

# Optimism and Portfolio Choice

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## **Abstract**

This study develops innovative measures of financial optimism by defining optimism as the overestimation of the favourable outcome in an individual's future financial situation. The 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 debt borrowing. We use more than 660,000 observations from the British Household Panel Survey covering the period 1991 to 2007 in our analysis. Optimistic, pessimistic and neutral respondents have significantly different demographic characteristics. Optimists are significantly younger, more likely to be male, have higher educational qualifications, more likely to have business ownership, borrow more personal debt and take on a larger mortgage than non-optimists. However they also have lower accumulated financial wealth and a 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 & 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 & 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 & 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. 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. Optimism is understood to have effects on many economic phenomena (Puri & Robinson, 2007). Optimism can affect corporate management financial decisions and entrepreneurs' behaviour (March & Shapira, 1987; Gervais, Heaton, & Odean, 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, & Thaler, 1991; Barberis, Shleifer, & Vishny, 1998); it plays an important role for the existence of financial intermediation (Coval & Shumway, 2005) and optimism has impact on consumer expenditures (Kacperczyk & Kominek, 2002). However there is little evidence on the role that optimism plays in household portfolio choice. As one of the four macroeconomic sectors, 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 & Welch, 2006).

In this paper, we define optimism as the overestimation of the favourable outcome in a future event. Specifically, in our study this is a positive improvement of an investor's future financial situation. Using household survey data enables us to employ a vast sample from the real

world rather than an experiment. We find that financial optimism significantly encourages risk taking behaviour and optimists have significantly different demographic characteristics compared to non-optimists. Optimistic investors choose risky portfolios over risk-free portfolios for their investments and they borrow higher level of debt. Optimists are significantly younger, more likely to be male, have higher educational qualifications, more likely to have business ownership, borrow more unsecured personal debt and take on a larger mortgage than non-optimists. However they have lower accumulated financial wealth and a higher average unemployment rate than people who are pessimistic or neutral towards their financial situation. We verified the robustness of the above results by using alternative measures of optimism and repeating the analysis for the household heads. We also run the regression in each year that that relevant data is collected and we obtained the same significant findings.

The only published empirical paper studying optimism and household economic choice is Puri and Robinson (2007). Puri and Robinson (2007) use life expectancy miscalibration to measure individuals' optimism. 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 suspect that using life 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 the general economy but life expectancy miscalibration might be independent from the economic cycle and remain relatively stable throughout one's life time. Therefore, we aim at measuring financial optimism explicitly.

Our research differs from Puri and Robinson (2007) in the measurement of optimism, research focus and data. We developed innovative measures of optimism to investigate the influence of financial optimism. Our definition of optimism directly measures financial optimism in the BHPS data but we do not suggest that this measure is definitely a good measure of optimism in decision making in other domains or events. Therefore, we focus on the effect of optimism on biasing household portfolio choice instead of the effect of optimism on a series of economic decisions and attitude toward life events as in Puri and Robinson (2007). We believe it is more accurate to study the effect of an optimism measure within each decision making domain separately. Moreover, we analyse data from the British

Household Panel Survey (Taylor, Brice, Buck, & Prentice-Lane, 2009) which has not been used before in similar studies and covers the period from 1991 to 2007.

## **2. Optimism in Literature**

There are a number of seminal studies on optimism in psychology and finance, and its implications on economic decision making. 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 (Weinstein, 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.

Researchers have 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.

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 & Lovallo, 1993; Palme, Sunden, & Soderlind, 2005).

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 (Camerer & Lovallo, 1999; Rosen R. J., 2003; Lee, Shleifer, & Thaler, 1991). Hackbarth (2007) found

that optimistic managers overestimate corporate assets' growth rate and underestimate the assets' riskiness. They prefer equity to debt to fund new projects. Most entrepreneurs in the experiment conducted by Camerer and Lovo (1999) think the total profit earned by all entrants will be negative, but their own profit will be positive. When social mood is high, there is higher volume of merge and acquisitions (Nofsinger & Kim, 2003). Lowry and Schwert (2002) find that more firms go public after observing high IPO returns for other firms. Easterwood and Nutt (1999) find that financial analysts underreact to negative information, but overreact to positive information. According to Nofsinger (2005), optimism/pessimism drives speculative asset bubbles and crashes.

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. 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.

However, no published empirical paper focuses explicitly on the relationship between optimistic expectation and household portfolio choices. The majority of the research on household sentiment and financial choice tends to concentrate on consumption (Kacperczyk & Kominek, 2002). Puri and Robinson (2007) produced the only empirical research on the effect of optimism on a series household economic decisions and attitude toward life events includes individuals' marriage decisions, retirement plans, and vocational choices. In this paper, we focus on only household portfolio choice including saving, investment and debt choice, which is consistent with our measures for financial optimism since we believe it is more accurate to study the effect of optimism within each decision making domains.

### **3. Household Portfolio Choice**

There is rich literature on the effect of demographics on household portfolio choice. Studies have shown that a number of demographics such as age, gender, marital status, wealth,

income, home and business ownership, occupation, and education level also have an influence on individuals' portfolio choices (Morin & Suarez, 1983; Cohn, Lewellen, Lease, & Sclarbaum, 1975; Heaton & Lucas, 2000; Lusardi, 2003). We control for these demographical effects in this study.

Previous 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 (Morin and Suarez, 1983; Cohn, Lewellen, Lease, and Schlarbaum, 1975; Wang and Hanna, 1998). 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). The effect of marital status is not straightforward and seems to jointly influence on portfolio choice with gender and age (Sundén & Surette, 1998; Lyons & Yilmazer, 2006). Ownership of businesses and house has a negative effect on risky asset holdings (Faig & Shum, 2006; Yao & Zhang, 2005; Cocco, 2005). Finance related occupation also leads to an increase of stock ownership (Christiansen, Rangvid, & Joensen, 2007). There are mixed results on whether health status affects portfolio choice (Rosen & Wu, 2003; Love & Smith, 2007).

In our study, demographic variables include age, gender, marital status, ethnicity, health condition, household size, financial wealth, annual income, annual household income, home ownership, home purchase price, current home value, mortgage outstanding, business ownership, occupation, employment status, and education will be used as control variables in our analysis to isolate the effect of a particular psychological factor - optimism, on portfolio choice. We expect the effect of demographics to be consistent with previous literature.

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 & Chow, 1992; Viceira, 2001; Cocco, Gomes, & Maenhout, 2005; Puri & Robinson, 2007).

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)<sup>1</sup> 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<sup>2</sup> whilst the default rate in the Europe is expected to research 14.7% this year<sup>3</sup>. 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 and similar trends have been evident in the UK and German government bond markets.<sup>4</sup> 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. We believe that 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.

Debt was not treated as a part of portfolio choice in the previous literature (Cohn, Lewellen,

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<sup>1</sup> 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.

<sup>2</sup> <http://seekingalpha.com/article/121141-default-rates-on-corporate-bonds-next-phase-of-the-credit-crunch>

<sup>3</sup> <http://www.bloomberg.com/apps/news?pid=20601090&sid=aVGhdWg8VN0k>

<sup>4</sup> <http://www.moneyweek.com/investments/how-safe-are-government-bonds-13986.aspx>

Lease, & Sclarbaum, 1975; Hanna & Lee, 1995; Guiso, Sapienza, & Zingales, 2004; Cocco, Gomes, & Maenhout, 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, Taylor, & Price, 2005). The choice of borrowing unsecured debt indicates the level of risk preference of the household (Brown, Garino, Simmons, & Taylor, 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 borrowing unsecured debt borrowing and taking mortgage will be investigated as debt indicates individuals' risk preference. In this study, personal debt (PD) is defined as unsecured debt a person owes apart from mortgages. Total debt (TD) is defined as the total amount of unsecured personal debt and outstanding mortgage (MG).

The above literature on household portfolio choice provides us the theoretical foundation to define portfolio choices as well as in choosing demographical variables as control variables to isolate the influence of optimism. More details of our portfolio definitions are presented in the following section.

#### **4. Data and Methodology**

We investigate the effect of optimism on portfolio choice at the individual and household level using the British Household Panel Survey. 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 half a million observations generated from the survey are relevant and are analysed 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.

The British Household Panel Survey (BHPS) contains questions regarding how much savings<sup>1</sup> (SAV), investment<sup>2</sup> (INV), and personal debt (PD) an individual has (solely or jointly held with someone else) in 1995, 2000, and 2005 (See Question 3, Question 4, Question 5 and Question 6 in Appendix 1). The following definitions of portfolio choice are used in our study based on above discussion and information from the BHPS: (a) Risk-free portfolios - the ratio of risk-free assets to financial wealth (SAV/FW), the amount of total savings (SAV), the ratio of risk-free assets to total wealth (SAV/TW), (b) Risky portfolios - the ratio of risky assets to financial wealth (INV/FW), the amount of total investment (INV), the ratio of risky assets to total wealth (INV/TW), (c) Debt choices - the amount of unsecured personal debt (PD), the ratio of personal debt to total debt (PD/TD), the ratio of mortgage to total wealth (MG/TW).

We measure financial optimism explicitly. We define optimism as the positive bias or overestimation of the favourable outcome in a future event. In particular, financial optimism is a positive improvement of an investor's future financial situation.

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

Q1 (F5 in the questionnaire):

Would you say that you yourself are Better off, or worse off financially than you were a year ago, Or about the same?

Q2 (F6 or F7 in the questionnaire):

Looking ahead, how do you think you will be financially a year from now, will you be Better off, worse off than you are now, Or about the same?

We develop the definition of optimism based on the answers to the above two questions in the BHPS. If  $t$  is the current year, we denote  $C_{t-1}^t$  as the change in financial situation during

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<sup>1</sup> Include savings with a bank, post office or building society, national savings bank (post office), TESSA only ISA or Cash ISA

<sup>2</sup> 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.

the past year (answers for Q1). 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  $E_t^{t+1}$  (answers for Q2).

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

$$\text{Optimism:} \quad O_t^- = E_t^{t+1} - C_{t-1}^t \quad (1)$$

Respondent's opinion for  $E_t^{t+1}$  is gathered before information about year  $t$  has been exposed. The definition of optimism indicates an investor is either irrationally optimistic since she disregards her historical return ( $C_{t-1}^t$ ), or she is rationally optimistic 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.

Table 1 The frequency distribution of optimism

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%

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. 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 optimism remain constant throughout the wave 1995, 2000, and 2005.

We develop two alternative measures of optimism as follows to check the validation of our findings.

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 alternative definition of optimism.

$$\text{Financial Expectation:} \quad E_t^{t+1} \quad (2)$$

A posteriori optimism, denoted as  $O_t^+$ , is our second alternative measure of optimism. It is constructed after information from year  $t$  has been exposed (with  $C_t^{t+1}$  gathered in year  $t+1$ ).

$$\text{A Posteriori Optimism:} \quad O_t^+ = E_t^{t+1} - C_t^{t+1} \quad (3)$$

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 since her actual return ( $C_t^{t+1}$ ) is smaller than her expected return ( $E_t^{t+1}$ ), or/and she is rationally optimistic 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.

Descriptive statistics on measure of optimism, portfolio choices, and demographic characteristics of all the individuals and the head of the household in the BHPS sample are reported in the following table.

Table 2 Descriptive statistics for optimism and portfolio choice

	All Individuals (Head of Household)								N	
	Mean		Sdv	Min	Max					
<i>Measure of optimism</i>										
Optimism	0.12	(0.12)	0.81	(0.78)	-2	(-2)	2	(2)	224624	(117335)
<i>Risk-free portfolios</i>										

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)
<b>Risky portfolios</b>										
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)
<b>Debt</b>										
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)

As shown in Table 2, the average score for optimism of the sample is 0.12 which indicates that the respondents on average are optimistic. The 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. 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. 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.

Table 3 Descriptive statistics of demographics

	All Individuals (Head of Household)					N	
	Mean	Sdv	Min	Max			
<b>Personal Characteristics</b>							
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)
<b>Wealth and Income</b>							
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)
<b>Employment Profile</b>										
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 3 shows us that among personal characteristics, the average age of household heads is 50.57 and 67% of the head of the household is male compared to 45.18 years old and 46% being male on average for all 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.

We believe that optimism and demographics jointly influence on individual and household portfolio choice, therefore, we develop our general regression equation as follows for ordinary least squares (OLS) regression analysis in the next section.

$$Portfolio\ Choice = \alpha + \beta_0(optimism) + \sum_{i=1}^{19} \beta_i Demographics_i \quad (4)$$

The definitions of portfolio choices are used as dependent variables while optimism and demographics are independent variables. The ratio of risk-free assets to financial wealth (SAV/FW), the amount of total savings (SAV), and the ratio of risk-free assets to total wealth (SAV/TW) are defined as risk-free portfolios. The ratio of risky assets to financial wealth (INV/FW), the amount of total investment (INV), and the ratio of risky assets to total wealth (INV/TW) are risky portfolios. The amount of unsecured personal debt (PD), the

ratio of personal debt to total debt (PD/TD), and the ratio of mortgage to total wealth (MG/TW) are debt choices. Demographical variables include age, gender, marital status, ethnicity, health condition, household size, financial wealth, annual income, annual household income, home ownership, home purchase price, current home value, mortgage outstanding, business ownership, occupation, employment status, and education.

## 5. Optimism and Portfolio Decisions

We first compare the characteristics between optimistic, pessimistic and neutral respondents. Then we report the effect of optimism on individual portfolio choice for all individual investors. Different definitions of risky portfolios, risk-free portfolios and debt choices are used as dependent variables. At last, we check the robustness of the effect of optimism by using alternative measures of financial optimism, running the regression on the head of the household instead of on all individuals and in each year independently.

### 5.1 Characteristics between Optimists, Pessimists, and Neutral Respondents

We distinguish the difference in characteristics among optimists, pessimists and neutral respondents in the following table.

Table 4 Comparisons between optimists, pessimists, and neutral respondents

	All Individuals		
	Optimistic	Neutral	Pessimistic
<i>Measure of optimism</i>			
Optimism	1.28	0.00	-1.09
<i>Risk-free portfolios</i>			
Savings (SAV)	2868 x	3787 y	4731 z
SAV/FW	0.74 x	0.76 y	0.78 z
SAV/TW	0.14 x	0	0.16 z
<i>Risky portfolios</i>			
Investment (INV)	2749 x	3556 y	3633
INV/FW	0.26 x	0.24 y	0.22 z
INV/TW	0.05 x	0.04 y	0.04
<i>Debt</i>			
Personal Debt (PD)	1990 x	1127 y	1310 z
PD/TD	0.35 x	0.29 y	0.29
MG/TW	2.32 x	0.21 y	0.15

**Personal Characteristics**

Age	40.63 x	48.08 y	42.02 z
Male	0.47 x	0.47	0.45 z
Married	0.64 x	0.64	0.63 z
White	0.96 x	0.94 y	0.97 z
Healthy	0.90 x	0.90	0.92 z
Household size	3.00 x	2.79 y	2.93 z

**Wealth and Income**

Total financial wealth	5618 x	7343 y	8364 z
Total wealth	95492 x	105497 y	106369
Annual income	11630 x	11087 y	13365 z
Annual household income	26100 x	25554 y	30034 z
Home ownership	0.69 x	0.71 y	0.74 z
Home purchase price	43266 x	39351 y	43979 z
Current home value	131421 x	134612 y	133809
Mortgage outstanding	55831 x	53063 y	54254 z

**Employment Profile**

Business ownership	0.11 x	0.09 y	0.10 z
Finance related occupation	0.05 x	0.04 y	0.06 z
Employment: permanent contract	0.54 x	0.48 y	0.64 z
Unemployed	0.08 x	0.03 y	0.02 z
Unemployed a year ago	0.05 x	0.03 y	0.03
Education: first degree or above	0.36 x	0.28 y	0.37 z

x denotes significant difference between demographics of respondents who are optimistic and pessimistic at 5% is the level of significance  
y denotes significant difference between demographics of respondents who are optimistic and neutral at 5% is the level of significance  
z denotes significant difference between demographics of respondents who are pessimistic and neutral at 5% is the level of significance

The results in Table 4 show that people who are optimistic about their financial situation are significantly younger, more likely to be 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 (£2,868 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 have lower annual individual and household income compared to non-optimistic investors. Optimists also have significantly higher business ownership and higher average unemployment rate (8% for optimist vs. 2% for pessimists) than neutral and pessimistic respondents. 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 for a better future. The results in Table 4 are almost all significant amongst our comparisons which indicate optimists have very different demographic characteristics and are not financially better off compared to pessimists and neutral respondents.

## 5.2 The Effect of Optimism on Portfolio Choices

We test the effect of optimism on investment in risk-free portfolios, risky portfolios, and debt choices for all individual investors. The results are reported in the following tables.

Table 5 Optimism and risk-free portfolios

	Risk-free Portfolios (All Individuals)					
	SAV/FW		ln(SAV)		SAV/TW	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism	-0.052	0.000	-0.033	0.000	-0.009	0.002
Age	-0.062	0.000	-0.027	0.000	0.008	0.074
Male	-0.055	0.000	-0.034	0.000	-0.012	0.000
Married	-0.032	0.000	-0.009	0.063	-0.006	0.097
White	-0.003	0.680	0.004	0.319	0.007	0.023
Healthy	-0.008	0.225	0.000	0.941	-0.002	0.549
Household size	-0.007	0.382	-0.016	0.003	0.009	0.012
Total financial wealth (ln)	-0.132	0.000	0.764	0.000	0.091	0.000
Annual income (ln)	-0.029	0.001	-0.017	0.003	0.000	0.913
Annual household income (ln)	0.000	0.961	0.009	0.143	0.017	0.000
Home ownership	0.087	0.002	0.043	0.029	-0.176	0.000
Home purchase price (ln)	-0.070	0.000	-0.026	0.000	-0.019	0.000
Current home value (ln)	-0.118	0.000	-0.050	0.015	-0.719	0.000
Mortgage outstanding (ln)	0.015	0.074	-0.008	0.158	-0.028	0.000
Business ownership	-0.009	0.148	-0.004	0.427	0.004	0.180
Finance related occupation	-0.050	0.000	-0.020	0.000	-0.005	0.074
Employment: permanent contract	0.009	0.287	-0.004	0.484	-0.019	0.000
Unemployed	0.003	0.695	0.000	0.989	0.001	0.824
Unemployed a year ago	-0.003	0.664	0.006	0.234	0.001	0.796
Education: first degree or above	-0.048	0.000	-0.014	0.005	0.000	0.946
R Square	0.070		0.555		0.799	

Table 5 presents the results for the relationship between optimism and investment in risk-free assets for all individual investors. The estimated results show that optimism is negatively correlated with risk-free portfolio choices. When investors are optimistic, they have lower percentage of investment in savings among their financial wealth and total wealth as well as lower amount of savings. The coefficients for optimism are all significant at 95% confidence level.

Among variables of personal characteristics, being male has a negative impact on investment in risk-free portfolio. The effect of gender is consistent with most of the existing literature (Bajtelsmit & VanDerhei, 1997; Hinz, McCarthy, & Turner, 1997). Investors who are married also prefer to invest in risk-free assets, which is consistent with some of the previous literature such as Bertocchi, Brunetti, & Torricelli (2009). One's financial wealth and annual income are significantly negatively correlated with investment in risk-free portfolios. Higher the home purchase price and current home value of one's property, less risk-free investment an investor would have. Having a finance related job would reduce the investment in risk-free portfolios.

Table 6 Optimism and risky portfolios

	Risky Portfolios (All Individuals)					
	INV/FW		ln(INV)		INV/TW	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism	0.052	0.000	0.041	0.000	0.032	0.000
Age	0.062	0.000	0.015	0.054	-0.006	0.534
Male	0.055	0.000	0.039	0.000	0.042	0.000
Married	0.032	0.000	0.028	0.000	0.000	0.931
White	0.003	0.680	0.007	0.214	-0.003	0.575
Healthy	0.008	0.225	0.012	0.027	0.011	0.085
Household size	0.007	0.382	-0.009	0.167	-0.017	0.027
Total financial wealth (ln)	0.132	0.000	0.502	0.000	0.198	0.000
Annual income (ln)	0.029	0.001	0.023	0.001	0.005	0.533
Annual household income (ln)	0.000	0.961	0.021	0.004	0.024	0.004
Home ownership	-0.087	0.002	-0.087	0.000	0.024	0.382
Home purchase price (ln)	0.070	0.000	0.063	0.000	0.042	0.000
Current home value (ln)	0.118	0.000	0.129	0.000	-0.388	0.000
Mortgage outstanding (ln)	-0.015	0.074	-0.042	0.000	-0.040	0.000
Business ownership	0.009	0.148	0.016	0.005	0.014	0.026
Finance related occupation	0.050	0.000	0.048	0.000	0.020	0.001
Employment: permanent contract	-0.009	0.287	-0.031	0.000	-0.030	0.000
Unemployed	-0.003	0.695	0.001	0.918	0.005	0.441
Unemployed a year ago	0.003	0.664	0.013	0.030	0.008	0.212
Education: first degree or above	0.048	0.000	0.057	0.000	0.040	0.000
R Square	0.070		0.343		0.137	

Table 6 displays the estimated results of the relationship between optimism and investment in risky portfolios. We find that optimism is positively correlated with risky portfolio choices. The estimated coefficients show that optimistic investors are more likely to have higher proportion in investment among their financial wealth and total wealth as well as higher level of investment. The coefficients for optimism are all 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.

Male investors prefer risky portfolios more than female investors. Investors with higher annual income or annual household income prefer to invest in risky portfolios. One's home purchase price and home value are also significantly positively correlated with allocating wealth in risky portfolios. People who work in finance or business or have higher educational degrees prefer to invest in risky assets. The amount of outstanding mortgage is on the other hand negatively correlated with investment in risky assets. Among all the coefficients, financial wealth seems to have the biggest effect (0.132, 0.502, and 0.198) on choosing risky portfolios among all other factors, which supports the previous literature that wealth is the most important variable in determining investors' portfolio choice (Morin and Suarez, 1983).

Table 7 Optimism and debt choices

	Debt (All Individuals)					
	ln(PD)		PD/TD		MG/TW	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism	0.063	0.000	0.016	0.000	0.022	0.001
Age	-0.208	0.000	-0.034	0.000	0.022	0.025
Male	0.025	0.000	0.007	0.001	0.002	0.714
Married	0.036	0.000	0.008	0.000	0.001	0.932
White	0.013	0.027	-0.003	0.134	0.001	0.826
Healthy	-0.002	0.787	0.000	0.608	-0.019	0.004
Household size	-0.006	0.423	-0.004	0.072	-0.001	0.883
Total financial wealth (ln)	-0.146	0.000	-0.019	0.000	-0.029	0.000
Annual income (ln)	0.134	0.000	0.023	0.000	-0.009	0.284
Annual household income (ln)	-0.009	0.252	0.019	0.000	0.003	0.761
Home ownership	0.087	0.001	-0.132	0.000	-0.032	0.283
Home purchase price (ln)	0.063	0.000	0.013	0.000	0.021	0.023
Current home value (ln)	-0.181	0.000	0.114	0.000	-0.015	0.634
Mortgage outstanding (ln)	0.096	0.000	-0.982	0.000	0.031	0.000
Business ownership	0.017	0.005	0.011	0.000	-0.005	0.425
Finance related occupation	0.012	0.054	0.004	0.040	-0.004	0.568
Employment: permanent contract	0.085	0.000	0.005	0.019	0.013	0.153
Unemployed	-0.006	0.361	-0.002	0.260	-0.003	0.662
Unemployed a year ago	-0.026	0.000	-0.003	0.096	-0.003	0.690
Education: first degree or above	0.086	0.000	0.024	0.000	0.003	0.646
R Square	0.192		0.952		0.004	

In Table 7, the estimated coefficients show that optimism is positively correlated with the borrowing debt and mortgage. The coefficients for optimism 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 have higher level of risk preferences and make more risky financial decisions.

Old people borrow less personal debt but have higher level of mortgage compared to their total wealth. Male or married people borrow higher personal debt and mortgage. Financial wealth is negatively correlated with debt borrowing while home purchase price has a positive effect on choosing debt. People who have higher income tend to borrow more personal debt. Having business ownership or permanent contract increases personal debt. Investors who work in finance related occupations or have higher education level also more likely to borrow personal debt. If a person was unemployed a year ago, it is unlikely she takes on unsecured personal debt.

### 5.3 Robustness Check

We check the robustness of findings on the effect of optimism on household portfolio choice. We first use the alternative measures of financial optimism derived from the BHPS data to verify the effect of optimism. Then we run our regression analysis only on the head of the households to check if the results still hold. At last we investigate if time of gathering the interview data affects our findings on optimism.

The following tables show the results by using the alternative measures of optimism: financial expectation and a posteriori optimism respectively with demographic variables as independent variables for our regression analysis.

Table 8 Financial expectation and portfolio choices

	Portfolios and Debt Choice (All Individuals)					
	ln(SAV)		ln(INV)		PD/TD	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism: Financial expectation	-0.013	0.007	0.007	0.194	0.009	0.011
Age	-0.029	0.000	0.016	0.050	-0.031	0.000
Male	-0.034	0.000	0.040	0.000	0.000	0.916
Married	-0.011	0.036	0.030	0.000	0.016	0.000
White	0.005	0.287	0.006	0.246	-0.001	0.688
Healthy	0.000	0.944	0.011	0.038	-0.005	0.187
Household size	-0.017	0.002	-0.009	0.186	-0.015	0.000
Total financial wealth (ln)	0.766	0.000	0.499	0.000	-0.020	0.000
Annual income (ln)	-0.018	0.001	0.024	0.001	0.029	0.000
Annual household income (ln)	0.011	0.062	0.018	0.013	0.023	0.000
Home ownership	0.045	0.024	-0.088	0.000	-0.085	0.000
Home purchase price (ln)	-0.027	0.000	0.065	0.000	0.014	0.005
Current home value (ln)	-0.051	0.012	0.131	0.000	0.054	0.000
Mortgage outstanding (ln)	-0.008	0.154	-0.042	0.000	-0.979	0.000
Business ownership	-0.004	0.409	0.016	0.003	0.014	0.000
Finance related occupation	-0.020	0.000	0.048	0.000	0.007	0.064
Employment: permanent contract	-0.002	0.710	-0.033	0.000	0.011	0.012
Unemployed	-0.004	0.473	0.006	0.356	0.000	0.978
Unemployed a year ago	0.008	0.121	0.011	0.072	-0.003	0.399

Education: first degree or above	-0.013	0.005	0.057	0.000	0.018	0.000
R Square	0.555		0.341		0.954	

Table 8 shows that financial expectation significantly negatively influences the level of savings but positively (not statistically significantly) affects investment in risky portfolios. Investors who have positive financial expectation for the next year borrow more personal debt. The effect of financial expectation on borrowing debt is significantly positive.

Table 9 A posteriori optimism and portfolio choices

	Portfolios and Debt Choice (All Individuals)					
	ln(SAV)		ln(INV)		PD/TD	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism: A Posteriori Optimism	-0.012	0.012	0.020	0.000	0.010	0.000
Age	-0.028	0.000	0.016	0.057	-0.035	0.000
Male	-0.035	0.000	0.041	0.000	0.007	0.001
Married	-0.007	0.198	0.027	0.000	0.009	0.000
White	0.005	0.295	0.008	0.164	-0.003	0.106
Healthy	0.000	0.981	0.009	0.097	-0.002	0.382
Household size	-0.017	0.003	-0.010	0.165	-0.005	0.024
Total financial wealth (ln)	0.766	0.000	0.503	0.000	-0.021	0.000
Annual income (ln)	-0.019	0.001	0.025	0.000	0.025	0.000
Annual household income (ln)	0.009	0.158	0.019	0.010	0.019	0.000
Home ownership	0.049	0.016	-0.090	0.000	-0.132	0.000
Home purchase price (ln)	-0.029	0.000	0.060	0.000	0.013	0.000
Current home value (ln)	-0.054	0.010	0.133	0.000	0.114	0.000
Mortgage outstanding (ln)	-0.008	0.191	-0.040	0.000	-0.981	0.000
Business ownership	-0.003	0.456	0.017	0.003	0.012	0.000
Finance related occupation	-0.021	0.000	0.049	0.000	0.004	0.061
Employment: permanent contract	-0.002	0.727	-0.033	0.000	0.005	0.029
Unemployed	-0.005	0.360	0.007	0.244	0.000	0.825
Unemployed a year ago	0.007	0.174	0.010	0.091	-0.005	0.026
Education: first degree or above	-0.013	0.007	0.057	0.000	0.025	0.000
R Square	0.554		0.345		0.949	

The results in Table 9 indicate that when using a posteriori optimism as an alternative measure of optimism, implications of the effect of optimism on portfolio and debt choices remain the same. Investors who are optimistic about their future financial situation allocate more wealth in risky investment and less in risk-free savings. Optimistic investors also are more likely to be in debt.

So far all the results show that optimistic individuals in the BHPS prefer risky assets to risk-free assets and higher level of debt. In the next step, we check if the financial decisions made by the head of the households are also affected by optimism. The head of the household is indicated in the BHPS data. In the descriptive statistics displayed in Table 3, the head of the household is older, better educated, and wealthier than an average individual. They are more

likely being the family members who make important decisions including financial ones. We hope to find out if optimism plays a role in their portfolio choices as well.

Table 10 Optimism and risk-free portfolios on the head of the households

	Risk-free Portfolios (Head of the Household)					
	SAV/FW		ln(SAV)		SAV/TW	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism	-0.062	0.000	-0.038	0.000	-0.012	0.008
Age	-0.026	0.047	-0.015	0.107	-0.003	0.663
Male	-0.051	0.000	-0.031	0.000	-0.026	0.000
Married	0.018	0.165	0.015	0.118	0.006	0.362
White	0.003	0.766	0.007	0.249	0.012	0.005
Healthy	-0.014	0.128	-0.004	0.550	-0.006	0.155
Household size	-0.042	0.000	-0.042	0.000	0.005	0.376
Total financial wealth (ln)	-0.133	0.000	0.725	0.000	0.094	0.000
Annual income (ln)	-0.022	0.129	-0.020	0.053	0.007	0.341
Annual household income (ln)	-0.012	0.445	0.013	0.287	0.012	0.145
Home ownership	0.071	0.084	0.052	0.077	-0.145	0.000
Home purchase price (ln)	-0.041	0.002	-0.010	0.310	-0.025	0.000
Current home value (ln)	-0.144	0.001	-0.078	0.011	-0.732	0.000
Mortgage outstanding (ln)	0.022	0.079	-0.006	0.486	-0.027	0.000
Business ownership	-0.011	0.213	-0.002	0.720	0.004	0.371
Finance related occupation	-0.049	0.000	-0.017	0.010	-0.004	0.359
Employment: permanent contract	0.028	0.036	0.004	0.657	-0.024	0.000
Unemployed	0.003	0.801	-0.001	0.882	0.001	0.845
Unemployed a year ago	-0.007	0.510	0.007	0.355	-0.003	0.600
Education: first degree or above	-0.059	0.000	-0.019	0.009	-0.005	0.307
R Square	0.067		0.510		0.779	

In Table 10, optimistic household heads behave very similarly to average optimistic individuals when they choose their portfolios. Optimism plays a significant role in discouraging investment in risk-free portfolios. Optimistic household heads allocate smaller portion of their wealth in risk-free assets than non-optimistic ones.

Table 11 Optimism and risky portfolios on the head of the households

	Risky Portfolios (Head of the Household)					
	INV/FW		ln(INV)		INV/TW	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism	0.062	0.000	0.051	0.000	0.036	0.000
Age	0.026	0.047	-0.032	0.003	-0.029	0.022
Male	0.051	0.000	0.021	0.019	0.055	0.000
Married	-0.018	0.165	0.003	0.752	-0.025	0.049
White	-0.003	0.766	0.005	0.472	-0.015	0.078
Healthy	0.014	0.128	0.008	0.285	0.013	0.129
Household size	0.042	0.000	0.017	0.076	-0.001	0.921
Total financial wealth (ln)	0.133	0.000	0.526	0.000	0.220	0.000
Annual income (ln)	0.022	0.129	0.040	0.001	0.016	0.255
Annual household income (ln)	0.012	0.445	0.015	0.270	0.020	0.207
Home ownership	-0.071	0.084	-0.080	0.018	0.055	0.160
Home purchase price (ln)	0.041	0.002	0.035	0.002	0.049	0.000
Current home value (ln)	0.144	0.001	0.159	0.000	-0.428	0.000
Mortgage outstanding (ln)	-0.022	0.079	-0.051	0.000	-0.061	0.000

Business ownership	0.011	0.213	0.018	0.020	0.017	0.047
Finance related occupation	0.049	0.000	0.049	0.000	0.016	0.073
Employment: permanent contract	-0.028	0.036	-0.051	0.000	-0.038	0.003
Unemployed	-0.003	0.801	0.005	0.585	0.011	0.274
Unemployed a year ago	0.007	0.510	0.013	0.112	0.015	0.113
Education: first degree or above	0.059	0.000	0.063	0.000	0.051	0.000
R Square	0.067		0.360		0.135	

As the results shown in Table 11, optimism affects the head of the household in a very similar way as it affects normal individuals in the BHPS in terms of choosing risky portfolios. Optimistic household heads are more likely to have wealth in risky investment. This supports our main findings that optimism has a positive effect on choosing risky portfolios.

Table 12 Optimism and debt choices on the head of the households

	Debt (Head of the Household)					
	ln(PD)		PD/TD		MG/TW	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
Optimism	0.054	0.000	0.011	0.000	0.028	0.003
Age	-0.256	0.000	-0.037	0.000	0.043	0.002
Male	0.016	0.101	0.006	0.063	0.014	0.226
Married	-0.024	0.040	-0.007	0.052	0.004	0.796
White	0.010	0.232	-0.002	0.394	0.001	0.904
Healthy	0.005	0.555	-0.003	0.282	-0.006	0.550
Household size	0.029	0.007	0.005	0.163	-0.017	0.179
Total financial wealth (ln)	-0.156	0.000	-0.022	0.000	-0.037	0.001
Annual income (ln)	0.012	0.357	0.004	0.311	-0.005	0.737
Annual household income (ln)	0.064	0.000	0.027	0.000	0.011	0.525
Home ownership	0.046	0.217	-0.122	0.000	-0.027	0.528
Home purchase price (ln)	0.004	0.718	0.000	0.941	0.029	0.034
Current home value (ln)	-0.081	0.033	0.116	0.000	-0.032	0.465
Mortgage outstanding (ln)	0.119	0.000	-0.986	0.000	0.035	0.006
Business ownership	0.018	0.028	0.015	0.000	-0.006	0.559
Finance related occupation	0.011	0.175	0.008	0.003	-0.003	0.750
Employment: permanent contract	0.049	0.000	-0.001	0.738	0.017	0.205
Unemployed	-0.005	0.568	0.000	0.967	-0.001	0.906
Unemployed a year ago	-0.029	0.002	-0.009	0.003	-0.003	0.809
Education: first degree or above	0.060	0.000	0.021	0.000	0.014	0.166
R Square	0.237		0.950		0.005	

Estimated results in Table 12 tell us that if a household head is optimistic, she will take on more debt and mortgage. All the coefficients of optimism are statistically significant at 95% confidence level indicating that our findings are highly robust.

The BHPS has carried out interviews and gathered data since 1991. All our above analysis is conducted in a panel and the effect of the year that interviews were taken place is neglected. Therefore, in this section, we are trying to find out if the year of interview would affect our main findings. We run the regression analysis on wave 1995, 2000, and 2005 independently since data on savings, investment, and personal debt is only collected in these three waves. The coefficients of optimism are reported in the following table.

Table 13 Optimism and portfolio and debt choice in 1995, 2000, and 2005

	Portfolios and Debt Choice (All Individuals)					
	ln(SAV)		ln(INV)		PD/TD	
	Beta	p-Value	Beta	p-Value	Beta	p-Value
<b>1995</b>						
Optimism	-0.034	0.000	0.034	0.001	0.009	0.011
R Square	0.577		0.389		0.954	
<b>2000</b>						
Optimism	-0.035	0.000	0.056	0.000	0.012	0.000
R Square	0.540		0.371		0.957	
<b>2005</b>						
Optimism	-0.030	0.000	0.025	0.008	0.024	0.000
R Square	0.559		0.310		0.949	

Table 13 shows that optimism has positive influence in investment in risky assets and borrowing debt and negative effect in allocate wealth in savings in wave 1995, 2000, and 2005 respectively. The implication is that no matter in which year the interview takes place, optimism all proved to have effect on investors' choices of portfolios. These results again support our major findings on the influence of optimism on portfolio choice.

## 6. Conclusions

In this study we proved that optimism is correlated with risk taking behaviour in financial decision making using one of the largest surveys of UK household data. While a number of interesting findings on financial optimism have published recently, these have been obtained in experimental environments or are based on detached theoretical models. There are hardly any published empirical findings on the effect of optimism on investors' financial choices. This is possibly due to difficulties in measuring optimism in the real world. In order to test the effect of optimism empirically, we designed innovative measures of optimism using answers derived from the household survey. We focus on only household portfolio choice

including saving, investment and debt choice, which is consistent with our measures for financial optimism since we believe it is more accurate to study the effect of optimism within each decision making domain separately.

We define optimism in this study as the overestimation of the favourable outcome in an investor's future financial situation. We find that optimists have significantly different demographic characteristics compared to pessimists or neutral respondents. Optimists are significantly younger, more likely to be 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 lower accumulated financial wealth and a higher average unemployment rate than people who are pessimistic or neutral towards their financial situation.

The results of this study also show that optimism has a positive influence on an individual's preference for risky portfolios and a negative impact on her preference for risk-free portfolios when controlled on other demographical and wealth variables. Optimistic individuals also borrow more debt and take on larger mortgages than non-optimistic individuals indicating that optimistic individuals have a higher risk preference for their portfolios. In our analysis we were able to obtain these findings across individuals in the BHPS with a statistically significant level of confidence

We verified the robustness of the effect of financial optimism by using alternative measures of optimism, repeating the regression analysis only with the individuals who are the head of households as indicated in the BHPS, and using different years of the BHPS between 1995 and 2005. The results from the robustness test support our main findings.

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## Appendix

### Appendix 1

#### Original questionnaires

Question 1	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 2	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 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} <sup>1</sup> , 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} <sup>2</sup> {but NOT including the savings you have just told 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

<sup>1</sup> 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

<sup>2</sup> 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 / modern 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.