) which includes savings (SAV), investment (INV) and current value of personal residence and possessions (CHV), and financial wealth (FW) which includes only savings and investment.

The BHPS contains questions regarding how much savings[4] (SAV) and investment[5] (INV) an individual has in 1995, 2000, and 2005 (See Question 3, Question 4, and Question 5 in

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[1] http://www.moneyweek.com/investments/how-safe-are-government-bonds-13986.aspx
[2] http://news.bbc.co.uk/1/hi/business/7900854.stm
[3] http://news.bbc.co.uk/1/hi/business/7947766.stm
[4] Include savings with a bank, post office or building society, national savings bank (post office), TESSA only ISA or Cash ISA
[5] Include shares (UK or foreign), stocks and shares ISA or PEP, premium bonds, unit trusts/investment trusts, national savings bonds, national savings certificates, and other investments such as gilts, government or company securities.

Appendix 1).

Risk-free portfolios

·   The ratio of risk-free assets to financial wealth:

$SAV/FW = Savings / (savings + investment)$ (Equation 3)

·   The amount of total savings:

$SAV = Savings$ (Equation 4)

·   The ratio of risk-free assets to total wealth:

$SAV/TW = Savings / (savings + investment + current estimated home value)$

(Equation 5)

Risky portfolios

·   The ratio of risky assets to financial wealth:

$INV/FW = Investment / (savings + investment)$ (Equation 6)

·   The amount of total investment:

$INV = Investment$ (Equation 7)

·   The ratio of risky assets to total wealth:

$INV/TW = Investment / (savings + investment + current estimated home value)$

(Equation 8)

4.3.2   Debt Choice

Debt was not treated as a part of portfolio choice in the previous literature (Cohn et al., 1975; Lee and Hanna, 1995; Guiso et al., 2004; Cocco et al., 2005). However, Morin and Suarez (1983) considered debt as a component in calculating an individual's net worth. They also argue that as household wealth increases, acquisition of risky assets is dominated by reduction of debt and mortgage. In the UK, the amount of debt borrowed by individuals and

households has mounted to 16% of gross domestic product GDP due to the massive increase of the number of credit cards available and the rise of a range of financial institutions offering unsecured loans (Brown, Garino and Taylor, et al. 2005). The choice of borrowing unsecured debt indicates the level of risk preference of the household (Brown, Garino and Simmons, et al. 2008). Brown et al. (2008) find that higher the level of risk preference more unsecured debt a household would borrow. Therefore in this study, the effect of optimism on unsecured debt borrowing and mortgage taking will be investigated as debt are indicators of individuals' risk preference.

The BHPS contains questions regarding how much personal debt an individual has in 1995, 2000, and 2005 as well as how much mortgage on all properties an individual owned since 1993. Unsecured personal debt (PD) is defined as debt a person owns apart from mortgages (See Question 6 in Appendix 1). Total debt (TD) is defined as the total amount of unsecured personal debt and outstanding mortgage (MG). The following expressions are used to measure personal indebtedness.

- Level of unsecured personal debt:

    PD = Personal debt (Equation 9)

- Ratio of unsecured personal debt to total debt:

    PD/TD = Personal debt / (personal debt + mortgage outstanding) (Equation 10)

- Ratio of mortgage to total wealth:

    MG/TW = Mortgage / (savings + investment + current estimated home value)

    (Equation 11)

4.4 Descriptive Statistics for Optimism, Portfolio Choice, and Demographic Variables

In this section, descriptive statistics are provided to observe demographic characteristics of all

the individuals in the household and the head of the household in the BHPS sample. Statistics for heuristics of optimism and portfolio choices are also provided. Descriptive statistics for individuals who are interviewed in 1995, 2000, and 2005 are displayed in Appendix 2, Appendix 3, and Appendix 4 respectively.

[Insert Table 4 here]

As shown in Table 4, the average score for all three optimism heuristics of the sample are 1.16, 0.12, and 0.12 respectively. These three scores indicate that the respondents on average are optimistic. A priori optimism has the highest standard deviation suggesting a priori optimism is the most volatile measure among the three heuristics.

[Insert Table 5 here]

Table 5 shows that average savings is £3,722 for individuals and £4,394 for the head of the household. Savings takes up 76% of total financial wealth and 14% of total wealth for individuals. For the head of the household, 72% of financial wealth and 17% of total wealth are made up by savings.

[Insert Table 6 here]

In Table 6, the average investment for individuals is £3,366 and £4,393 for the head of the household. Investment constitutes 24% of total financial wealth and 4% of total wealth for individuals. As for the head of the household, investment makes up 28% of financial wealth and 5% of total wealth. The standard deviation for individual investment is 20214, which indicates the amount of investment varies largely among individuals.

[Insert Table 7 here]

Average amount of unsecured debt of all individuals is £1,378 and the head of the household borrow even more, £1,533. Unsecured debt comprises 31% of total debt borrowing for individuals and 35% for household heads. Mortgage makes up 68% of an individual's total wealth.

[Insert Table 8 here]

Table 8 shows us that among personal characteristics, the average age of household heads is 50.6 and 67% of the head of the household is male compare to 45.1 years old and 46% being male on average for the average of all the individuals in the sample. 64% of the respondent are married or living as a couple. 95% of the respondents are white and 90% of them think they have been healthy during the past year. The average household size is 2.87.

The average financial wealth for all individuals is £7,089 and the average of total wealth is £103,127. Average annual income is £11,627 and annual household income is £26,488. These income figures include both working and non-working respondents. 71% of the sample have owned their house or bought their property on a mortgage. The mean of the current home value is approximately £133,705. Average mortgage is £54,060.

As for the employment profile of the respondents, 10% of them have their own business. 5% have an occupation that is finance or business related. 52% have permanent contract while 4% being unemployed. 32% of the respondents have a first degree or above.

4.5 Methodology

Based on our literature survey, our definitions of optimism and portfolio choices, and preliminary results we obtained from section 4.4, we develop the regression models for further analysis in this section.

4.5.1   General Model

We have discussed the published literature in Chapter 2 which demonstrated that optimism affects people's decision making. Individuals, including corporate managers and financial professionals, consistently overestimate the probability of positive outcomes and therefore decide on risky business strategy or choose risky investment opportunities. In this research, we aim at unveiling the effect of optimism on normal individuals' portfolio choice. We also discussed in Chapter 2 that the relationship between demographics and household portfolio choice are relatively well researched and these demographics are demonstrated to have effect on portfolio choice. We believe that optimism and demographics jointly influence on individual and household portfolio choice, therefore, we develop our general model for portfolio choice as follows,

$$Porfolio\ Choice = f\ (Optimism) + f(Demographics) \qquad \text{(Equation 12)}$$

4.5.2   Estimating Equations

Based on our general model for household portfolio choice above, we develop the following estimating equations for the regression analysis in Chapter 5. The definitions of portfolio choices in section 4.3 are used as dependent variables while optimism and demographics are

independent variables.

Risk-free Portfolios

$$SAV/FW = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 13)}$$

$$Ln\,(SAV) = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 14)}$$

$$SAV/TW = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 15)}$$

Risky Portfolios

$$INV/FW = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 16)}$$

$$Ln\,(INV) = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 17)}$$

$$INV/TW = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 18)}$$

Debt

$$Ln\,(PD) = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 19)}$$

$$PD/TD = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 20)}$$

$$MG/TW = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i \, Demographics_i \qquad \text{(Equation 21)}$$

Where the following are used as demographic variables:

$Demographics_1$	Age
$Demographics_2$	Male
$Demographics_3$	Married
$Demographics_4$	White
$Demographics_5$	Healthy
$Demographics_6$	Household size

$Demographics_7$	Financial wealth
$Demographics_8$	Annual income
$Demographics_9$	Annual household income
$Demographics_{10}$	Home ownership
$Demographics_{11}$	Home purchase price
$Demographics_{12}$	Current home value
$Demographics_{13}$	Mortgage outstanding
$Demographics_{14}$	Business ownership
$Demographics_{15}$	Occupation
$Demographics_{16}$	Permanent contract
$Demographics_{17}$	Unemployed
$Demographics_{18}$	Unemployed a year ago
$Demographics_{19}$	Education

4.6 Summary

In Chapter 4, we first developed the three heuristics to measure optimism: financial expectation, a priori optimism, and a posteriori optimism in this study. The heuristics of optimism capture financial optimism among individuals of the BHPS and have never been used before in other similar studies. By looking at the frequency distribution of the heuristics of optimism, we find the respondents on average are optimistic for all three heuristics. Then we defined risk-free portfolio, risky portfolio, and different choices of debt borrowing.

By analysing descriptive statistics, we find that the average financial wealth for all individuals is £7,089 and the average of total wealth is £103,127. Savings takes up 76% of total financial wealth and 14% of total wealth for individuals, while investment constitutes 24% of total financial wealth and 4% of total wealth for individuals. Average amount of unsecured debt of all individuals is £1,378 and the head of the household borrow even more, £1,533.

At the end of this chapter, we developed our general model as optimism and demographic variables jointly affect individual portfolio choices. Nine estimating equations for risk-free portfolios, risky portfolios, and debt choices are prepared for the regression analysis in the next chapter.

5. Findings

In Chapter 5, we first investigate the profile of optimists and compare the profile of optimists with pessimists and neutral respondents. Then we carry out regression analysis to estimate the coefficients of optimism in order to measure the magnitude of the effect of optimism on individual portfolio choice for all individuals. Different definitions of portfolio choices are used as dependent variables. At last, we run the regression on the head of the household instead of on all individuals in order to check the robustness of the effect of optimism.

5.1 Profile of Optimists

In this section, comparisons are carried out to distinguish the difference in characteristics among optimists, pessimists and neutral respondents. Student's *t*-test is used to examine the significance of these differences.

5.1.1   Profile of Optimists

We first selected people who think they are going to be financially better off for the year ahead and whose a priori optimism or a posteriori optimism score is positive. Then we display the average value for the portfolio choices and demographics of the optimists in Table 9 in order to observe the profile of optimistic investors.

[Insert Table 9 here]

As shown in Table 9, if we only look at a priori optimism as the measure of optimism to observe the profile of optimists, the average savings for optimists is £2,868, the average investment is £2,749, and the average unsecured debt they borrow is £1,990. An average optimist is 40.63 years old with 3 people being in her household. Her total wealth is £95,492 with annual income of £11,630 and annual household income of £26,100. The value of the property she owns is £131,421 and she still has a mortgage of £55,831. As for the employment profile of the optimists, 11% of them have business ownership, 54% have permanent contracts, and 36% have first degree or above, while 8% are unemployed.

After looking at a general profile of optimists in this section, we examine the difference between the profile of optimists, pessimists and neutral respondents by using three heuristics of optimism respectively in the next section.

5.1.2   Comparison between Optimist, Pessimists and Neutral Respondents

In Table 10, the sample has been divided to three groups according to the respondents' answer to Question 1 (Looking ahead, how do you think you will be financially <u>a year from now</u>, will you be <u>Better off</u>, <u>worse off</u> than you are now, Or about the same?) in order to analyse whether there are significant differences in respondents' demographic characteristics and wealth level among those who have optimistic financial expectation, pessimistic expectation, and a neutral expectation for the year ahead.

[Insert Table 10 here]

The results in Table 10 show that people who have optimistic financial expectation are significantly younger, more likely being male, have higher educational qualifications, more

likely to have business ownership, borrow more personal debt and take on higher mortgage than people with neutral or pessimistic financial expectation. Interestingly optimistic respondents have less savings (£2,475 for optimist vs. £5,583 for pessimists) and investment (£2,518 for optimist vs. £3,911 for pessimists) but higher unsecured debt (£2,338 for optimist vs. £1,207 for pessimists) and higher average unemployment rate (7% for optimist vs. 3% for pessimists) than pessimistic respondents. We suggest that the smaller amount of financial wealth of optimists is probably due to the fact that optimists (34.41 years old) in the sample is much younger than pessimistic ones (48.8 years old) therefore optimists have accumulated lower wealth on average. As for the higher unemployment rate among optimistic respondents, this might reflect the irrational aspect of being optimistic. It is understandable that people who are unemployed and have very little income may perceive themselves as already at the depths of their financial situation, do not think or are not willing to think their finances are going to be even worse for the next year and aspire and hope for a better future. Optimists also have significantly higher business ownership than non-optimists. The results in Table 10 are almost all significant amongst our comparisons which indicate people with different financial expectations have with very different demographic and wealth-related characteristics.

Similar analysis has been carried out for the other two optimism heuristics: a priori optimism in Table 11 and a posteriori optimism in Table 12. Respondents are divided into three groups for each measurement based on whether they are optimistic, pessimistic and neutral.

[Insert Table 11 here]

As shown in Table 11, when a priori optimism is used to distinguish optimists, pessimists and neutral respondents, optimists have less savings (£2,868 for optimist vs. £4,731 for pessimists) and investment (£2,749 for optimist vs. £3,633 for pessimists) but higher unsecured debt

(£1,990 for optimist vs. £1,310 for pessimists). Optimists (40.63 years old) in the sample are on average younger than pessimistic ones (42.02 years old). 47% of optimists are married compared to 45% of pessimists who are married. Fewer optimists (69%) than pessimists (74%) have homeownership. Optimists (£55,831) take on more mortgage than pessimists (£54,254). Optimists (8%) have higher average unemployment rate than pessimists (2%).

[Insert Table 12 here]

When using a posteriori optimism to distinguish among optimists, pessimists and neutral respondents in Table 12, optimists have less savings (£3,219 for optimist vs. £4,360 for pessimists) and investment (£3,063 for optimist vs. £3,558 for pessimists) but higher unsecured debt (£1,717 for optimist vs. £1,302 for pessimists). Optimists (41.3 years old) in the sample are on average younger than pessimistic ones (43.4 years old). 66% of optimists are married compared to 64% of pessimists who are married. Fewer optimists (71%) than pessimists (73%) have homeownership. Optimists (£53,390) take on more mortgage than pessimists (£51,412). Optimists (5%) have higher average unemployment rate than pessimists (3%).

With alternative measurements for optimism, the results in Table 11 and Table 12 have very similar indications as in the analysis for Table 10 despite of some of the demographical differences between optimists and pessimists become smaller or even insignificant after using a priori optimism and a posteriori optimism as measurements, such as educational level. It is still highly significant that optimists have lower savings and investment but larger debt and mortgage borrowing and higher unemployment rate compare to pessimists and neutral respondents.

5.2 Optimism and Portfolio Choice for all Individuals

We run regressions by using Equation 13, Equation 14, and Equation 15 for risk-free portfolios, Equation 16, Equation 17, and Equation 18 for risky portfolios and Equation 19, Equation 20, and Equation 21 on debt choices on all individuals. The estimated results are displayed in the following sections followed by discussions.

5.2.1 Investment Choice

5.2.1.1 Risk-free Portfolios

Table 13 to Table 15 provide estimated results for the effect of optimism on choosing risk-free portfolios.

[Insert Table 13 here]

In Table 13, the estimated results show that optimism is negatively correlated with risk-free portfolio choices when Equation 13 is employed. When investors are optimistic, they have lower percentage of investment in savings among their financial wealth. The coefficients for a priori optimism and posteriori optimism are -0.052 and -0.020 respectively and they are both significant at 95% confidence level. Among variables of personal characteristics, age is significantly negatively correlated with investment in risk-free portfolios. This result is different from what we expected based on our literature survey. Being male or married have a negative impact on investment in risk-free portfolio. The effect of gender is consistent with most of the existing literature. One's financial wealth and annual income are significantly negatively correlated with risk-free portfolios. Higher the home purchase price and current

home value of one's property, less proportion of savings one would have. Having a finance related job would reduce the investment in risk-free portfolios. People with higher degrees are less likely to prefer investment in risk-free portfolios.

[Insert Table 14 here]

When employing Equation 14 as our regression equation, all three heuristics of optimism have significant negative effect on investing in risk-free portfolios with coefficients of -0.013, -0.033, and -0.012 respectively. These results mean that optimists have smaller amount of savings compared to non optimistic investors. This supports our finding from Table 13 that optimism is negatively correlated with choice of risk-free portfolios.

[Insert Table 15 here]

Table 15 shows that only a priori optimism has a significant effect on investment in risk-free portfolios when Equation 15 is employed. The coefficient for a priori optimism (-0.009) shows that optimistic investors have lower proportion in savings among their total wealth. The result still supports the finding from Table 13 that optimism has a negative impact on allocation wealth to risk-free portfolios.

5.2.1.2 Risk Portfolios

Table 16 to Table 18 display estimated coefficients for the effect of optimism on investing in risky portfolios.

[Insert Table 16 here]

In Table 16, the most important finding is that optimism is positively correlated with risky portfolio choices. The estimated coefficients prove that optimistic investors are more likely to have higher proportion in investment among their total financial wealth. The coefficients for a priori optimism and posteriori optimism are 0.052 and 0.02 respectively and they are both significant at 95% confidence level. The logic for optimists to take on more risks in their portfolios is perhaps as suggested by Tennen and Affleck (1987) that if a person is optimistic about the future, then there is little tendency to worry about the potentially negative consequences of a risky decision.

Among demographic variables, age, being male, and being married all have positive impact on investing in risky portfolios. One's financial wealth and annual income is also significantly positively correlated with allocate wealth in risky portfolios. Home ownership has a negative impact on investment in risky portfolios. Higher the home purchase price and home value, more likely an investor will allocate more fortune in risky portfolios. People who work in finance or business or have higher educational degrees prefer to invest in risky assets. Among all the coefficients, financial wealth seems to have the biggest effect (0.128, 0.132, and 0.128) on choosing risky portfolios among all other factors.

[Insert Table 17 here]

When employing Equation 17 as our regression equation, a priori optimism and a posteriori optimism have significant positive effect on investing in risky portfolios with coefficients of 0.041 and 0.02 respectively. These results indicate more optimistic an investor is, more likely she will have larger amount of her wealth in investment. This is consistent with our finding from Table 16 that optimism has positive effect on choosing risky portfolios.

[Insert Table 18 here]

Table 18 shows that only a priori optimism has a significant effect on investment in risky portfolios when Equation 18 is employed. The coefficient for a priori optimism (0.032) tells us that optimistic investors have higher proportion in investment among their total wealth. The coefficient supports the finding from Table 16 that optimism has a positive influence on allocation one's fortune to risky portfolios.

5.2.2   Debt Choice

Table 19 to Table 21 provide estimated coefficients for the effect of optimism on debt borrowing.

[Insert Table 19 here]

In Table 19, the estimated coefficients show that optimism is positively correlated with the amount of debt one borrows when Equation 19 is used. The coefficients for financial expectation, a priori optimism and posteriori optimism are 0.054, 0.063, and 0.033 respectively and they are all highly significant at 95% confidence level. These results suggest optimistic people are more convinced of their ability of becoming financially better off and repay the debt in the future, therefore they make more risky financial decisions. When an investor gets older, she is less likely to borrow personal debt. Male or married people borrow higher personal debt. Financial wealth is negatively correlated with unsecured debt borrowing while annual income has a positive effect on borrowing debt. Home ownership, home purchase price and mortgage outstanding are positively related to take on more unsecured

debt. But home value has a negative influence on borrowing debt. Owning a business, having a permanent contract, and achieving higher educational degree all contribute to a higher amount of unsecured debt. However, if one person was unemployed a year ago, it is unlikely she takes on unsecured personal debt.

By employing the same dataset, Brown et al. (2005) have similar findings of the effect of financial expectations on unsecured debt borrowing. However, their main focus is on the effect of financial expectation instead of optimism as in this study. In this paper, financial expectation is considered as one heuristic of optimism among other measures. We believe in this way, the implications of financial expectation can be understood in the context of previous literature rather than a random factor contributing to household portfolio choice. We also include the debt figure for 2005 which is not available in Brown et al. (2005).

[Insert Table 20 here]

In Table 20, the estimated coefficients show optimistic people have higher percentage of unsecured debt among their total debt borrowing than non optimistic ones, which supports our finding from Table 19 that optimistic people are more likely to borrow debt. The coefficients for optimism are 0.014, 0.016, and 0.01 for financial expectation, a priori optimism and a posteriori optimism respectively. The effect of optimism on borrowing unsecured debt is highly significant at 95% confidence level.

[Insert Table 21 here]

When we run Equation 21 for our regression analysis, the results in Table 21 show that optimistic investors have higher proportion of mortgage among total wealth than non

optimistic ones. The estimated coefficients for three heuristics of optimism are 0.015, 0.022, and 0.021 respectively and they are all significant at 95% confidence level. These results again are consistent with the findings in Table 19 that optimism is positively correlated with taking on debt therefore involve more risks in their portfolios.

From Table 13 to Table 21, we can see that a priori optimism and a posteriori optimism are better measures for optimism in portfolio choice than financial expectation. The coefficients also indicate a priori optimism has stronger influence on investing more in risky portfolios than a posteriori optimism or optimistic financial expectation.

5.3 Optimism and Portfolio Choice for the Head of Households

In this section, we check the robustness of above findings by running regression analysis on household heads. We run regressions by using Equation 13, Equation 16, and Equation 19 for risk-free portfolios, risky portfolios and debt choices on the head of the household respectively. The estimated results are provided in the following sections.

5.3.1   Investment Choice

5.3.1.1 Risk-free Portfolios

[Insert Table 22 here]

The estimated results shown in Table 22 are consistent with our main findings from Table 13. When we run the regression equation on only the household head, the effect of financial expectation also becomes significant (at 10% significant level). Therefore, all of our three

heuristics of optimism are demonstrated to have a significantly negative effect on investment in risk-free portfolios. Some effects of the demographic variables become insignificant, such as being married, or having higher wealth and individual income level are no longer having a significant effect on the choice of risk-free portfolios. However, these changes do not affect our main findings on the effect of optimism.

5.3.1.2 Risky Portfolios

[Insert Table 23 here]

The estimated results shown in Table 23 are consistent with our main findings on the regression results for all individuals. Optimism proved to have a positive impact on choosing risky portfolios. Financial expectation has a positive impact on allocating one's fortunes in risky portfolios and the coefficient is 0.018 and is significant at 90% confidence level. The coefficients for a priori optimism and a posteriori optimism are 0.062 and 0.021 respectively and both are significant at 95% confidence level. These results still indicate that a priori optimism is the best heuristic of optimism among all three heuristics in this research.

5.3.2   Debt Choice

[Insert Table 24 here]

In Table 24, the estimated coefficients support our finding that optimistic people borrow more debt therefore they take on more risks in their portfolios. The head of the household is slightly less affected by optimism in terms of borrowing personal debt than the average individual. The coefficients for optimism become slightly smaller (0.051, 0.054, and 0.031) compared to

the coefficients for optimism for all individuals (0.054, 0.063, and 0.033). However, the effect of optimism on unsecured debt borrowing is still highly significant at 95% confidence level. The effects of demographics on debt choice for household heads remain very similar to the effects on all individuals in Table 19.

5.4 Summary

In this chapter, findings support our research hypothesis that individuals who are optimistic on their financial situation prefer risky portfolios to risk-free portfolios. The estimated results show that optimism has a negative relationship with investment in risk-free portfolios but is positively related to investment in risky portfolios. Optimists take on more debt therefore include more risks in their portfolios. Among the three heuristics of optimism, a priori optimism seems to have the strongest influence on portfolio choices followed by a posteriori optimism and financial expectation. The robustness checks also support these findings.

However, there is no evidence showing that people who are optimistic about their financial situation are truly financially better off than pessimistic or neutral respondents. By testing the difference between optimists, pessimists and neutral respondents, we find that optimists have different demographic characteristics compare to pessimists or neutral respondents. Optimists are significantly younger, more likely being male, have higher educational qualifications, more likely to have business ownership, but have lower accumulated wealth than pessimistic or neutral respondents. We also find that optimistic people borrow more unsecured personal debt and take on larger mortgage.

6. Conclusion

Optimism has been proved to have effects on many economic phenomena and decision making in other social domains. Most research in psychology has been conducted to measure optimism under controlled experimental conditions. In financial economics, the majority of research on optimism has been focused on its effect on corporate decision making, financial market bubbles, and consumer expenditures. There is little empirical research on whether and how much optimism influences normal households' portfolio choices. This is possibly due to the difficulties of observing optimism in real life.

Based on the definition of optimism in finance and advantages of the questions and scale of the British Household Panel Survey, we develop three heuristics to measure optimism which are financial expectation for the year ahead, a priori optimism and a posteriori optimism. These three measures enable us to test the effect of financial optimism on the portfolio choices at individual and household level.

All evidence in this study suggests that optimism has a positive influence on households' preference of risky portfolios when controlled on other demographical and wealth variables. Optimistic individuals also borrow more debt than non-optimistic ones hence include more risks in their portfolios. Among the three heuristics of optimism, a priori optimism had the strongest influence on portfolio choice followed by a posteriori optimism and financial expectation. Optimism also exists widely amongst the younger population with lower accumulated wealth. A higher percentage of optimists are unemployed than pessimists or neutral respondents.

Our observations and results suggest optimism could be generated from one's irrationality instead of rational expectations based on information, which reveals potential future research directions. Research into the rationality of optimism would contribute to a deeper understanding of optimism and the effect of optimism on individual portfolio choices and other economic decisions.

Bibliography

Acemoglu, D., and A. Scott. "Consumer Confidence and Rational Expectations: Are Agents' Beliefs Consistent with the." *The Economic Journal* 104, no. 422 (1994): 1-19.

Ait-Sahalia, Yacine, Jonathan A. Parker, and Motohiro Yogo. "Luxury Goods and the Equity Premium." *Journal of Finance, American Finance Association* 59, no. 6 (December 2004): 2959-3004.

Alessie, Rob, Stefan Hochguertel, and Arthur H. O. Van Soest. *Household Portfolios in the Netherlands.* Working Paper No. 2000-55. Available at SSRN: http://ssrn.com/abstract=246964 or DOI: 10.2139/ssrn.246964, 2000.

Ando, A., and F. Modigliani. "Tests of the Life Cycle Hypothesis of Saving: Comments and Suggestions." *Oxford Institute of Statistics Bulletin* 19 (1957): 99-124.

Aucote, H. M., and R. S. Gold. "Non-equivalence of Direct and Indirect Measures of Unrealistic Optimism." *Psychology, Health & Medicine* 10, no. 4 (2005): 376 – 383.

Bajtelsmit, V. L., A. Bernasek, and N. Jianakoplos. "Gender Differences in Defined Contribution Pension Decisions." *Financial Services Review* 8, no. 1 (1999): 1-10.

Bajtelsmit, V. L., and J. L. VanDerhei. "Risk Aversion and Pension Investment Choices." *Positioning Pensions for the Twenty-first Century*, 1997: 45-66.

Bakshi, G. S., and Z. Chen. "Baby Boom, Population Aging, and Capital Markets." *Journal of Business* 67, no. 2 (1994): 163-202.

Barber, B. M., and T. Odean. "Boys will be Boys: Gender, Overconfidence, and Common Stock Investment." *Quarterly Journal of Economic* 116, no. 1 (2001): 261-292.

Barberis, N., A. Shleifer, and R. Vishny. "A model of Investor Sentiment." *Journal of Financial Economics* 49 (1998): 307-343.

Bertaut, C. C., and M. Starr-McCluer. "Household Portfolios in the United States." *FEDS Working Paper No. 2000-26* . 2000.

Bertocchi, G., M. Brunetti, and C. Torricelli. "Marriage and Other Risky Assets: A Portfolio Approach." *CEPR Discussion Paper No. DP7162*. 2009.

Binder, M., and A. Coad. "An Examination of the Dynamics of Happiness Using Vector Autoregressions." *Available at SSRN: http://ssrn.com/abstract=1301564*. 2009.

Bogan, V. "Stock Market Participation and the Internet." *Journal of Financial and Quantitative Analysis* 43, no. 1 (2008): 191-212.

Brown, S., G. Garino, K. Taylor, and S. W. Price. "Debt and Financial Expectations: An Individual- and Household-Level Analysis." *Economic Inquiry* 43, no. 1 (2005): 100-120.

Brown, S., G. Garino, P. Simmons, and K. Taylor. "Debt and Risk Preference: A Household Level Analysis." *Available at: http://www.shef.ac.uk/content/1/c6/08/38/04/SERP2008005.pdf.* 2008.

Brown, Sarah, and Karl Taylor. "Household Debt and Financial Assets: Evidence from Great Britain, Germany and the United States." *Discussion Papers in Economics 05/5* (Department of Economics, University of Leicester), 2005.

Brunetti, M., and C. Torricelli. "The Effect of Population Ageing on Household Portfolio Choices in Italy." *Department of Economics 545, University of Modena and Reggio E., Faculty of Economics* . 2007.

Brunnermeier, M. K., and J. A. Parker. "Optimal Expectations." *The American Economic Review* 95, no. 4 (2005): 1092-1118.

Bucciol, A., and R. Miniaci. "Household Portfolios and Implicit Risk Aversion." *Available at SSRN: http://ssrn.com/abstract=1190822.* 2008.

Camerer, C., and D. Lovallo. "Overconfidence and Excess Entry: An Experimental Approach." *The American Economic Review* 89, no. 1 (1999): 306-318.

Cardak, B. A., and R. Wilkins. "The Determinants of Household Risky Asset Holdings: Background Risk and Other Factors." *Journal of Banking and Finance* 33, no. 5 (2009): 850-860.

Carroll, C. D., J. C. Fuhrer, and D. W. Wilcox. "Does Consumer Sentiment Forecast Household Spending? If So, Why?" *The American Economic Review* 84, no. 5 (1994): 1397-1408.

Cass, D., and J. E. Stiglitz. "Risk Aversion and Wealth Effects on Portfolios with Many Assets." *Review of Economic Studies* 39 (1972): 331-354.

Christiansen, C., J. Rangvid, and J. S. Joensen. "Are Economists More Likely to Hold Stocks?" *Aarhus University Economics Paper No. 2005-06.* 2007.

Cocco, J. F. "Portfolio Choice in the Presence of Housing." *The Review of Financial Studies* 18, no. 2 (2005): 535-567.

Cocco, J. F., F. J. Gomes, and P. J. Maenhout. "Consumption and Portfolio Choice over the Life-cycle." *The Review of Financial Studies* 18 (2005): 491-533.

Cohn, R.A., W.G. Lewellen, R.C. Lease, and G.G. Sclarbaum. "Individual Investor Risk Aversion and Investment Portfolio Composition." *Journal of Finance* 30, no. 2 (1975): 605-620.

Cooper, A., C. Woo, and W. Dunkelberg. "Entrepreneurs' Perceived Chances for Success." *Journal of Business Venturing* 3 (1988): 97-108.

Coval, J. D., and A. V. Thakor. "Financial Intermediation as a Beliefs-bridge between Optimists and Pessimists." *Journal of Financial Economics* 75 (2005): 535-569.

Coval, J. D., and T. Shumway. "Do Behavioural Biases Affect Prices?" *The Journal of Finance* 60, no. 1 (2005): 2005.

Covey, J. A., and A. D.M. Davies. "Are People Unrealistically Optimistic? It Depends How You Ask Them." *British Journal of Health Psychology* 9 (2004): 39–49.

Daniel, K., D. Hirshleifer, and S. H. Teoh. "Investor Psychology in Capital Markets: Evidence and Policy Implications." *Journal of Monetary Economics* 49 (2002): 139–209.

Dimmock, S G, and R Kouwenburg. "Loss-Aversion and Household Portfolio Choice." *Available at SSRN: http://ssrn.com/abstract=680783*. 2008.

Døskeland, T., and H. K. Hvide. "Expertise Bias in Individuals' Stock Market Investments." *Available at SSRN: http://ssrn.com/abstract=1159673*. 2008.

Faig, M., and P. M. Shum. "What Explains Household Stock Holding?" *Journal of Banking and Finance* 30, no. 9 (2006): 2579-2597.

Faig, M., and P. Shum. "Portfolio Choice in the Presence of Personal Illiquid Projects." *The Journal of Finance* 57, no. 1 (2002): 303-328.

Farhi, E., and S. Panageas. "Saving and Investing for Early Retirement: A Theoretical Analysis." *Available at SSRN: http://ssrn.com/abstract=571682*. 2005.

Gerhardt, R., and A. Hackethal. "The Influence of Financial Advisors on Household Portfolios: A Study on Private Investors Switching to Financial Advice ." *Available at SSRN: http://ssrn.com/abstract=1343607*. 2009.

Gervais, S., J. B. Heaton, and T. Odean. *The Positive Role of Overconfidence and Optimism in Investment Policy.* Wharton School Working Paper, 2002.

Giofré, M. "Bias in Foreign Equity Portfolios: Households Versus Professional Investors." *Available at SSRN: http://ssrn.com/abstract=1340342*. 2009.

Gollier, C. "Optimal Illusions and Decisions under Risk." *Available at SSRN: http://ssrn.com/abstract=648602*. 2005.

Gomes, F, and A Michaelides. "Optimal Life-Cycle Asset Allocation: Understanding the Empirical Evidence." *Journal of Finance* 60, no. 2 (2005): 869-904.

Graves, P. E. *The Increasing Relative Risk Aversion Hypothesis.* Ph.D. dissertation, Northwestern University, 1973.

Guiso, L., P. Sapienza, and L. Zingales. "The Role of Social Capital in Financial Development." *The American Economic Review* 94, no. 3 (2004): 526-556.

Guiso, Luigi, Tullio Jappelli, and Daniele Terlizzese. "Income Risk, Borrowing Constraints, and Portfolio Choice." *American Economic Review* (American Economic Association) 86, no. 1 (March 1996): 158-172.

Hackbarth, D. "Managerial Traits and Capital Structure Decisions." *Available at SSRN: http://ssrn.com/abstract=362740 or DOI: 10.2139/ssrn.362740*. 2007.

Haliassos, Michael, and Alexander Michaelides. "Portfolio Choice and Liquidity Constraints." *International Economic Review* (Department of Economics, University of Pennsylvania and Osaka University Institute of Social and Economic Research Association) 44, no. 1 (February 2003): 143-177.

Hanna, Sherman Davie, and H. Lee. "Investment portfolios and human wealth." *Financial Counseling and Planning* 6 (1995): 147-152.

Harris, D. M., and S. Guten. "Health Protective Behavior: An Exploratory Study." *Journal of Health and Social Behavior* 20 (1979): 17-29.

He, P., and X. Hu. "Household Investment - the Horizon Effect." *Available at SSRN: http://ssrn.com/abstract=798431*. 2007.

Heaton, J. B. "Managerial Optimism and Corporate Finance." *Financial Management*, 2002: 33-45.

Heaton, J., and D. Lucas. "Portfolio Choice and Asset Prices: The Importance of Entrepreneurial Risk." *The Journal of Finance* 55, no. 3 (2000): 1163-1198.

Helweg-Larsen, M., and J. A. Shepperd. "Do Moderators of the Optimistic Bias Affect Personal or Target Risk Estimates? A Review of the Literature." *Personality and Social Psychology Review* 5, no. 1 (2001):

74-95.

Hinz, R. P., D. D. McCarthy, and J. A. Turner. "Are Women Conservative Investors? Gender Differences in Participant Directed Pension Investments." *Positioning Pensions for the Twenty-first Century*, 1997: 91-103.

Hong, H., J. D. Kubik, and J. C. Stein. "Social Interaction and Stock-Market Participation." *The Journal of Finance* 59, no. 1 (2004): 137-163.

Hsu, Jason C. "What Drives Equity Market Non-participation?" *Available at SSRN: http://ssrn.com/abstract=473426 or DOI: 10.2139/ssrn.473426*, November 2003.

Jin, Fangyi. "Non-Participant or Gambler: Investment Decisions of Low-Wealth Households." *Available at SSRN: http://ssrn.com/abstract=1104644*, 2008.

Johnson, E J, and A Tversky. "Affect, Generalization, and the Perception of Risk." *Journal of Personality and Social Psychology* 45, no. 1 (1983): 20-31.

Kacperczyk, M., and Z. Kominek. "Do Optimists Grow Faster and Invest More?" *Available at SSRN: http://ssrn.com/abstract=301242 or DOI: 10.2139/ssrn.301242*. 2002.

Kahneman, D, and A B Krueger. "Developments in the Measurement of Subjective Well-being." *Journal of Economic Perspectives* 20, no. 1 (2006): 3-24.

Kahneman, D., and D. Lovallo. "Timid Choices and Bold Forecasts: A Cognitive Perspective on Risk Taking." *Management Science* 39, no. 1 (1993): 17-31.

Kézdi, G, and R J Willis. "Who Becomes a Stockholder? Expectations, Subjective Uncertainty, and Asset Allocation." *Michigan Retirement Research Center Research Paper No. WP 2003-039*. 2003.

Kézdi, G., and R. J. Willis. "Who Becomes a Stockholder? Expectations, Subjective Uncertainty, and Asset Allocation." *Michigan Retirement Research Center Research Paper No. WP 2003-039* . 2003.

Klein, C. T.F., and M. Helweg-Larsen. "Perceived Control and the Optimistic Bias: A Meta-analytic Review." *Psychology and Health* 17 (2002): 437-446.

Langer, E. J., and J. Roth. "Heads I Win, Tails it's Chance: The Illusion of Control as a Function of the Sequence of Outcomes in a Purely Chance Task." *Journal of Personality and Social Psychology* 32 (1975): 951-955.

Lee, C. C., A. Shleifer, and R. H. Thaler. "Investor Sentiment and the Closed-End Fund Puzz." *The Journal of Finance* 46, no. 1 (1991).

Leece, D. "Applying Data Visualization and Knowledge Discovery in Databases to Segment the Market for Risky Financial Assets." *Managerial and Decision Economics* 20, no. 5 (1999): 267-280.

Love, D. A., and P. A. Smith. "Does Health Affect Portfolio Choice?" *FEDS Working Paper No. 2007-45.* 2007.

Lowry, M. "Why Does IPO Volume Fluctuate So Much?" *Journal of Financial Economics* 67 (2003): 3–40.

Lowry, M., and G. W. Schwert. "IPO Market Cycles: Bubbles or Sequential Learning?" *Journal of Finance* 57, no. 3 (2002).

Lusardi, A. "The Impact of Financial Education on Savings and Asset Allocation." *Michigan Retirement Research Center Research Paper No. WP 2003-061* . 2003.

Lusardi, Annamaria. "Financial Education and Saving." In *Pension Design and Decision-Making Under Uncertainty*, edited by O. Mitchell and S. Utkus. Philadelphia, PA: Pension Research Council, 2003.

Lyons, A. C., and T. Yilmazer. "Marriage and the Allocation of Assets in Women's Defined Contribution Plans." *Available at SSRN: http://ssrn.com/abstract=922134.* 2006.

Malmendier, U., and G. Tate. "CEO Overconfidence and Corporate Investment." *The Journal of Finance* 60, no. 6 (2005).

Manglik, G. "Countering Over-Confidence and Over-Optimism By Creating Awareness and Experiential Learning Amongst Stock Market Players." *Available at SSRN: http://ssrn.com/abstract=954861.* 2006.

March, J. G., and Z. Shapira. "Managerial Perspectives on Risk and Risk Taking." *Management Science* 33, no. 11 (1987).

McGuire, W. J. *Attitude Organization and Change: An Analysis of Consistency among Attitude Components.* Yale University Press, 1960.

McKenna, F. P. "It Won't Happen to Me: Unrealistic Optimism or Illusion of Control?" *British Journal of Psychology* 84 (1993): 39-50.

Mitchell, M. L., and J. H. Mulherinb. "The Impact of Industry Shocks on Takeover and Restructuring Activity." *Journal of Financial Economics* 41 (1996): 193-229.

Morin, R. A., and A. F. Suarez. "Risk Aversion Revisited." *Journal of Finance* 38, no. 4 (1983): 1201-1216.

Muñoz, S. "Habit Formation and Persistence in Individual Asset Portfolio Holdings: The Case of Italy." *IMF Working Paper No. 06/29* , 2006: 1-44.

Nofsinger, J R. "Social Mood and Financial Economics." *Journal of Behavioral Finance* 6, no. 3 (2005): 144-160.

Nofsinger, J., and K. Kim. *Infectious Greed: Restoring Confidence in America's.* New Jersey: Financial Times Prentice Hall, 2003.

Owen, A L, and S Wu. "Financial Shocks and Worry about the Future." *Empirical Economics* 33, no. 3 (2007): 515-530.

Palme, Marten, Annika Sunden, and Paul Soderlind. "Investment Choice in the Swedish Premium Pension Plan." *Available at SSRN: http://ssrn.com/abstract=1148968.* 2005.

Palme, Marten, Annika Sunden, and Paul Soderlind. "Investment Choice in the Swedish Premium Pension Plan." *Working Papers* (Center for Retirement Research at Boston College), 2005.

Palmiter, A. R., and A. E. Taha. "Mutual Fund Investors: Divergent Profiles." *Columbia Business Law Review* 2008, no. 3 (2008).

Peress, Joël. "Wealth, Information Acquisition, and Portfolio Choice." *Review of Financial Studies* (Oxford University Press for Society for Financial Studies) 17, no. 3 (2004): 879-914.

Polkovnichenko, V. "Household Portfolio Diversification: A Case for Rank Dependent Preferences ." *Available at SSRN: http://ssrn.com/abstract=293831 or DOI: 10.2139/ssrn.293831.* 2004.

Puri, M, and D T Robinson. "Optimism and Economic Choice." *Journal of Financial Economics* 86, no. 1 (2007): 71-99.

Rajamohan, R. R. "An Empirical Study on the Impact of Financial Knowledge on Household Portfolio." *Available at SSRN: http://ssrn.com/abstract=876876.* 2006.

Rajan, R., and H. Servaes. "Analyst Following of Initial Public Offerings." *Journal of Finance* 52, no. 2 (1997).

Riley, W. B., and K. V. Chow. "Asset Allocation and Individual Risk Aversion." *Financial Analysts Journal* 48, no. 6 (1992): 32-37.

Robertson, L. S. "Perceived Vulnerability and Willingness to Pay for Crash Protection." *Journal of Community Health*, 1977: 136-141.

Rooij, M. V., A. Lusardi, and R. Alessie. "Financial Literacy and Stock Market Participation." *Michigan Retirement Research Center Research Paper No. 2007-162.* 2007.

Rosen, H. S., and S. Wu. "Portfolio Choice and Health Status." *NBER Working Paper No. W9453 .* 2003.

Rosen, R. J. "Merger Momentum and Investor Sentiment: The Stock Market Reaction to Merger Announcements." *Available at SSRN: http://ssrn.com/abstract=343600 or DOI: 10.2139/ssrn.343600.* 2003.

Roy, J, and T Tvszka. "Optimism and Attitude Towards Risk." *Kozminski Business School Working Paper Series No. 06 .* 2005.

Salvatore, Dominick, and Eugene A. Diulio. *Schaum's Outline of Theory and Problems of Principles of Economics.* McGraw-Hill, 1995.

Schornick, Astrid V., and Dmitry Makarov. "Explaining Households' Investment Behavior." *Available at SSRN: http://ssrn.com/abstract=949189*, March 2008.

Shefrin, H., and M. Statman. "The Disposition to Sell Winners too Early and Ride Losers too Long: Theory and Evidence." *The Journal of Finance* 40, no. 3 (1985).

Skata, D. "Overconfidence in Psychology and Finance - An Interdisciplinary Literature Review." *Bank i Kredyt* 4 (2008): 33-50.

Soest, A. V., and A. Kapetyn. "Savings, Portfolio Choice, and Retirement Expectations." *Michigan Retirement Research Center Research Paper No. WP 2006-119 .* 2006.

Souleles, N. S. "Household Securities Purchases, Transactions Costs, and Hedging Motives." *Rodney L. White Center for Financial Research Working Paper No. 24-99 .* 1999.

Sundén, A. E., Surette, and B. T. Surette. "Gender Differences in the Allocation of Assets in Retirement Savings Plans." *The American Economic Review* 88, no. 2 (1998): 207-211.

Tennen, H., and G. Affleck. "The Costs and Benefits of Optimistic Explanations and Dispositional Optimism." *Joumal qf Personality* 55, no. 2 (1987).

Uccello, C. E. "Do Spouses Coordinate their Investment Decisions in Order to Share Risks?" *Boston College CRR Working Paper No. 2000-09 .* 2000.

Viceira, L. M. "Optimal Portfolio Choice for Long-Horizon Investors with Nontradable Labor Income." *The Journal of Finance* 56, no. 2 (2001): 433-470.

Wang, H., and S. Hanna. "Does Risk Tolerance Decrease With Age?" *Financial Counseling and Planning* 8, no. 2 (1998).

Weinstein, N. D. "Coping with Environmental Hazards: Reactions to the Threat of Crime." *Paper presented at the meeting of the American Psychological Association, San Francisco.* 1977.

Weinstein, N. D. "Unrealistic Optimism About Future Life Events." *Journal of Personality and Social Psychology* 39, no. 5 (1980): 806-820.

Weinstein, N. D., and J. E. Lyon. "Mindset, Optimistic Bias about Personal Risk and Health-protective

Behaviour." *British Journal of Health Psychology* 4 (1999): 289–300.

Weinstein, N. D., and W. M. Klein. "Unrealistic Optimism: Present and Future." *Journal of Social and Clinical Psychology* 15 (1996): 1-8.

Welch, P. J., and G. F. Welch. *Economics: Theory and Practice.* John Wiley & Sons, Inc., 2006.

Yao, R., and H. H. Zhang. "Optimal Consumption and Portfolio Choices with Risky Housing and Borrowing Constraints." *The Review of Financial Studies* 18, no. 1 (2005): 197-239.

Yao, R., S. D. Hanna, and S. Lindamood. "Changes in Financial Risk Tolerance, 1983-2001." *Financial Services Review* 13, no. 4 (2004): 249-266.

Tables

Table 1

The frequency distribution of *financial expectation*

	Code	E_t^{t+1}	C_{t-1}^t	E_{1995}^{1996}	C_{1994}^{1995}	E_{2000}^{2001}	C_{1999}^{2000}	E_{2005}^{2006}	C_{2004}^{2005}
Better off	2	25.8%	26.0%	26.5%	26.3%	28.8%	29.0%	25.4%	24.6%
About the same or Don't know	1	64.4%	52.4%	61.2%	46.3%	63.3%	50.6%	65.9%	55.3%
Worse off	0	9.8%	21.6%	12.3%	27.4%	7.9%	20.4%	8.7%	20.1%

Table 2

The frequency distribution of *a priori optimism*

A Priori Optimism	Score	1991-2007	1995	2000	2005
Optimistic	2	6.8%	7.7%	6.9%	6.9%
	1	17.6%	20.4%	18.7%	16.3%
Neutral	0	57.7%	53.5%	55.7%	60.5%
Pessimistic	-1	16.2%	16.4%	17%	14.9%
	-2	1.7%	2.0%	1.6%	1.5%

Table 3

The frequency distribution of *a posteriori optimism*

A Posteriori Optimism	Score	1991-2007	1995	2000	2005
Optimistic	2	4.8%	4.8%	4.7%	4.6%
	1	20.7%	20.6%	20.1%	20.1%
Neutral	0	57.3%	55.1%	56.9%	59.7%
Pessimistic	-1	15.8%	17.5%	16.8%	14.4%
	-2	1.4%	2.0%	1.5%	1.2%

Table 4

Descriptive statistics of heuristics of optimism

	All Individuals (Head of Household)									
	Mean		Sdv		Min		Max		N	
Heuristics of optimism										
Financial expectation	1.16	(1.12)	0.58	(0.56)	0	(0)	2	(2)	224624	(117335)
A priori optimism	0.12	(0.12)	0.81	(0.78)	-2	(-2)	2	(2)	224624	(117335)
A posteriori optimism	0.12	(0.11)	0.77	(0.76)	-2	(-2)	2	(2)	189065	(99698)

Table 5

Descriptive statistics for risk-free portfolios

	All Individuals (Head of Household)									
	Mean		Sdv		Min		Max		N	
Risk-free portfolios										
Savings (SAV)	3722	(4394)	14664	(15277)	0	(0)	900000	(500000)	40479	(21200)
SAV/FW	0.76	(0.72)	0.36	(0.38)	0	(0)	1	(1)	22876	(11927)
SAV/TW	0.14	(0.17)	0.31	(0.33)	0	(0)	1	(1)	33925	(17262)

Table 6

Descriptive statistics of risky portfolios

	All Individuals (Head of Household)									
	Mean		Sdv		Min		Max		N	
Risky portfolios										
Investment (INV)	3366	(4393)	20214	(23065)	0	(0)	999999	(900000)	40479	(21200)
INV/FW	0.24	(0.28)	0.36	(0.38)	0	(0)	1	(1)	22876	(11927)
INV/TW	0.04	(0.05)	0.15	(0.16)	0	(0)	1	(1)	33925	(17262)

Table 7

Descriptive statistics of debt borrowing

	All Individuals (Head of Household)									
	Mean		Sdv		Min		Max		N	
Debt										
Personal Debt (PD)	1378	(1533)	5678	(5966)	0	(0)	400000	(400000)	40479	(21200)
PD/TD	0.31	(0.35)	0.44	(0.45)	0	(0)	1	(1)	22811	(11237)
MG/TW	0.68	(0.52)	104.58	(80.38)	0	(0)	30000	(20000)	131991	(72161)

Table 8

Descriptive statistics of demographics

	All Individuals (Head of Household)									
	Mean		Sdv		Min		Max		N	
Personal Characteristics										
Age	45.18	(50.57)	18.62	(17.93)	15	(15)	101	(100)	224624	(117335)
Male	0.46	(0.67)	0.50	(0.47)	0	(0)	1	(1)	223254	(116601)
Married	0.64	(0.60)	0.48	(0.49)	0	(0)	1	(1)	224624	(117335)
White	0.95	(0.96)	0.21	(0.20)	0	(0)	1	(1)	224624	(117335)
Healthy	0.90	(0.89)	0.30	(0.31)	0	(0)	1	(1)	209001	(109018)
Household size	2.87	(2.44)	1.39	(1.33)	1	(1)	14	(14)	224624	(117335)
Wealth and Income										
Total financial wealth	7089	(8788)	28339	(31805)	0	(0)	1400000	(1400000)	40479	(21200)
Total wealth	103127	(96040)	129100	(126141)	0	(0)	4100000	(4100000)	40479	(21200)
Annual income	11627	(14642)	13235	(14784)	0	(0)	1191104	(1009984)	224624	(117335)
Annual household income	26488	(22910)	21664	(20702)	0	(0)	1205210	(1205210)	224624	(117335)
Home ownership	0.71	(0.67)	0.45	(0.47)	0	(0)	1	(1)	224624	(117335)
Home purchase price	41150	(39968)	46578	(46051)	1	(1)	1800000	(1800000)	143793	(77429)
Current home value	133705	(128610)	140339	(132962)	1	(1)	7500000	(7500000)	153793	(75816)
Mortgage outstanding	54060	(54519)	84368	(93922)	1	(1)	9990000	(9990000)	82377	(38613)
Employment Profile										
Business ownership	0.10	(0.12)	0.30	(0.33)	0	(0)	1	(1)	224624	(117335)
Finance related occupation	0.05	(0.04)	0.21	(0.20)	0	(0)	1	(1)	224624	(117335)
Employment: permanent contract	0.52	(0.52)	0.50	(0.50)	0	(0)	1	(1)	224624	(117335)
Unemployed	0.04	(0.03)	0.19	(0.18)	0	(0)	1	(1)	224624	(117335)
Unemployed a year ago	0.03	(0.03)	0.18	(0.18)	0	(0)	1	(1)	224624	(117335)
Education: first degree or above	0.32	(0.34)	0.47	(0.48)	0	(0)	1	(1)	224624	(117335)

Table 9

Profile of Optimists

	Profile of Optimists		
	Financial Expectation	**A Priori Optimism**	**A Posteriori Optimism**
Risk-free portfolios			
Savings (SAV)	2475	2868	3219
SAV/FW	0.77	0.74	0.75
SAV/TW	0.15	0.14	0.14
Risky portfolios			
Investment (INV)	2518	2749	3063
INV/FW	0.23	0.26	0.25
INV/TW	0.04	0.05	0.04
Debt			
Personal Debt (PD)	2338	1990	1717
PD/TD	0.34	0.35	0.33
MG/TW	2.74	2.32	2.91
Personal Characteristics			
Age	34.41	40.63	41.30
Male	0.52	0.47	0.47
Married	0.60	0.64	0.66
White	0.95	0.96	0.96
Healthy	0.93	0.90	0.90
Household size	3.14	3.00	3.00
Wealth and Income			
Total financial wealth	4993	5618	6282
Total wealth	96223	95492	101127
Annual income	12670	11630	12022
Annual household income	29844	26100	26781
Home ownership	0.70	0.69	0.71
Home purchase price	46987	43266	42082
Current home value	129940	131421	125077
Mortgage outstanding	60122	55831	53390
Employment Profile			
Business ownership	0.13	0.11	0.12
Finance related occupation	0.07	0.05	0.05
Employment: permanent contract	0.67	0.54	0.60
Unemployed	0.07	0.08	0.05
Unemployed a year ago	0.05	0.05	0.04
Education: first degree or above	0.40	0.36	0.35

Table 10

Financial expectation: better off, worse off, or about the same

	Financial Expectation		
	Better off	**About the same**	**Worse off**
Heuristics of optimism			
Financial expectation	2	1	0
A priori optimism	0.82	-0.04	-0.68
A posteriori optimism	0.72	0.00	-0.64
Risk-free portfolios			
Savings (SAV)	2475 a	3980 b	5583 c
SAV/FW	0.77 a	0.75 b	0.74
SAV/TW	0.15 a#	0.14 b	0.14
Risky portfolios			
Investment (INV)	2518 a	3645 b	3911
INV/FW	0.23 a	0.25 b	0.26
INV/TW	0.04 a	0.04	0.05 c
Debt			
Personal Debt (PD)	2338 a	997 b	1207 c
PD/TD	0.34	0.29 b	0.33 c
MG/TW	2.74 a	0.07 b	0.14
Personal Characteristics			
Age	34.41 a	48.95 b	48.80
Male	0.52 a	0.44 b	0.47 c
Married	0.60 a	0.66 b	0.64 c
White	0.95 a	0.95	0.97 c
Healthy	0.93 a	0.90 b	0.88 c
Household size	3.14 a	2.78 b	2.68 c
Wealth and Income			
Total financial wealth	4993 a	7625 b	9494 c
Total wealth	96223 a	104468 b	114012 c
Annual income	12670 a	11209 b	11624 c
Annual household income	29844 a	25320 b	25317
Home ownership	0.70 a	0.71 b	0.73 c
Home purchase price	46987 a	38969 b	40872 c
Current home value	129940 a	134555 b	137894 c
Mortgage outstanding	60122 a	50775 b	52876 c#
Employment Profile			
Business ownership	0.13 a	0.09 b	0.08 c
Finance related occupation	0.07 a	0.04 b	0.04
Employment: permanent contract	0.67 a	0.47 b	0.45 c
Unemployed	0.07 a	0.03 b	0.03
Unemployed a year ago	0.05 a	0.03 b	0.03
Education: first degree or above	0.40 a	0.28 b	0.31 c

a denotes significant difference between demographics of respondents whose financial expectation are better off and worse off
b denotes significant difference between demographics of respondents whose financial expectation are better off and about the same
c denotes significant difference between demographics of respondents whose financial expectation are worse off and about the same
5% is the level of significance unless denoted by # which means the result is significant at 10% level of significance

Table 11

A priori optimism: respondents who are optimistic, pessimistic, or neutral

	A Priori Optimism		
	Optimistic	**Neutral**	**Pessimistic**
Heuristics of optimism			
Financial expectation	1.59	1.11	0.72
A priori optimism	1.28	0.00	-1.09
A posteriori optimism	0.59	0.07	-0.38
Risk-free portfolios			
Savings (SAV)	2868 d	3787 e	4731 f
SAV/FW	0.74 d	0.76 e	0.78 f
SAV/TW	0.14 d	0.14	0.16 f
Risky portfolios			
Investment (INV)	2749 d	3556 e	3633
INV/FW	0.26 d	0.24 e	0.22 f
INV/TW	0.05 d	0.04 e	0.04
Debt			
Personal Debt (PD)	1990 d	1127 e	1310 f
PD/TD	0.35 d	0.29 e	0.29
MG/TW	2.32 d	0.21 e	0.15
Personal Characteristics			
Age	40.63 d	48.08 e	42.02 f
Male	0.47 d	0.47	0.45 f
Married	0.64 d	0.64	0.63 f
White	0.96 d	0.94 e	0.97 f
Healthy	0.90 d	0.90	0.92 f
Household size	3.00 d	2.79 e	2.93 f
Wealth and Income			
Total financial wealth	5618 d	7343 e	8364 f
Total wealth	95492 d	105497 e	106369
Annual income	11630 d	11087 e	13365 f
Annual household income	26100 d	25554 e	30034 f
Home ownership	0.69 d	0.71 e	0.74 f
Home purchase price	43266 d	39351 e	43979 f
Current home value	131421 d	134612 e	133809
Mortgage outstanding	55831 d	53063 e	54254 f
Employment Profile			
Business ownership	0.11 d	0.09 e	0.10 f
Finance related occupation	0.05 d	0.04 e	0.06 f
Employment: permanent contract	0.54 d	0.48 e	0.64 f
Unemployed	0.08 d	0.03 e	0.02 f
Unemployed a year ago	0.05 d	0.03 e	0.03
Education: first degree or above	0.36 d	0.28 e	0.37 f

e denotes significant difference between demographics of respondents who are optimistic and pessimistic
d denotes significant difference between demographics of respondents who are optimistic and neutral
f denotes significant difference between demographics of respondents who are pessimistic and neutral
5% is the level of significance unless denoted by # which means the result is significant at 10% level of significance

Table 12

A posteriori optimism: respondents who are optimistic, pessimistic, or neutral

	A Posteriori Optimism		
	Optimistic	Neutral	Pessimistic
Heuristics of optimism			
Financial expectation	1.54	1.12	0.71
A priori optimism	0.59	0.07	-0.43
A posteriori optimism	1.19	0.00	-1.08
Risk-free portfolios			
Savings (SAV)	3219 g	3970 h	4360 i
SAV/FW	0.75 g#	0.75	0.76 i#
SAV/TW	0.14 g	0.13 h	0.15 i
Risky portfolios			
Investment (INV)	3063 g#	3726 h	3558
INV/FW	0.25 g#	0.25	0.24 i#
INV/TW	0.04	0.04	0.04
Debt			
Personal Debt (PD)	1717 g	1256 h	1302
PD/TD	0.33 g	0.3 h	0.27 i
MG/TW	2.91 g	0.17 h	0.10 i
Personal Characteristics			
Age	41.30 g	47.78 h	43.40 i
Male	0.47 g	0.45 h	0.46 i
Married	0.66 g	0.66	0.64 i
White	0.96 g	0.95 h	0.97 i
Healthy	0.90 g	0.91 h	0.91
Household size	3.00 g	2.78 h	2.88 i
Wealth and Income			
Total financial wealth	6282 g	7696 h	7918
Total wealth	101127 g	107112 h	106017
Annual income	12022 g	11391 h	12421 i
Annual household income	26781 g	25678 h	27652 i
Home ownership	0.71 g	0.73 h	0.73 i
Home purchase price	42082 g#	38898 h	42650 i
Current home value	125077	126878 h	125253 i
Mortgage outstanding	53390 g	51052 h	51412
Employment Profile			
Business ownership	0.12 g	0.10 h	0.10
Finance related occupation	0.05	0.04 h	0.05 i
Employment: permanent contract	0.60 g	0.50 h	0.58 i
Unemployed	0.05 g	0.03 h	0.03
Unemployed a year ago	0.04 g	0.03 h	0.03
Education: first degree or above	0.35	0.30 h	0.35 i

g denotes significant difference between demographics of respondents who are optimistic and pessimistic
h denotes significant difference between demographics of respondents who are optimistic and neutral
i denotes significant difference between demographics of respondents who are pessimistic and neutral
5% is the level of significance unless denoted by # which means the result is significant at 10% level of significance

Table 13

Optimism and risk-free portfolio choice for all individuals

| | Risk-free Portfolios (All Individuals) | | | | | |
| | Financial expectation | | A Priori Optimism | | A Posteriori Optimism | |
	Beta	p -Value	Beta	p -Value	Beta	p -Value
Optimism	-0.008	0.259	-0.052	0.000	-0.020	0.003
Age	-0.062	0.000	-0.062	0.000	-0.061	0.000
Male	-0.056	0.000	-0.055	0.000	-0.057	0.000
Married	-0.034	0.000	-0.032	0.000	-0.029	0.000
White	-0.002	0.748	-0.003	0.680	-0.002	0.715
Healthy	-0.007	0.288	-0.008	0.225	-0.006	0.342
Household size	-0.008	0.351	-0.007	0.382	-0.007	0.427
Total financial wealth (ln)	-0.128	0.000	-0.132	0.000	-0.128	0.000
Annual income (ln)	-0.031	0.000	-0.029	0.001	-0.031	0.000
Annual household income (ln)	0.004	0.638	0.000	0.961	0.003	0.745
Home ownership	0.089	0.002	0.087	0.002	0.094	0.001
Home purchase price (ln)	-0.072	0.000	-0.070	0.000	-0.070	0.000
Current home value (ln)	-0.120	0.000	-0.118	0.000	-0.127	0.000
Mortgage outstanding (ln)	0.015	0.081	0.015	0.074	0.014	0.102
Business ownership	-0.010	0.120	-0.009	0.148	-0.010	0.122
Finance related occupation	-0.049	0.000	-0.050	0.000	-0.051	0.000
Employment: permanent contract	0.012	0.172	0.009	0.287	0.013	0.163
Unemployed	-0.004	0.612	0.003	0.695	-0.004	0.604
Unemployed a year ago	0.000	0.969	-0.003	0.664	-0.001	0.843
Education: first degree or above	-0.049	0.000	-0.048	0.000	-0.049	0.000

SAV/FW = α + β_0 (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 14

Optimism and risk-free portfolio choice for all individuals

| | Risk-free Portfolios (All Individuals) | | | | | |
| | Financial expectation | | A Priori Optimism | | A Posteriori Optimism | |
	Beta	p -Value	Beta	p -Value	Beta	p -Value
Optimism	-0.013	0.007	-0.033	0.000	-0.012	0.012
Age	-0.029	0.000	-0.027	0.000	-0.028	0.000
Male	-0.034	0.000	-0.034	0.000	-0.035	0.000
Married	-0.011	0.036	-0.009	0.063	-0.007	0.198
White	0.005	0.287	0.004	0.319	0.005	0.295
Healthy	0.000	0.944	0.000	0.941	0.000	0.981
Household size	-0.017	0.002	-0.016	0.003	-0.017	0.003
Total financial wealth (ln)	0.766	0.000	0.764	0.000	0.766	0.000
Annual income (ln)	-0.018	0.001	-0.017	0.003	-0.019	0.001
Annual household income (ln)	0.011	0.062	0.009	0.143	0.009	0.158
Home ownership	0.045	0.024	0.043	0.029	0.049	0.016
Home purchase price (ln)	-0.027	0.000	-0.026	0.000	-0.029	0.000
Current home value (ln)	-0.051	0.012	-0.050	0.015	-0.054	0.010
Mortgage outstanding (ln)	-0.008	0.154	-0.008	0.158	-0.008	0.191
Business ownership	-0.004	0.409	-0.004	0.427	-0.003	0.456
Finance related occupation	-0.020	0.000	-0.020	0.000	-0.021	0.000
Employment: permanent contract	-0.002	0.710	-0.004	0.484	-0.002	0.727
Unemployed	-0.004	0.473	0.000	0.989	-0.005	0.360
Unemployed a year ago	0.008	0.121	0.006	0.234	0.007	0.174
Education: first degree or above	-0.013	0.005	-0.014	0.005	-0.013	0.007

Ln (SAV) = α + $\beta0$ (Optimism) + $\beta1$ (Age) + $\beta2$ (Male) + $\beta3$ (Married) + $\beta4$ (White) + $\beta5$ (Healthy) + $\beta6$ (Household size) + $\beta7$ (Financial wealth) + $\beta8$ (Annual income) + $\beta9$ (Annual household income) + $\beta10$ (Home ownership) + $\beta11$ (Home purchase price) + $\beta12$ (Current home value) + $\beta13$ (Mortgage outstanding) + $\beta14$ (Business ownership) + $\beta15$ (Occupation) + $\beta16$ (Permanent contract) + $\beta17$ (Unemployed) + $\beta18$ (Unemployed a year ago) + $\beta19$ (Education)

Table 15

Optimism and risk-free portfolio choice for all individuals

| | Risk-free Portfolios (All Individuals) | | | | | |
| | Financial expectation | | A Priori Optimism | | A Posteriori Optimism | |
	Beta	p -Value	Beta	p -Value	Beta	p -Value
Optimism	0.002	0.530	-0.009	0.002	0.000	0.960
Age	0.009	0.056	0.008	0.074	0.007	0.124
Male	-0.012	0.000	-0.012	0.000	-0.013	0.000
Married	-0.006	0.083	-0.006	0.097	-0.005	0.195
White	0.007	0.020	0.007	0.023	0.009	0.003
Healthy	-0.002	0.584	-0.002	0.549	-0.001	0.688
Household size	0.009	0.012	0.009	0.012	0.007	0.060
Total financial wealth (ln)	0.092	0.000	0.091	0.000	0.096	0.000
Annual income (ln)	0.000	0.997	0.000	0.913	0.003	0.491
Annual household income (ln)	0.018	0.000	0.017	0.000	0.018	0.000
Home ownership	-0.176	0.000	-0.176	0.000	-0.180	0.000
Home purchase price (ln)	-0.019	0.000	-0.019	0.000	-0.022	0.000
Current home value (ln)	-0.719	0.000	-0.719	0.000	-0.715	0.000
Mortgage outstanding (ln)	-0.028	0.000	-0.028	0.000	-0.028	0.000
Business ownership	0.004	0.210	0.004	0.180	0.003	0.400
Finance related occupation	-0.005	0.072	-0.005	0.074	-0.005	0.087
Employment: permanent contract	-0.019	0.000	-0.019	0.000	-0.020	0.000
Unemployed	0.000	0.868	0.001	0.824	0.002	0.589
Unemployed a year ago	0.001	0.686	0.001	0.796	0.002	0.544
Education: first degree or above	0.000	0.999	0.000	0.946	0.000	0.992

SAV/TW = $\alpha + \beta_0$ (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 16

Optimism and risky portfolio choice for all individuals

| | Risky Portfolios (All Individuals) | | | | | |
| | Financial expectation | | A Priori Optimism | | A Posteriori Optimism | |
	Beta	p -Value	Beta	p -Value	Beta	p -Value
Optimism	0.008	0.259	0.052	0.000	0.020	0.003
Age	0.062	0.000	0.062	0.000	0.061	0.000
Male	0.056	0.000	0.055	0.000	0.057	0.000
Married	0.034	0.000	0.032	0.000	0.029	0.000
White	0.002	0.748	0.003	0.680	0.002	0.715
Healthy	0.007	0.288	0.008	0.225	0.006	0.342
Household size	0.008	0.351	0.007	0.382	0.007	0.427
Total financial wealth (ln)	0.128	0.000	0.132	0.000	0.128	0.000
Annual income (ln)	0.031	0.000	0.029	0.001	0.031	0.000
Annual household income (ln)	-0.004	0.638	0.000	0.961	-0.003	0.745
Home ownership	-0.089	0.002	-0.087	0.002	-0.094	0.001
Home purchase price (ln)	0.072	0.000	0.070	0.000	0.070	0.000
Current home value (ln)	0.120	0.000	0.118	0.000	0.127	0.000
Mortgage outstanding (ln)	-0.015	0.081	-0.015	0.074	-0.014	0.102
Business ownership	0.010	0.120	0.009	0.148	0.010	0.122
Finance related occupation	0.049	0.000	0.050	0.000	0.051	0.000
Employment: permanent contract	-0.012	0.172	-0.009	0.287	-0.013	0.163
Unemployed	0.004	0.612	-0.003	0.695	0.004	0.604
Unemployed a year ago	0.000	0.969	0.003	0.664	0.001	0.843
Education: first degree or above	0.049	0.000	0.048	0.000	0.049	0.000

INV/FW = $\alpha + \beta_0$ (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 17

Optimism and risky portfolio choice for all individuals

	Risky Portfolios (All Individuals)					
	Financial expectation		A Priori Optimism		A Posteriori Optimism	
	Beta	*p*-Value	Beta	*p*-Value	Beta	*p*-Value
Optimism	0.007	0.194	0.041	0.000	0.020	0.000
Age	0.016	0.050	0.015	0.054	0.016	0.057
Male	0.040	0.000	0.039	0.000	0.041	0.000
Married	0.030	0.000	0.028	0.000	0.027	0.000
White	0.006	0.246	0.007	0.214	0.008	0.164
Healthy	0.011	0.038	0.012	0.027	0.009	0.097
Household size	-0.009	0.186	-0.009	0.167	-0.010	0.165
Total financial wealth (ln)	0.499	0.000	0.502	0.000	0.503	0.000
Annual income (ln)	0.024	0.001	0.023	0.001	0.025	0.000
Annual household income (ln)	0.018	0.013	0.021	0.004	0.019	0.010
Home ownership	-0.088	0.000	-0.087	0.000	-0.090	0.000
Home purchase price (ln)	0.065	0.000	0.063	0.000	0.060	0.000
Current home value (ln)	0.131	0.000	0.129	0.000	0.133	0.000
Mortgage outstanding (ln)	-0.042	0.000	-0.042	0.000	-0.040	0.000
Business ownership	0.016	0.003	0.016	0.005	0.017	0.003
Finance related occupation	0.048	0.000	0.048	0.000	0.049	0.000
Employment: permanent contract	-0.033	0.000	-0.031	0.000	-0.033	0.000
Unemployed	0.006	0.356	0.001	0.918	0.007	0.244
Unemployed a year ago	0.011	0.072	0.013	0.030	0.010	0.091
Education: first degree or above	0.057	0.000	0.057	0.000	0.057	0.000

Ln (INV) = α + β_0 (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 18

Optimism and risky portfolio choice for all individuals

	Risky Portfolios (All Individuals)					
	Financial expectation		A Priori Optimism		A Posteriori Optimism	
	Beta	*p*-Value	Beta	*p*-Value	Beta	*p*-Value
Optimism	0.004	0.516	0.032	0.000	0.010	0.105
Age	-0.006	0.541	-0.006	0.534	-0.005	0.569
Male	0.042	0.000	0.042	0.000	0.043	0.000
Married	0.000	0.948	0.000	0.931	-0.004	0.622
White	-0.004	0.537	-0.003	0.575	-0.006	0.323
Healthy	0.010	0.104	0.011	0.085	0.009	0.165
Household size	-0.017	0.030	-0.017	0.027	-0.014	0.085
Total financial wealth (ln)	0.195	0.000	0.198	0.000	0.202	0.000
Annual income (ln)	0.006	0.439	0.005	0.533	0.004	0.650
Annual household income (ln)	0.021	0.009	0.024	0.004	0.023	0.006
Home ownership	0.023	0.401	0.024	0.382	0.027	0.344
Home purchase price (ln)	0.044	0.000	0.042	0.000	0.045	0.000
Current home value (ln)	-0.387	0.000	-0.388	0.000	-0.392	0.000
Mortgage outstanding (ln)	-0.040	0.000	-0.040	0.000	-0.040	0.000
Business ownership	0.014	0.021	0.014	0.026	0.017	0.009
Finance related occupation	0.020	0.002	0.020	0.001	0.020	0.002
Employment: permanent contract	-0.032	0.000	-0.030	0.000	-0.033	0.000
Unemployed	0.009	0.177	0.005	0.441	0.006	0.426
Unemployed a year ago	0.007	0.318	0.008	0.212	0.007	0.327
Education: first degree or above	0.040	0.000	0.040	0.000	0.041	0.000

INV/TW = α + β_0 (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 19

Optimism and indebtedness for all individuals

| | Debt (All Individuals) | | | | | |
| | Financial expectation | | A Priori Optimism | | A Posteriori Optimism | |
	Beta	p -Value	Beta	p -Value	Beta	p -Value
Optimism	0.054	0.000	0.063	0.000	0.033	0.000
Age	-0.198	0.000	-0.208	0.000	-0.199	0.000
Male	0.024	0.000	0.025	0.000	0.027	0.000
Married	0.039	0.000	0.036	0.000	0.043	0.000
White	0.013	0.031	0.013	0.027	0.014	0.029
Healthy	-0.003	0.617	-0.002	0.787	-0.005	0.440
Household size	-0.005	0.536	-0.006	0.423	-0.012	0.122
Total financial wealth (ln)	-0.148	0.000	-0.146	0.000	-0.156	0.000
Annual income (ln)	0.135	0.000	0.134	0.000	0.136	0.000
Annual household income (ln)	-0.014	0.077	-0.009	0.252	-0.013	0.107
Home ownership	0.083	0.002	0.087	0.001	0.086	0.002
Home purchase price (ln)	0.065	0.000	0.063	0.000	0.065	0.000
Current home value (ln)	-0.175	0.000	-0.181	0.000	-0.176	0.000
Mortgage outstanding (ln)	0.096	0.000	0.096	0.000	0.103	0.000
Business ownership	0.016	0.008	0.017	0.005	0.018	0.004
Finance related occupation	0.010	0.093	0.012	0.054	0.009	0.150
Employment: permanent contract	0.080	0.000	0.085	0.000	0.084	0.000
Unemployed	0.000	0.922	-0.006	0.361	0.000	0.933
Unemployed a year ago	-0.029	0.000	-0.026	0.000	-0.023	0.001
Education: first degree or above	0.085	0.000	0.086	0.000	0.083	0.000

Ln (PD) = $\alpha + \beta_0$ (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 20

Optimism and indebtedness for all individuals

| | Debt (All Individuals) | | | | | |
| | Financial expectation | | A Priori Optimism | | A Posteriori Optimism | |
	Beta	p -Value	Beta	p -Value	Beta	p -Value
Optimism	0.014	0.000	0.016	0.000	0.010	0.000
Age	-0.032	0.000	-0.034	0.000	-0.035	0.000
Male	0.006	0.001	0.007	0.001	0.007	0.001
Married	0.008	0.000	0.008	0.000	0.009	0.000
White	-0.003	0.123	-0.003	0.134	-0.003	0.106
Healthy	-0.001	0.431	0.000	0.608	-0.002	0.382
Household size	-0.003	0.112	-0.004	0.072	-0.005	0.024
Total financial wealth (ln)	-0.019	0.000	-0.019	0.000	-0.021	0.000
Annual income (ln)	0.024	0.000	0.023	0.000	0.025	0.000
Annual household income (ln)	0.018	0.000	0.019	0.000	0.019	0.000
Home ownership	-0.133	0.000	-0.132	0.000	-0.132	0.000
Home purchase price (ln)	0.014	0.000	0.013	0.000	0.013	0.000
Current home value (ln)	0.116	0.000	0.114	0.000	0.114	0.000
Mortgage outstanding (ln)	-0.982	0.000	-0.982	0.000	-0.981	0.000
Business ownership	0.011	0.000	0.011	0.000	0.012	0.000
Finance related occupation	0.003	0.064	0.004	0.040	0.004	0.061
Employment: permanent contract	0.004	0.064	0.005	0.019	0.005	0.029
Unemployed	-0.001	0.573	-0.002	0.260	0.000	0.825
Unemployed a year ago	-0.004	0.044	-0.003	0.096	-0.005	0.026
Education: first degree or above	0.023	0.000	0.024	0.000	0.025	0.000

PD/TD = $\alpha + \beta_0$ (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 21

Optimism and indebtedness for all individuals

| | Debt (All Individuals) | | | | | |
| | Financial expectation | | A Priori Optimism | | A Posteriori Optimism | |
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism	0.015	0.026	0.022	0.001	0.021	0.002
Age	0.025	0.013	0.022	0.025	0.023	0.022
Male	0.002	0.725	0.002	0.714	0.003	0.640
Married	0.002	0.831	0.001	0.932	0.000	0.959
White	0.001	0.843	0.001	0.826	0.001	0.827
Healthy	-0.020	0.003	-0.019	0.004	-0.021	0.003
Household size	0.000	0.923	-0.001	0.883	-0.001	0.894
Total financial wealth (ln)	-0.030	0.000	-0.029	0.000	-0.031	0.000
Annual income (ln)	-0.009	0.316	-0.009	0.284	-0.010	0.267
Annual household income (ln)	0.001	0.911	0.003	0.761	0.002	0.802
Home ownership	-0.033	0.265	-0.032	0.283	-0.033	0.282
Home purchase price (ln)	0.022	0.018	0.021	0.023	0.022	0.019
Current home value (ln)	-0.013	0.674	-0.015	0.634	-0.015	0.632
Mortgage outstanding (ln)	0.031	0.000	0.031	0.000	0.032	0.000
Business ownership	-0.006	0.411	-0.005	0.425	-0.006	0.398
Finance related occupation	-0.004	0.526	-0.004	0.568	-0.004	0.578
Employment: permanent contract	0.011	0.212	0.013	0.153	0.012	0.198
Unemployed	-0.001	0.877	-0.003	0.662	-0.001	0.858
Unemployed a year ago	-0.004	0.571	-0.003	0.690	-0.004	0.559
Education: first degree or above	0.003	0.675	0.003	0.646	0.004	0.618

MG/TW = α + β_0 (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 22

Optimism and risk-free portfolio choice for the head of the household

| | Risk-free Portfolios (Head of the Household) | | | | | |
| | Financial expectation | | A Priori Optimism | | A Posteriori Optimism | |
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism	-0.018	0.053	-0.062	0.000	-0.021	0.022
Age	-0.026	0.052	-0.026	0.047	-0.019	0.156
Male	-0.051	0.000	-0.051	0.000	-0.053	0.000
Married	0.018	0.164	0.018	0.165	0.022	0.100
White	0.003	0.727	0.003	0.766	0.007	0.459
Healthy	-0.012	0.172	-0.014	0.128	-0.008	0.395
Household size	-0.044	0.000	-0.042	0.000	-0.045	0.000
Total financial wealth (ln)	-0.023	0.119	-0.022	0.129	-0.021	0.154
Annual income (ln)	-0.009	0.590	-0.012	0.445	-0.010	0.573
Annual household income (ln)	-0.129	0.000	-0.133	0.000	-0.134	0.000
Home ownership	0.072	0.081	0.071	0.084	0.071	0.089
Home purchase price (ln)	-0.043	0.001	-0.041	0.002	-0.043	0.001
Current home value (ln)	-0.147	0.001	-0.144	0.001	-0.142	0.001
Mortgage outstanding (ln)	0.022	0.072	0.022	0.079	0.019	0.142
Business ownership	-0.012	0.189	-0.011	0.213	-0.014	0.138
Finance related occupation	-0.048	0.000	-0.049	0.000	-0.051	0.000
Employment: permanent contract	0.031	0.018	0.028	0.036	0.037	0.006
Unemployed	-0.004	0.732	0.003	0.801	-0.006	0.597
Unemployed a year ago	-0.003	0.762	-0.007	0.510	-0.004	0.731
Education: first degree or above	-0.058	0.000	-0.059	0.000	-0.058	0.000

SAV/FW = α + β_0 (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 23

Optimism and risky portfolio choice for the head of the household

	Risky Portfolios (Head of the Household)					
	Financial expectation		A Priori Optimism		A Posteriori Optimism	
	Beta	*p*-Value	Beta	*p*-Value	Beta	*p*-Value
Optimism	0.018	0.053	0.062	0.000	0.021	0.022
Age	0.026	0.052	0.026	0.047	0.019	0.156
Male	0.051	0.000	0.051	0.000	0.053	0.000
Married	-0.018	0.164	-0.018	0.165	-0.022	0.100
White	-0.003	0.727	-0.003	0.766	-0.007	0.459
Healthy	0.012	0.172	0.014	0.128	0.008	0.395
Household size	0.044	0.000	0.042	0.000	0.045	0.000
Total financial wealth (ln)	-0.072	0.081	-0.071	0.084	-0.071	0.089
Annual income (ln)	0.043	0.001	0.041	0.002	0.043	0.001
Annual household income (ln)	0.147	0.001	0.144	0.001	0.142	0.001
Home ownership	-0.022	0.072	-0.022	0.079	-0.019	0.142
Home purchase price (ln)	0.058	0.000	0.059	0.000	0.058	0.000
Current home value (ln)	-0.031	0.018	-0.028	0.036	-0.037	0.006
Mortgage outstanding (ln)	0.012	0.189	0.011	0.213	0.014	0.138
Business ownership	0.004	0.732	-0.003	0.801	0.006	0.597
Finance related occupation	0.003	0.762	0.007	0.510	0.004	0.731
Employment: permanent contract	0.048	0.000	0.049	0.000	0.051	0.000
Unemployed	0.023	0.119	0.022	0.129	0.021	0.154
Unemployed a year ago	0.009	0.590	0.012	0.445	0.010	0.573
Education: first degree or above	0.129	0.000	0.133	0.000	0.134	0.000

INV/FW = α + β_0 (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Table 24

Optimism and indebtedness for the head of the household

	Debt (Head of the Household)					
	Financial expectation		A Priori Optimism		A Posteriori Optimism	
	Beta	*p*-Value	Beta	*p*-Value	Beta	*p*-Value
Optimism	0.051	0.000	0.054	0.000	0.031	0.000
Age	-0.249	0.000	-0.256	0.000	-0.251	0.000
Male	0.016	0.108	0.016	0.101	0.017	0.093
Married	-0.024	0.045	-0.024	0.040	-0.023	0.057
White	0.010	0.226	0.010	0.232	0.009	0.258
Healthy	0.003	0.677	0.005	0.555	0.003	0.736
Household size	0.032	0.003	0.029	0.007	0.030	0.006
Total financial wealth (ln)	0.014	0.291	0.012	0.357	0.017	0.200
Annual income (ln)	0.059	0.000	0.064	0.000	0.056	0.000
Annual household income (ln)	-0.157	0.000	-0.156	0.000	-0.159	0.000
Home ownership	0.043	0.249	0.046	0.217	0.052	0.166
Home purchase price (ln)	0.005	0.669	0.004	0.718	0.007	0.569
Current home value (ln)	-0.075	0.051	-0.081	0.033	-0.087	0.026
Mortgage outstanding (ln)	0.118	0.000	0.119	0.000	0.123	0.000
Business ownership	0.017	0.038	0.018	0.028	0.019	0.026
Finance related occupation	0.009	0.254	0.011	0.175	0.011	0.197
Employment: permanent contract	0.044	0.000	0.049	0.000	0.046	0.000
Unemployed	0.000	0.916	-0.005	0.568	0.003	0.773
Unemployed a year ago	-0.032	0.000	-0.029	0.002	-0.034	0.000
Education: first degree or above	0.058	0.000	0.060	0.000	0.058	0.000

Ln (PD) = α + β_0 (Optimism) + β_1 (Age) + β_2 (Male) + β_3 (Married) + β_4 (White) + β_5 (Healthy) + β_6 (Household size) + β_7 (Financial wealth) + β_8 (Annual income) + β_9 (Annual household income) + β_{10} (Home ownership) + β_{11} (Home purchase price) + β_{12} (Current home value) + β_{13} (Mortgage outstanding) + β_{14} (Business ownership) + β_{15} (Occupation) + β_{16} (Permanent contract) + β_{17} (Unemployed) + β_{18} (Unemployed a year ago) + β_{19} (Education)

Appendix

Appendix 1

Original questionnaires

Question 1	Looking ahead, how do you think you will be financially <u>a year from now</u>, will you be <u>Better off</u>, or <u>worse off</u> than you are now, Or about the same?
Question 2	Would you say that you yourself are <u>Better off</u>, or <u>worse off</u> financially than you were <u>a year ago</u>, Or about the same?
Question 3	I'd like to ask you about any savings and investments you may have. Please look at this card and tell me which types of savings accounts or investments you have, if any. They can be in your name only, held in joint names with your husband/wife/partner or with someone else. None (0); Don't know (98); Refused (99); savings or deposit account, (with a bank, post office or building society) (01); National Savings Bank (Post Office) (02); TESSA only ISA or Cash ISA (03); National Savings Certificates (04); Premium Bonds (05); Unit Trusts/Investment Trusts (excluding ISAs/PEPs) (06); Stocks and shares ISA or PEP (07); Shares (UK or foreign/excluding ISAs and PEPs) (08); National Savings Bonds (Capital, Income or Deposit) (09); Other investments (Gilts, government or company securities) (10)
Question 4	Thinking first about your savings accounts, including your {text fill categories 1, 2, 3}[1], about how much in total is the current balance in these accounts?
Question 5	Thinking now about the investments you have including your {text fill categories from F15}[2] {but NOT including the savings you have just told me me about}, about how much is the total value of these investments?
Question 6	I would like to ask you now about any other financial commitments you may have apart from mortgages. Do you currently owe any money on the things listed on this card? Please do not include credit card and other bills being fully paid off in the current month. ... About how much in total is owed on

[1] Refers to (01) savings or deposit account, (with a bank, post office or building society), (02) National Savings Bank (Post Office), and (03) TESSA only ISA or Cash ISA

[2] Refers to Question 4

	this/these commitment(s)?
Question 7	Would you please tell me your exact date of birth?
Question 8	Interviewer check: respondent is: Male or Female.
Question 9	Marital Status: Married, Living as couple, Widowed, Divorced, Separated, Never married, or Under 16.
Question 10	To which of these ethnic groups do you consider you belong? a) White, b) Mixed, c) Asian or Asian British, d) Black or Black British, and e) Chinese or other ethnic group.
Question 11	Please think back over the last 12 months about how your health has been. Compared to people of your own age, would you say that your health has on the whole been: Excellent, Good, Fair, Poor, Very Poor, or Don't know?
Question 12	Fill out the respondent's person number
Question 13	Does your household own or rent this accommodation or does it come rent-free? Owned/being bought on mortgage, Shared ownership (part-owned part-rented), Rented, Rent free, or Other.
Question 14	How much did you pay for the property?
Question 15	About how much would you expect to get for your home if you sold it today? (If range given write in lowest figure)
Question 16	Could I just check, approximately how much is the total amount of your outstanding loans on all the property you (or your household) own, including your current home? IF 'DON'T KNOW / CAN'T REMEMBER' PROBE: 'Can you give me an approximate amount?'
Question 17	Are you an employee or self-employed?
Question 18	What was your (main) job last week? Please tell me the exact job title and describe fully the sort of work you do. (if more than one job: main job = job with most hours; if equal hours: main job = highest paid) ENTER JOB TITLE:_____ DESCRIBE FULLY WORK DONE: (if relevant 'what are the materials made of?') _____
Question 19	Leaving aside your own personal intentions and circumstances, is your job: A permanent job, or Is there some way that it is not permanent?
Question 20	Which of the following best describes your current situation, Are you (read out and code one only): Self employed, In paid employment (full or part-time), Retired from paid work altogether, Looking after family or home, Full-time

	student/ at school, Long term sick or disabled, On a government training scheme, Something else (please give details).
Question 21	Which of the following best describes your current situation, Are you (read out and code one only): Self employed, In paid employment (full or part-time), Retired from paid work altogether, Looking after family or home, Full-time student/ at school, Long term sick or disabled, On a government training scheme, Something else (please give details).
Question 22	Which qualifications do you have? (code all that apply) 1) Youth training certificate/Skillseekers, Recognised trade / mocern apprenticeship completed, 2) Clerical and commercial qualifications (eg typing/shorthand/book-keeping/commerce), 3) City & Guilds Certificate - Craft/Intermediate/Ordinary/Part I / or Scotvec National Certificate Modules / or NVQ1/SVQ1, 4) City & Guilds Certificate - Advanced/Final/Part II / or Scotvec Higher National Units / or NVQ2/SVQ2, City & Guilds Certificate - Full Technological/Part III / or Scotvec Higher National Units / or NVQ3/SVQ3, 5) Ordinary National Certificate (ONC) or Diploma (OND), 6) BEC/TEC/BTEC / Scotvec National Certificate or Diploma / or NVQ3/SVQ3, 7) Higher National Certificate (HNC) or Diploma (HND), 8) BEC/TEC/BTEC / Scotvec Higher Certificate or Higher Diploma / or NVQ4/SVQ4, 9) Nursing qualifications (eg SEN, SRN, SCM, RGN), 10) Teaching qualifications (not degree), 11) University diploma, 12) University or CNAA First Degree (eg BA, B.Ed, BSc), 13) University or CNAA Higher Degree (eg MSc, PhD), or 14) Other technical, professional or higher qualifications.

The questionnaires in Appendix Table 1 are selected from Wave 2005 from the BHPS. The wording for some of the questions varies slightly throughout the survey period. However, the slight variation does not affect our data analysis.

Appendix 2

Descriptive statistics for all individuals and the head of the household in wave 1995

	1995 All Individuals (Head of Household)									
	Mean		**Sdv**		**Min**		**Max**		**N**	
Heuristics of optimism										
Financial expectation	1.14	(1.10)	0.61	(0.59)	0	(0)	2	(2)	9249	(4800)
A priori optimism	0.15	(0.17)	0.86	(0.81)	-2	-(2)	2	(2)	9249	(4800)
A posteriori optimism	0.09	(0.08)	0.80	(0.78)	-2	-(2)	2	(2)	8612	(4508)
Risk-free portfolios										
Savings (SAV)	3699.27	(4275.50)	17109.75	(13020.03)	0	(0)	900000	(230000)	9249	(4800)
SAV/FW	0.73	(0.70)	0.36	(0.37)	0	(0)	1	(1)	5315	(2803)
SAV/TW	0.15	(0.18)	0.31	(0.33)	0	(0)	1	(1)	7671	(3884)
SAV/HINC	0.23	(0.60)	0.92	(5.06)	0	(0)	33	(300)	9089	(4547)
SAV/INV	5.48	(4.78)	33.87	(18.40)	0	(0)	1330	(333)	2394	(1404)
Risky portfolios										
Investment (INV)	4163.71	(5393.20)	23203.51	(24271.24)	0	(0)	999999	(800000)	9249	(4800)
INV/FW	0.27	(0.30)	0.36	(0.37)	0	(0)	1	(1)	5315	(2803)
INV/TW	0.05	(0.07)	0.16	(0.17)	0	(0)	1	(1)	7671	(3884)
(INV + CHV)/TW	0.85	(0.82)	0.31	(0.33)	0	(0)	1	(1)	7671	(3884)
INV/HINC	0.24	(0.55)	2.43	(4.24)	0	(0)	200	(200)	9089	(4547)
Debt										
Personal Debt (PD)	746.23	(894.55)	2914.38	(3647.42)	0	(0)	99999	(99999)	9249	(4800)
PD/TD	0.28	(0.31)	0.43	(0.44)	0	(0)	1	(1)	5483	(2668)
MG/TD	0.97	(0.96)	0.08	(0.09)	0	(0)	1	(1)	4075	(1922)
PD/INC	0.11	(0.10)	0.67	(0.77)	0	(0)	33	(33)	8459	(4515)
MG/HINC	1.74	(2.03)	7.09	(9.92)	0	(0)	413	(413)	4075	(1922)
PD/TW	0.20	(0.18)	2.95	(2.46)	0	(0)	168	(100)	7671	(3884)
MG/TW	1.05	(1.18)	9.80	(11.32)	0	(0)	300	(300)	4039	(1902)
Demographic Variables										
Age	44.02	(49.41)	18.49	(18.20)	15	(16)	96	(96)	9249	(4800)
Male	0.47	(0.68)	0.50	(0.47)	0	(0)	1	(1)	9249	(4800)
Married	0.64	(0.61)	0.48	(0.49)	0	(0)	1	(1)	9249	(4800)
White	0.95	(0.95)	0.23	(0.22)	0	(0)	1	(1)	9249	(4800)
Healthy	0.91	(0.90)	0.28	(0.30)	0	(0)	1	(1)	9249	(4800)
Household size	2.88	(2.46)	1.38	(1.33)	1	(1)	11	(11)	9249	(4800)
Home ownership	0.70	(0.66)	0.46	(0.47)	0	(0)	1	(1)	9249	(4800)
Home purchase price	36246.42	(35916.80)	41949.08	(42987.92)	1	(1)	999997	(999997)	6025	(3216)
Current home value	76152.10	(73372.90)	53153.61	(51706.71)	250	(250)	685000	(685000)	6570	(3231)
Mortgage outstanding	38137.72	(38824.13)	39732.18	(39925.58)	68	(68)	1000000	(1000000)	4075	(1922)
Education: first degree or above	0.27	(0.30)	0.44	(0.46)	0	(0)	1	(1)	9249	(4800)
Employment: permanent contract	0.51	(0.50)	0.50	(0.50)	0	(0)	1	(1)	9249	(4800)
Business ownership	0.11	(0.13)	0.32	(0.34)	0	(0)	1	(1)	9249	(4800)
Unemployed	0.04	(0.04)	0.20	(0.20)	0	(0)	1	(1)	9249	(4800)
Unemployed a year ago	0.04	(0.04)	0.20	(0.20)	0	(0)	1	(1)	9249	(4800)
Finance related occupation	0.05	(0.05)	0.22	(0.21)	0	(0)	1	(1)	9249	(4800)
Annual income	9583.68	(12300.99)	10536.03	(11721.40)	0	(0)	292060	(292060)	9249	(4800)
Annual household income	22141.11	(19252.28)	16966.98	(16466.10)	0	(0)	300301	(300301)	9249	(4800)
Total financial wealth	7864.82	(9670.18)	32384.77	(31730.80)	0	(0)	1114999	(870000)	9249	(4800)
Total wealth	61959.24	(59059.32)	70890.59	(70653.60)	0	(0)	1464999	(970000)	9249	(4800)

Appendix 3

Descriptive statistics for all individuals and the head of the household in wave 2000

	2000 All Individuals (Head of Household)									
	Mean		**Sdv**		**Min**		**Max**		**N**	
Heuristics of optimism										
Financial expectation	1.21	(1.18)	0.57	(0.56)	0	(0)	2	(2)	15603	(8291)
A priori optimism	0.12	(0.14)	0.83	(0.80)	-2	-(2)	2	(2)	15603	(8291)
A posteriori optimism	0.10	(0.09)	0.78	(0.77)	-2	-(2)	2	(2)	14258	(7662)
Risk-free portfolios										
Savings (SAV)	3196.78	(3781.25)	11094.36	(12793.63)	0	(0)	350000	(350000)	15603	(8291)
SAV/FW	0.75	(0.72)	0.36	(0.37)	0	(0)	1	(1)	8151	(4306)
SAV/TW	0.14	(0.17)	0.30	(0.33)	0	(0)	1	(1)	12488	(6393)
SAV/HINC	0.18	(0.70)	0.96	(13.37)	0	(0)	45	(833)	15321	(7929)
SAV/INV	7.73	(9.12)	47.10	(58.38)	0	(0)	1168	(1168)	3560	(2075)
Risky portfolios										
Investment (INV)	3137.52	(3969.39)	17509.31	(19865.57)	0	(0)	500000	(500000)	15603	(8291)
INV/FW	0.25	(0.28)	0.36	(0.37)	0	(0)	1	(1)	8151	(4306)
INV/TW	0.04	(0.05)	0.14	(0.16)	0	(0)	1	(1)	12488	(6393)
(INV + CHV)/TW	0.86	(0.83)	0.30	(0.33)	0	(0)	1	(1)	12488	(6393)
INV/HINC	0.16	(1.47)	2.26	(93.78)	0	(0)	252	(8333)	15321	(7929)
Debt										
Personal Debt (PD)	1286.05	(1446.14)	4966.07	(5845.52)	0	(0)	400000	(400000)	15603	(8291)
PD/TD	0.33	(0.37)	0.45	(0.46)	0	(0)	1	(1)	8918	(4439)
MG/TD	0.96	(0.95)	0.09	(0.09)	0	(0)	1	(1)	6217	(2931)
PD/INC	0.21	(0.17)	1.31	(1.14)	0	(0)	52	(41)	14407	(7882)
MG/HINC	1.61	(1.77)	2.53	(2.55)	0	(0)	113	(68)	6212	(2927)
PD/TW	0.39	(0.44)	3.68	(4.10)	0	(0)	108	(102)	12488	(6393)
MG/TW	1.01	(1.18)	11.24	(11.28)	0	(0)	612	(400)	6184	(2910)
Demographic Variables										
Age	45.19	(50.35)	18.60	(17.99)	15	(16)	101	(99)	15603	(8291)
Male	0.46	(0.66)	0.50	(0.48)	0	(0)	1	(1)	15603	(8291)
Married	0.64	(0.59)	0.48	(0.49)	0	(0)	1	(1)	15603	(8291)
White	0.96	(0.96)	0.20	(0.19)	0	(0)	1	(1)	15603	(8291)
Healthy	0.89	(0.88)	0.31	(0.33)	0	(0)	1	(1)	15603	(8291)
Household size	2.84	(2.42)	1.38	(1.32)	1	(1)	11	(11)	15603	(8291)
Home ownership	0.69	(0.64)	0.46	(0.48)	0	(0)	1	(1)	15603	(8291)
Home purchase price	40370.76	(39076.09)	42335.21	(42210.66)	1	(1)	999997	(999997)	9631	(5216)
Current home value	101847.48	(97706.32)	80750.89	(77399.38)	2000	(2000)	999999	(999999)	10852	(5379)
Mortgage outstanding	45076.73	(45088.89)	44576.19	(43090.29)	100	(100)	800000	(800000)	6217	(2931)
Education: first degree or above	0.32	(0.35)	0.47	(0.48)	0	(0)	1	(1)	15603	(8291)
Employment: permanent contract	0.53	(0.51)	0.50	(0.50)	0	(0)	1	(1)	15603	(8291)
Business ownership	0.09	(0.11)	0.29	(0.32)	0	(0)	1	(1)	15603	(8291)
Unemployed	0.04	(0.03)	0.19	(0.18)	0	(0)	1	(1)	15603	(8291)
Unemployed a year ago	0.03	(0.03)	0.18	(0.18)	0	(0)	1	(1)	15603	(8291)
Finance related occupation	0.05	(0.04)	0.21	(0.20)	0	(0)	1	(1)	15603	(8291)
Annual income	11398.59	(14182.74)	11722.34	(13129.75)	0	(0)	397320	(397320)	15603	(8291)
Annual household income	25518.99	(21961.45)	18983.44	(18027.93)	0	(0)	397320	(397320)	15603	(8291)
Total financial wealth	6335.81	(7752.01)	23300.18	(26533.17)	0	(0)	550000	(505000)	15603	(8291)
Total wealth	77171.47	(71141.50)	90433.55	(88881.45)	0	(0)	1239999	(1239999)	15603	(8291)

Appendix 4

Descriptive statistics for all individuals and the head of the household in wave 2005

	2005 All Individuals (Head of Household)									
	Mean		**Sdv**		**Min**		**Max**		**N**	
Heuristics of optimism										
Financial expectation	1.17	(1.13)	0.56	(0.55)	0	(0)	2	(2)	15627	(8109)
A priori optimism	0.12	(0.13)	0.794	(0.77)	-2	-(2)	2	(2)	15627	(8109)
A posteriori optimism	0.12	(0.12)	0.751	(0.73)	-2	-(2)	2	(2)	14435	(7569)
Risk-free portfolios										
Savings (SAV)	4258.94	(5090.23)	16135.501	(18483.90)	0	(0)	500000	(500000)	15627	(8109)
SAV/FW	0.79	(0.76)	0.344	(0.36)	0	(0)	1	(1)	7312	(3928)
SAV/TW	0.1	(0.12)	0.261	(0.29)	0	(0)	1	(1)	12914	(6539)
SAV/HINC	0.2	(2.95)	1.044	(183.57)	0	(0)	63	(15833)	14913	(7535)
SAV/INV	10.29	(9.83)	56.411	(48.79)	0	(0)	1700	(1322)	2905	(1729)
Risky portfolios										
Investment (INV)	3121.27	(4233.02)	20815.139	(25257.65)	0	(0)	900000	(900000)	15627	(8109)
INV/FW	0.21	(0.24)	0.344	(0.36)	0	(0)	1	(1)	7312	(3928)
INV/TW	0.02	(0.03)	0.1	(0.12)	0	(0)	1	(1)	12914	(6539)
(INV + CHV)/TW	0.9	(0.88)	0.261	(0.29)	0	(0)	1	(1)	12914	(6539)
INV/HINC	0.12	(0.34)	0.903	(5.39)	0	(0)	46	(333)	14913	(7535)
Debt										
Personal Debt (PD)	1843.37	(2000.20)	7306.902	(7055.06)	0	(0)	400000	(240000)	15627	(8109)
PD/TD	0.3	(0.34)	0.434	(0.45)	0	(0)	1	(1)	8410	(4130)
MG/TD	0.96	(0.95)	0.096	(0.10)	0	(0)	1	(1)	6115	(2876)
PD/INC	0.27	(0.18)	2.474	(1.94)	0	(0)	133	(133)	13946	(7497)
MG/HINC	2.81	(3.20)	37.178	(38.99)	0	(0)	2015	(2015)	6113	(2874)
PD/TW	0.54	(0.59)	6.969	(6.90)	0	(0)	286	(233)	12914	(6539)
MG/TW	1.33	(1.39)	24.799	(23.51)	0	(0)	1000	(1000)	6091	(2863)
Demographic Variables										
Age	45.93	(51.52)	18.694	(17.68)	15	(16)	99	(99)	15627	(8109)
Male	0.46	(0.67)	0.498	(0.47)	0	(0)	1	(1)	15623	(8106)
Married	0.64	(0.59)	0.481	(0.49)	0	(0)	1	(1)	15627	(8109)
White	0.96	(0.97)	0.202	(0.17)	0	(0)	1	(1)	15627	(8109)
Healthy	0.91	(0.90)	0.29	(0.31)	0	(0)	1	(1)	15627	(8109)
Household size	2.88	(2.44)	1.42	(1.34)	1	(1)	14	(13)	15627	(8109)
Home ownership	0.75	(0.72)	0.431	(0.45)	0	(0)	1	(1)	15627	(8109)
Home purchase price	46445.77	(44122.26)	51020.12	(49018.67)	1	(1)	999997	(999997)	10205	(5672)
Current home value	193368.94	(186372.76)	155469.254	(149711.41)	1	(1)	4000000	(4000000)	11801	(5833)
Mortgage outstanding	71261.93	(73119.17)	117441.868	(152670.31)	150	(150)	7299999	(7299999)	6115	(2876)
Education: first degree or above	0.37	(0.40)	0.483	(0.49)	0	(0)	1	(1)	15627	(8109)
Employment: permanent contract	0.53	(0.53)	0.499	(0.50)	0	(0)	1	(1)	15627	(8109)
Business ownership	0.1	(0.12)	0.295	(0.33)	0	(0)	1	(1)	15627	(8109)
Unemployed	0.03	(0.03)	0.176	(0.16)	0	(0)	1	(1)	15627	(8109)
Unemployed a year ago	0.02	(0.02)	0.155	(0.15)	0	(0)	1	(1)	15627	(8109)
Finance related occupation	0.04	(0.04)	0.193	(0.19)	0	(0)	1	(1)	15627	(8109)
Annual income	14037.27	(17605.72)	16600.654	(19574.54)	0	(0)	1009984	(1009984)	15627	(8109)
Annual household income	31735.55	(27750.43)	25290.482	(25607.92)	0	(0)	1009984	(1009984)	15627	(8109)
Total financial wealth	7381.25	(9324.21)	30274.184	(36431.37)	0	(0)	1400000	(1400000)	15627	(8109)
Total wealth	153407.16	(143386.65)	166823.244	(163965.14)	0	(0)	4100000	(4100000)	15627	(8109)