

# Evidence on expectations of household finances\*

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## Abstract

We use a long panel with information on expected and realized changes in individual finances to study the process of expectation formation and expectation errors, controlling for individual fixed effects. We find that, following improvements in financial situation, individuals tend to form extrapolative expectations and are excessively optimistic about the future. However, following a deterioration in financial situation, there is an increase in the dispersion of forecasts: individuals increase both their subjective probability of a future deterioration (consistent with extrapolative behavior) and the probability of a future improvement (mean-reversion). We show that when individuals expect mean-reversion, they are too optimistic about the future. They reduce their savings and increase their borrowing, and they are more likely to find themselves financially worse off again in subsequent periods.

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# 1 Introduction

How do the changes that individuals experience in their financial situation impact their expectations for the future? And how are these expectations reflected in individual saving and borrowing decisions? We provide evidence on the process of expectation formation of household finances using almost two decades of panel data.

Our data, from the United Kingdom, has information, for each year and individual, on realized changes in finances and on expectations of changes for the year ahead. The questions are similar to those in the US Michigan Survey of consumers, but unlike the Michigan Survey which is a rotating panel, our data is a full panel. This allows us to measure expectation errors over time, and to control for unobserved individual heterogeneity, including in the interpretation of the survey questions (Manski (2017)). Another advantage of our data is that it includes detailed information on many other individual characteristics and decisions, including on saving and borrowing, that we relate to expectations.

There is a growing literature that studies the importance of personal experiences for expectations formation (e.g. Malmendier and Nagel (2011)). With this in mind, we first study how realized changes in financial situation shape future expectations. Consistent with the literature that finds evidence of extrapolative expectations in financial markets (e.g. Greenwood and Shleifer (2014), Gennaioli et al. (2015) and Bordalo et al. (2017)), we show that there is a strong positive relationship between current changes in financial situation and the expectations of future changes.

We then study whether the expectations depend on the nature of the realized changes in financial situation. We find that, following an improvement, the expectation of a further future improvement increases, consistent once more with extrapolative expectations. However, following a deterioration in financial situation, the patterns are different. We find increases in both the subjective probability of being worse off again in the future (consistent with extrapolative expectations), and in the subjective probability of being better off in the future (mean-reversion).<sup>1</sup> Thus, following negative events, there is a significant increase in the dispersion of individual expectations. This increase in the second moment of expectations following negative events is, as far as we know, a novel result.<sup>2</sup>

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<sup>1</sup>With a compensating decline in the number of those who expect no future changes in their financial situation.

<sup>2</sup>Kuhnen (2015) shows that, following losses, agents are less able to learn about financial information. Fer-

We try to learn more about the sources of the increased dispersion. The fixed effects that we include in our regressions control for the average expectation, i.e. whether some individuals are on average more likely to expect to be better off or worse off. However, they do not control for whether some individuals are on average more likely to expect to be better off or worse off following negative changes in financial situation. Therefore, the increased dispersion could be due to: (i) *different* individuals changing their expectations in different ways following a negative change in financial situation; or (ii) the *same* individuals sometimes responding in one direction and sometimes in the other. We find that most of the action is in the second channel, i.e. the heterogeneity in responses is mostly occurring from an increase in the dispersion of the forecasts of the same individuals.

With these results in mind, we turn our attention to the expectation errors. Since we observe the same individuals over many years, and both their expectations and ex-post realizations, we can use year  $t$  expectations and year  $t + 1$  realizations to construct, for each year and each individual, an ex-post expectation error, and measures of optimism and pessimism. An optimistic observation is that of an individual who expects in year  $t$  a change in year  $t + 1$  financial situation that is better than his/her year  $t + 1$  realized change. On the other hand, a pessimistic observation is that of an individual who expects in year  $t$  a change in year  $t + 1$  financial situation that is worse than his/her year  $t + 1$  realized change. Therefore, we construct optimism and pessimism using expectation errors, and not raw expectations. An individual who in year  $t$  expects to be better off in year  $t + 1$ , and who is indeed better off in year  $t + 1$ , is not classified as being optimistic.

Obviously, the expectation errors could simply reflect the ex-post realization of ex-ante unpredictable shocks. However, we find that, following improvements in financial situation, individuals extrapolate excessively from these positive experiences. More precisely, they are more likely to become optimistic, and less likely to become pessimistic.

As previously explained, the pattern for expectations following negative changes in financial situation is more complex, with increases in both extrapolation and mean-reversion. Our analysis of the corresponding expectation errors shows that the degrees of extrapolation and of mean-reversion are both excessive relative to the future realizations. When individuals extrapolate from their current experience, they expect more persistence than there actually is in

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mand et al. (2018) document that agents are more uncertain about their expectations in bad times.

the data. Similarly, when they expect mean-reversion, they are too optimistic: their financial situation is not as likely to recover as they anticipate.

The expectation of too much mean reversion following a worse financial situation is particularly important because at these times household finances tend to be stretched. If households are too optimistic about the future, they may not cut back on their consumption, and may instead reduce their savings and/or increase their borrowing. This could prolong the impact of the initial event and thus have significant negative implications for future household welfare. We explore this possibility using the information on income, savings and debt in the our data. We first document that individuals who experience a worse financial situation but are optimist are more likely to cut back on savings and/or take on an extra loan than those who are pessimist. And importantly, we find that such optimist individuals are more likely to be financially worse off in the future.

A final contribution of our paper is to link our results on the experienced change in financial situation and optimism/pessimism for the year ahead to the literature that studies the importance of accumulated personal lifetime experiences in shaping individual beliefs (early contributions include [Vissing-Jorgensen \(2003\)](#), [Greenwood and Nagel \(2009\)](#), [Malmendier and Nagel \(2011\)](#)).<sup>3</sup> We follow [Malmendier and Nagel \(2011\)](#) in constructing a cohort variable that measures past large negative experiences (economic recessions and wars). We find that individuals who have experienced a greater incidence of such events tend to be more pessimist (less optimist) about their future finances. In other words, their subjective probability distribution is shifted towards pessimism. These results, for individual outcomes, are consistent with the previous literature that has focused on expectations of aggregate variables (e.g. expected returns or inflation). They are about the (subjective) estimates of the unconditional distribution of outcomes, whereas the previous results on optimism for the year ahead are about the (subjective) estimates of the serial correlation of the shocks.

Our paper is related to the growing literature on financial expectations (e.g. [Greenwood and Shleifer \(2014\)](#), [Giglio et al. \(2019\)](#)) and, in particular, to the previously mentioned literatures on role of personal experiences in shaping expectations and household decisions (see also the contributions of [Kaustia and Knupfer \(2008\)](#); [Kuhnen \(2015\)](#); [Rozsypal and Schlafmann \(2017\)](#); [Malmendier and Shen \(2018\)](#); [Das et al. \(2018\)](#)) and on extrapolative expectations ([Gennaioli](#)

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<sup>3</sup>See [Malmendier et al. \(2011\)](#), [Kuchler and Zafar \(2018\)](#), [Malmendier et al. \(2018\)](#).

et al. (2015) and Bordalo et al. (2017)). Most of these papers focus on expectations of aggregate variables, such as stock returns or inflation.<sup>4</sup> Few papers provide evidence on expectations of individual finances. Brown and Taylor (2006) and Rozsypal and Schlafmann (2017) relate expectations and expectation errors to demographic characteristics and income levels, respectively. Fermann et al. (2018) document that expectations uncertainty increases in bad times and that those with more uncertain expectations exhibit more precaution in their consumption, credit, and investment behaviors.

It is also related to the literature on motivated beliefs and optimal expectations (Bénabou and Tirole (2002), Bénabou and Tirole (2011), Brunnermeier and Parker (2005)). Since our paper studies expectations of changes in household finances, it contributes to the literature on individual sentiment and financial decisions (Souleles (2004); Puri and Robinson (2007)).<sup>5</sup>

The paper is organized as follows. In Section 2 we describe the data, and the realized changes in financial situation. In Section 3 we focus on expectations, and how they are affected by the experienced changes in financial situation. In Section 4 we study the expectation errors by constructing the optimism and pessimism measures and relating them to experienced changes in financial situation. In Section 5 we provide evidence on individual saving and borrowing responses to earnings declines. The final section concludes.

## 2 The data

### 2.1 Data sources

Our main data source is the British Household Panel Survey (BHPS), which is a representative panel of U.K. households (University of Essex, 2010). The sample starts in 1991 and there is annual data available until (and including) 2008. After 2008 the BHPS became part of a new survey entitled Understanding Society, but at this time several of the questions that are crucial for our study were dropped from the survey, so that we focus on the data contained in waves 1 through 18. The nature of the data, both in terms of the data collection process and the information available, is similar to that in the U.S. Panel Study of Income Dynamics (PSID).

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<sup>4</sup>Kaustia and Knupfer (2008) also consider expectations of own investment ability.

<sup>5</sup>Our paper is also related to the household finance literature, see Campbell (2006), Guiso and Sodini (2013), and Guiso and Jappelli (1997) for overviews.

The panel nature of the data allows us to control for individual fixed effects in the regressions.

Each year individuals are asked a wide range of questions about their circumstances including income, demographics, financial situation, and expectations about their future financial situation, among others. The first wave contains information for around 5,500 households. In subsequent years more households were added to the survey, bringing the total number to around 9,000. We use the answers of the household head. Not all households appear in each of the eighteen waves, so that we use an unbalanced panel. The average number of households per year is 6,793 and the median household appears 11 times in the sample. The data also includes yearly information on income, expenditures, and demographics variables such as age, education, gender and race. Wealth information is also available but only every five years, so we only have two observations for the median household in the sample. We use retail price indices from the U.K. Office of National Statistics to construct real variables.

## 2.2 Changes in financial situation

The data has information on significant changes in household finances. In each year, individuals are asked whether they are financially better off, about the same, or worse off than they were one year ago. The exact question is: “Would you say that you yourself are better off or worse off financially than you were a year ago?” This question, and the possible answers, are similar to the question in the University of Michigan Consumer Survey, that asks respondents to compare their current financial situation with that of a year ago.

The answers naturally represent changes in financial situation as perceived by the individuals themselves. An advantage is that they capture the state of the world as evaluated by the agents when they are making their consumption/saving decisions. We will also provide evidence that the individual answers are highly correlated with objective measures of changes in financial situation (e.g. realized changes in earnings). In Panel A of Table 1 we report the number and the proportion of responses for each category, for all years in the sample. Thus, the unit of observation is household/year. Roughly half of the responses are for about the same, and the remainder are equally split between better off and worse off.

[Table 1 here]

## 2.3 Reasons for change in financial situation

Our data allows includes information on the different channels that drive changes in household finances. From 1993 onward, those participants who responded that they were better off or worse off than in the previous year were also asked to provide the main reason for the change. The exact question is “Why is that? (financially better or worse off).” In Panel B.1 of Table 1 we tabulate the answers to the reason for being (significantly) better off question. Unsurprisingly, the main reason is higher earnings (54%). The second highest category is lower expenditures, with a response rate of 15%. In Panel B.2 we tabulate the answers for those individuals who report being significantly worse off than a year ago. The main reason is higher expenditures (53%), a reason that is given twice as often as lower earnings (24%).<sup>6</sup>

In order to gain some initial insights into life-cycle effects, in columns two to five of Panel A of Table 2 we report responses by age. There is a marked age decline in the proportion of individuals who are financially better off, from 0.39 for the 20 to 34 age group to 0.11 for those above 65. This decline is mirrored by an increase in the proportion of those who are about the same, while the fraction of those who are worse off remains stable over the life-cycle.

[Table 2 here]

In Panel B we report the reasons given for better off, as a fraction of the total of better off. Early in life, the main reason why individuals are better off is higher earnings. During this part of the life-cycle earnings profiles are upward sloping, and this is naturally reflected in the answers given. As individuals age, and labor income profiles flatten, the proportion of those who report being better off declines, and so does the relevance of earnings increases as the reason for being better off. For the above 65 age group the main reason is higher benefits.

In Panel C we tabulate the worse off answers. Higher expenditures is the main reason for all age groups, and particularly so for those aged over 65. For those below retirement age, lower earnings is also an important reason why individuals are financially worse off, with a fraction of roughly 0.30.

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<sup>6</sup>The number of observations for the reasons why individuals are better off and worse off in Panel A add to 58,585 whereas in Panel B they add to 51,838. The main reason is that, as previously mentioned, the question on “why the change in financial situation” is only available from 1993 onwards.

In the last three columns of Table 2 we report the responses by income group. In each year  $t - 1$ , we divide individuals in our data into three groups based on their household income. The low (high) income group refers to individuals in the bottom (top) one-third of the distribution of household income for that year. We then tabulate their answers one year after (in year  $t$ ). Higher (lower) income individuals are more (less) likely to become significantly better off, an event which occurs with probability 0.29 (0.17). For those in the high income group, an increase in earnings is the main reason for better off. In contrast, among the low income group, increases in benefits are as important as increases in earnings (Panel B). Higher expenditures is a more important reason for being worse off for the low income group, with a proportion of answers equal to 0.63, but it still is the most important category for the high income group, with 0.46 (Panel C).

The BHPS sample was chosen to be representative of the overall population. Nevertheless, one potential concern is that sample attrition may not be random. For example, those individuals who become financially worse off may be more or less likely to drop out from the sample. We test this hypothesis by calculating the probability that an individual is no longer in the data set in year  $t$ , conditional on being there in year  $t - 1$ . Across the full sample this probability is 8.5%. For all four of our major categories the attrition rates are very similar. For those who report being significantly better off due to an increase in earnings (decrease in expenditures), the corresponding number is 8.4% (8.6%). For those who report being significantly worse off due to an increase in expenditures (decrease in earnings), the attrition rate is 8.2% (8.1%). This shows that selection due to attrition is not a particular concern for our analysis.

### 3 Expectations of future changes in financial situation

In this section, we study individual expectations, and how they are influenced by the experienced changes in financial situation.

#### 3.1 Summary statistics

In each year, individuals are asked about their expectations of their future (one year ahead) financial situation. The exact question is: “Looking ahead, how do you think you will be



financially a year from now, will you be?” The answers that are read out to the individual are: “better than now, worse than now, and about the same.”<sup>7</sup>

Table 3 reports summary statistics for these expectations. The second column reports the unconditional distribution of expectations in our sample. The majority of individuals (almost two thirds) expect their financial situation to remain unchanged. One in four expect to be significantly better off, and only one in ten expect to be significantly worse off. If we compare these proportions with the distribution of realized changes in financial situation reported in Panel A of Table 1, they suggest that on average individuals are remarkably good at anticipating improvements in financial situation: the average expectation and the average realization are both 24%. On the other hand, individuals appear to under-estimate the probability of becoming worse-off: 12% in expectation versus 24% in realization. This could be the result of our sample including a significant realization of unexpected negative events, but is also consistent with theories of over-confidence and motivated beliefs.

[Table 3 here]

The remaining columns of Table 3 report expectations by age and income. There is some similarity in the patterns to those for the realizations shown in Table 2: the proportion of those who expect to be better off declines with age, and it is larger for higher income groups. The proportion of those who expect to be worse off is relatively more stable over the life-cycle, although there is an economically significant increase from 0.08 for the 20-34 age group, to 0.16 for those over 65 years of age.

There is a similar expectations question in the University of Michigan Consumer Survey, that asks respondents to report on their expected change in financial situation in a year time. But there is a fundamental difference between the Michigan Consumer Survey and the BHPS data that we use. The former is a rotating panel, whereas the latter is a panel. This means that we can include individual fixed effects in the regressions, that control, among other, for the fact that different respondents may interpret verbal questions in a different way (Manski (2017)). Giglio, Maggiori, Stroebel and Utkus (2019) show that beliefs are characterized by large and persistent individual heterogeneity.

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<sup>7</sup>Individuals are not asked to report on the reason for the expectation (earnings, expenditure, etc.).

## 3.2 Experienced changes and average expectations

In this section, we study how current changes in financial situation affect the expectations of future changes. Using individual  $i$ 's time  $t$  change in financial situation we construct a variable which takes on three possible values:

$$\Delta FS_{t+1}^i = \begin{cases} 1 & \text{if individual } i \text{ is financially better off at time } t + 1 \\ 0 & \text{if individual } i \text{ is financially about the same at time } t + 1 \\ -1 & \text{if individual } i \text{ is financially worse off at time } t + 1 \end{cases}$$

We let  $E_t^i[\Delta FS_{t+1}^i]$  denote the individual  $i$ 's time  $t$  expectations of future changes in financial situation, which again can take the values of +1, 0, and -1 for individuals who at time  $t$  expect to be better off, about the same, and worse off at time  $t + 1$ , respectively. We estimate the following regression, in which we control for individual fixed effects ( $f^i$ ):<sup>8</sup>

$$E_t^i[\Delta FS_{t+1}^i] = \alpha + \beta \Delta FS_t^i + f^i + \epsilon_t^i. \quad (1)$$

The results are shown in column (1) of Table 4. We estimate a coefficient  $\beta$  equal to 0.07 with a t-statistic of 27.6. In column (2) we report results from an extended regression where we also include controls for income group and year fixed effects. The estimated  $\beta$  coefficient is almost identical (0.06) and again highly significant (t-statistic of 23.1).

[Table 4 here]

From these results we conclude that, individuals who have experienced an improvement (a deterioration) in their current financial situation are more likely to expect another improvement (deterioration) and less likely to expect a deterioration (improvement) in the following year. In other words, the positive statistically significant  $\beta$  coefficient provides evidence in favor of extrapolative expectations. These results are therefore consistent with the previous literature that finds evidence of extrapolative expectations in financial variables (e.g. [Greenwood and Shleifer \(2014\)](#), [Gennaioli et al. \(2015\)](#) and [Bordalo et al. \(2017\)](#)), and extend such evidence to the context of household finances.

We estimate similar regressions, but decomposing the current change in financial situation in two separate dummy variables, one for positive changes and another one for negative changes:<sup>9</sup>

<sup>8</sup>The results for a multinomial logit model lead to the same conclusions.

<sup>9</sup>No change in financial situation is captured by the (unreported) constant in the regression.

The results are reported in column (3) of Table 4. The coefficient on positive changes is positive, while the coefficient on negative changes is negative, and both are statistically significant. This shows that individuals, on average, form extrapolative expectations following both improvements and deteriorations in their financial situation. However, the coefficient on positive changes is almost five times larger in absolute value than the coefficient on negative changes, 0.09 versus 0.02, indicating that this (average) extrapolative behavior is much stronger after the former than following the latter events.

### 3.3 Experienced changes and the distribution of expectations

The results in the previous section have shown that current changes in financial situation have a significant impact on the average expectations of future changes. We now study this further by studying how the nature of the current changes affects the distribution of expectations.

#### 3.3.1 Variable construction and econometric approach

In order to study separately changes in expectations of future improvements, of no changes and of future deteriorations, we construct three separate dummy variables for expectations. The first dummy variable is equal to one if the individual expects an improvement in her  $t+1$  financial situation, and zero otherwise:

$$\text{Expect Better}_{it} = \begin{cases} 1 & \text{if } E_t^i[\Delta FS_{t+1}^i] = 1, \\ 0 & \text{Otherwise.} \end{cases} \quad (2)$$

The second dummy variable is equal to one if the expectation is of an unchanged financial situation, and zero otherwise:

$$\text{Expect Same}_{it} = \begin{cases} 1 & \text{if } E_t^i[\Delta FS_{t+1}^i] = 0, \\ 0 & \text{Otherwise.} \end{cases} \quad (3)$$

Finally, the third dummy variable takes a value of one when individuals expect their financial situation to deteriorate, and zero otherwise:

$$\text{Expect Worse}_{it} = \begin{cases} 1 & \text{if } E_t^i[\Delta FS_{t+1}^i] = -1, \\ 0 & \text{Otherwise.} \end{cases} \quad (4)$$

For our econometric analysis, we use a standard binary choice model. In our baseline specification we estimate separate regressions where the outcome variables  $y_{it}$  are the three dummy variables defined above that measure expectations.<sup>10</sup> We model:

$$Prob(y_{it} = 1 | \mathbf{x}_{it}, u_i) = F(\mathbf{x}_{it}, u_i) \quad (5)$$

where  $\mathbf{x}_{it}$  is a vector of observable covariates and  $u_i$  is an unobserved individual specific effect. One common approach to modeling the unobserved individual heterogeneity ( $u_i$ ) is the random effects model. An alternative approach, which does not require us to make assumptions on how the individual effects are related to the covariates  $\mathbf{x}_{it}$ , is the fixed effects model. This model cannot in general be estimated due to the incidental parameters problem. One important exception is the logit distribution. Under this specification the fixed effects are removed from the estimation to avoid the incidental parameters problem, and the analysis is thus conditional on the unobserved  $u_i$  which are not estimated.

The fixed effects logit estimator of the regression parameters ( $\beta$ ) gives us the effect of each element of  $\mathbf{x}_i$  on the log-odds ratio:

$$Ln \left[ \frac{Prob(y_{it} = 1 | \mathbf{x}_{it} = x'')}{Prob(y_{it} = 0 | \mathbf{x}_{it} = x'')} / \frac{Prob(y_{it} = 1 | \mathbf{x}_{it} = x')}{Prob(y_{it} = 0 | \mathbf{x}_{it} = x')} \right] = \beta(x'' - x') \quad (6)$$

We are mainly interested in evaluating the extent to which the changes in financial situation that individuals experience affect their expectations going forward. But we also investigate the extent to which other variables (such as income) are related to these expectations. Because we control for individual fixed effects, the regressions capture variation over time for each individual. We also control throughout for year fixed effects since aggregate economic conditions will naturally influence individuals' expectations of their future financial situation. Finally, even though we focus on the conditional fixed effects logit model, the results are unchanged when we estimate a linear probability model.

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<sup>10</sup>The null set for each of these variables combines two alternative outcomes. For instance, those who do not expect to be better off, can either expect no change or worse off. For this reason, later on, we also estimate alternative specifications where we only compare expectations of improvements or of deteriorations with expectations of no change. These regressions are discussed at the end of this section.

### 3.3.2 Baseline results

The estimation results are shown in Table 5. In columns (1) to (3) we regress the financial expectations dummy variables on dummy variables for whether the individual has currently experienced an improvement or a deterioration in her financial situation.

[Table 5 here]

The significant coefficient in the first row of column (1) shows that, following a time  $t$  improvement in financial situation, individuals increase their subjective probability of a subsequent time  $t+1$  improvement. The significant coefficients in the first row of columns (2) and (3) reveal that this is compensated by a decrease in the probability of a  $t+1$  deterioration and, particularly, a decrease in the probability of no change. These results confirm the previous finding that, following an improvement in financial situation, individuals tend to have extrapolative expectations. The values of the estimated coefficients are also economically important. The log-odds ratio for the increase in the subjective probability of being better off next year is 0.64. Interestingly, these results show that the extrapolative pattern is not the outcome of a parallel shift of the subjective probability distribution of future changes, but rather by an increase of the mass in the right tail offset largely by a reduction of the mass in the middle of the distribution.

Interestingly, the expectation responses to deteriorations in financial situation (second row of table 5) show a different pattern. The estimated coefficients on the worse off dummy are positive both in the regression for expectations of future improvements (column (1)) and in the regression for expectations of future deteriorations (column (2)). In the previous section we documented that, on average, following deteriorations in financial situation individuals revise their future expectations negatively, consistent with extrapolative expectations. However, by separately studying the revisions in the subjective probabilities of the three different categories we uncover a more complex pattern. Following negative changes in financial situation, there is both an increase in the subjective probability of being worse off again in the future (also consistent with extrapolative expectations), and an increase in the subjective probability of being better off in the future (mean reversion).<sup>11</sup> This increase in the second moment of

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<sup>11</sup>These increases are compensated by a decline in the number of those who expect no future changes in their financial situation (column (3)).

expectations following negative events is, as far as we know, a novel result.

In a related result, [Ferland et al. \(2018\)](#) document that, in bad times, agents are more uncertain about their expectations. Their result implies that agents should behave more conservatively in their financial decisions and, consistent with this they document an increase in savings behavior and a more cautious investment behaviors. In our case agents should either increase or decrease their savings depending on their expectations of the future, and we confirm that this is indeed the case later in the paper. To the extent that the result in [Ferland et al. \(2018\)](#) is also likely to present in our data that will only work against finding the savings responses that we identify in our data, and confirms that these are indeed two different results.

The results in the previous section had shown an extrapolative pattern in average expectations that is much weaker following deteriorations than following improvements in financial situation. This can now be understood from the results in the second row [Table 5](#). After negative changes in financial situation, there is an increase in both the left and the right tails of the distribution of future expectations. The increase is slightly larger in the left than in the right tail (0.99 versus 0.74), giving rise to an average negative change, and thus the (small) negative coefficient estimated the third row of column (3) of [Table 4](#). The mean-reversion pattern in expectations following a negative event could arise from motivated beliefs. Agents want to believe that in the future they will be better off as this increases their current utility. Therefore, one possible explanation for these expectation results, is that there is heterogeneity in how individuals react. Some individuals are extrapolative, hence the positive coefficient on the worse off dummy in column (2), while others expect mean-reversion due to motivated beliefs, hence the positive coefficient on the better off dummy in column (1).<sup>12</sup> We investigate this possibility in the next section.

Only one of the estimated coefficients on the dummies that control for the income group of the individual is marginally statistically significant. As discussed below, this is because in these regressions we are controlling for individual fixed effects, so that the income group variables only capture variation over time in income group for the same individual.

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<sup>12</sup>The extrapolative behavior can also arise from motivated beliefs in the presence of self-control problems. The individual expects to be worse off in the future to incentivize herself to save more today.

### 3.3.3 Alternative specifications

In the previous regressions the null set of the endogenous variables combines two alternative outcomes. For instance, those who do not expect to be better can either expect to be the same or worse off. In order to investigate the extent to which this is important, we estimate an alternative specification where the expect better and expect worse individuals are only compared to those with the expectation of no change in financial situation. We define the following dummy variables:

$$\text{Expect Better vs Same}_{it} = \begin{cases} 1 & \text{if } E_t^i[\Delta FS_{t+1}^i] = 1, \\ 0 & \text{if } E_t^i[\Delta FS_{t+1}^i] = 0, \end{cases} \quad (7)$$

and

$$\text{Expect Worse vs Same}_{it} = \begin{cases} 1 & \text{if } E_t^i[\Delta FS_{t+1}^i] = -1, \\ 0 & \text{if } E_t^i[\Delta FS_{t+1}^i] = 0. \end{cases} \quad (8)$$

The estimation results for the logit regressions with these two dependent variables are shown in columns (4) and (5) of Table 5. They deliver the same qualitative conclusions as their counterparts in columns (1) and (2), and even the values of the estimated coefficients are similar. The estimated coefficient on the better off dummy in the expect worse regression is not statistically different from zero, but this leads to essentially a similar overall conclusion: following improvements in financial situation, individuals form on average extrapolative expectations, resulting from an increase in the mass on the right tail of the distribution and a decrease in the mass at the center of the distribution.

In the last two columns of Table 5, we report the results, for our original expectation dummies, of regressions without individual fixed effects. Although the magnitudes of the estimated coefficients are significantly different from those obtained in the baseline specification (columns (1) and (2)), the qualitative conclusions are the same.<sup>13</sup> We again observe extrapolative behavior following improvements in financial situation, and an increase in the second moment of the distribution of expectations following deteriorations. Since we no longer include fixed effects in the regression, the coefficients on the income group variables are now all highly significant.

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<sup>13</sup>The inclusion of individual fixed effects makes a substantial difference for the qualitative conclusions for regressions in which the dependent variables measure expectations errors, shown later on in the paper.

Individuals with higher income are more likely to expect to be better off in the future (column (6)), and less likely to expect a future deterioration in their financial situation (column (7)).

### 3.4 Heterogeneity in expectations after negative changes

We have documented that following a worse off event, there are increases in the expectations of both positive and negative changes in future financial situation. This could be due to: (i) households in general being more prone to adjust their expectations in either direction following a negative change in financial situation; or (ii) some households being significantly more likely to always expect to be better off, while others being significantly more likely to always expect to be worse off, again following a negative change in financial situation. The previous regressions included individual fixed effects that control for the average expectation, i.e. whether some individuals are on average more likely to expect to be better off or worse off. However, they do not control for whether some individuals are on average more more likely to expect to be better off or worse off *following* a deterioration in household finances.

In order to address this question, we first compute, for individuals in our sample who have been financially worse off in at least one year, the proportions of those who always expected to be financially better off or worse off in the following year. Therefore, the unit of observation is the individual, and the sample is restricted to those individuals who faced at least one worse off event. The results in the second column of Table 6 show that, among those individuals who have been worse off in at least one year, only 10% (18%) *always* expected to be financially worse off (better off) in the following year. These proportions are nearly halved, to 5% and 11% respectively, when we restrict the sample to individuals who were financially worse off at least twice during the sample, so that they could actually be giving different expectation answers each time the worse off event took place. In contrast, 84% of the individuals who were worse off at least twice during the sample, had some variation in their expectations of future finances following the negative events. These results show that the heterogeneity in responses is not primarily an individual fixed effect, but arises from an increase in the dispersion of forecasts by the same individuals.

These results cast doubt on the hypothesis that the divergence in expectations following negative events is the result of some agents being extrapolative and others expecting mean-



reversion due to motivated beliefs. If that were the case, we would expect the same individuals to revise the expectations in the same manner after every negative event. Of course this does not rule out the possibility that the same agents sometimes are extrapolative and at other times are more influenced by motivated beliefs.

[Table 6 here]

For the sample of individuals who were worse off at least twice during the sample, we calculate their average age, the average of the income group to which they belong to, and the average of the male dummy. The results are shown in the last three columns of Table 6. Individuals who always expect to be worse off at  $t+1$  following a worse off event at  $t$ , are on average older, they tend to have lower income, and they are disproportionately male. In contrast, those who always expect to be better off are on average younger and have higher income. Thus, older individuals are more likely to expect negative events to persist and younger individuals to expect them to revert. Naturally, these are simply expectations, which may or may not have been correct. We study expectation errors later on, in Section 4.

### 3.5 Expectations and actions

One potential concern with expectation surveys, is that they may not reflect true expectations because the responses may be affected by framing and/or some individuals may not actually mean what they say. As discussed in Greenwood and Shleifer (2014), this concern can be addressed by showing that individuals actually behave in line with the expectations that they report. Giglio et al. (2019) show that beliefs influence both portfolio allocations and trading behavior. Makridis (2019) finds that investors self-reported expectations of future economic activity have a casual impact on their consumption. Fermann et al. (2018) show that individuals with more uncertain expectations exhibit more precaution in their consumption, credit, and investment behaviors. Vellekoop and Wiederholt (2019) find that households with higher inflation expectations save less. In this section, we show that, in the BHPS data, expectations are also related to savings and (some) borrowing behavior.

### 3.5.1 Savings and borrowing variables

The BHPS has information on whether individuals are currently saving. The question is: “Do you save any amount of your income for example by putting something away now and then in a bank, building society, or Post Office account other than to meet regular bills?” The possible answers are: “Yes, No or Refused” (only a very small proportion, of less than one percent refuse to answer). We construct a dummy variable that takes the value of one for individual/years in which the response is Yes and zero for those in which it is No.

Individuals in the survey are also asked about the amount of savings. The exact question is: “About how much on average do you personally manage to save a month?” We multiply the amount stated by 12 to obtain an annual figure<sup>14</sup> and divide by gross household income to calculate a saving rate. For those who report that they do not currently save, we set the saving rate to zero. And to reduce the influence of outliers we winsorize the variable at the one percent level.

The last variable that we consider captures the borrowing decisions of individuals. The homeowners in the data are, in each year, asked whether they have taken out an additional mortgage on their home. The question is: “Have you taken out any additional mortgage or loan on this house/flat since (date of the previous interview)?” We use the answers to this question to construct a dummy variable that takes the value of one in case of an affirmative answer, and zero otherwise. Naturally, we are only able to do so for the sample of homeowners.

### 3.5.2 Results

We regress these variables that measure savings and borrowing behavior on the expectation variables, controlling for the current change in financial situation and income group. Naturally, savings and borrowing behavior is likely to depend on this set of controls. As before, we include individual and year fixed effects in the regressions.

Column (1) of Table 7 shows the results of a FE logit regression with the dummy for current saver as dependent variable. The statistically significant and positive (negative) coefficient on the better off (worse off) dummy, shows that individuals who experienced an improvement (deterioration) in their financial situation are more (less) likely to be active savers today. Turning

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<sup>14</sup>For couples we multiply this amount by 2.

our attention to the expectation variables, we estimate statistically significant and negative (positive) coefficient on the dummy variable for expect to be better off (worse off). This shows that individuals who expect future improvements (deteriorations) in their financial situation are less (more) likely to save today. This combined set of results confirms that individuals indeed act in line with their reported expectations and changes in financial situation.

[Table 7 here]

In columns (2) and (3) of Table 7 we report the results of regressions with the savings rate as the endogenous variable. In column (2) we include all available observations, while in column (3) we restrict the sample to observations with a positive savings rate. In both cases, the results again confirm that individuals' savings behavior is consistent with their reported expectations and the experienced changes in financial situation. Individuals who expect to be better off (worse off) in the future decrease (increase) their savings rates.<sup>15</sup> Furthermore, individuals who have experienced an improvement (a deterioration) in their financial situation increase (decrease) their savings rate.

Finally, in column (4) of Table 7 we report the results of a regression with the new home loan dummy as the dependent variable. In this case we do not find any statistical significant results for either expectations or realizations. As explained before, this variable is only defined for homeowners. More importantly, even among that set very few individuals actually take a new home loan in a given year, or even during our sample. As a result this variable only takes a value of one for 3.6% of our observations. The income group dummies are statistically significant, but their t-statistics are an order of magnitude smaller than in the other three regressions.

## 4 Expectation errors

In the previous section, we have studied how expectations respond to experienced changes in financial situation. We now exploit the panel dimension of our data further, to study the forecast errors.

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<sup>15</sup>We include individual fixed effects in the regression, so they capture differences in average savings rates across individuals, which could be driven by a large number of other factors. This regression is therefore capturing increases/decreases in the savings rate, relative to its average, in response to changes in the explanatory variables.

## 4.1 Variables construction

In Table 8 we compare the expectations of each individual  $i$  at time  $t$  of the change in her financial situation at time  $t + 1$  ( $E_t^i[\Delta FS_{t+1}^i]$ ), with the subsequent realization, i.e. the actual change in her financial situation at time  $t + 1$  ( $\Delta FS_{t+1}^i$ ). For example, in the first row, we see that 46% of the individuals who at time  $t$  expected to be financially better off at time  $t + 1$  had their expectations confirmed by the future realization. On the other hand, also at  $t + 1$ , 35% of them were in the same financial situation, and 19% were actually worse off.

[Table 8 here]

A first conclusion from Table 8 is that agents tend to have correct expectations, as demonstrated by the diagonal values being the highest for each row: of those who expect to be financially about the same the following year, 64% get it right; of those who expect to be financially worse off, 52% have correct expectations. The second important conclusion from the table is that, despite the previous result, there is also a significant number of individuals who fail to correctly forecast the future changes. Naturally, this could be the result of incorrect expectations or of realizations of unforecastable shocks. We explore this further in the remainder of this section.

We construct individual specific measures of optimism and pessimism, that require that we observe the same individual in each two consecutive years. Panel A of Table 9 presents a graphical representation of their construction. (We return to the remaining panels of this table below, to consider alternative definitions of the variables). An individual  $i$  is at time  $t$  optimistic, if her expectation of the time  $t + 1$  change in financial situation ( $E_t^i[\Delta FS_{t+1}^i]$ ) is better than the realized time  $t + 1$  change in financial situation ( $\Delta FS_{t+1}^i$ ). As is clear from Table ??, this may happen because: (i) the individual expected to be better off and the realized change is the same or worse off; or (ii) the individual expected no change in financial situation but the realized  $t + 1$  change is worse off.

[Table 9 here]

We construct a dummy variable (optimist) that takes the value of one for individual/year observations in which the individual is optimistic and zero otherwise:

$$\text{Optimist}_{it} = \begin{cases} 1 & \text{if } E_t^i[\Delta FS_{t+1}^i] > \Delta FS_{t+1}^i, \\ 0 & \text{Otherwise.} \end{cases} \quad (9)$$

Similarly, an individual  $i$  is at time  $t$  pessimistic if her expectation of her time  $t + 1$  financial situation is worse than the time  $t + 1$  realized change. This may happen because: (i) the individual expected to be worse off and the realized change is the same or better off; or (ii) the individual expected no change in financial situation, but the realized  $t + 1$  change is better off. We construct a dummy variable (pessimist) that takes the value of one for individual/year observations in which the individual is pessimistic and zero otherwise:

$$\text{Pessimist}_{it} = \begin{cases} 1 & \text{if } E_t^i[\Delta FS_{t+1}^i] < \Delta FS_{t+1}^i, \\ 0 & \text{Otherwise.} \end{cases} \quad (10)$$

It is important to note that our optimist and pessimist variables are based on the realized forecasting error, and not simply on the expectation. If an individual  $i$  at time  $t$  expected to be better off at time  $t + 1$ , and if when time  $t + 1$  arrives she is indeed better off, then the individual had the correct time  $t$  expectations (she was not optimistic).

## 4.2 Summary statistics

The second column of Table 10 reports the averages of the optimist and pessimist dummies, and the residual neither category (corresponding to correct expectations) in the last row. There are more individual/year observations for optimist than for pessimist, 0.26 and 0.17 of the total number of observations, respectively. For roughly 57% of the observations individuals correctly anticipate the change in their financial situation.

[Table 10 here]

The optimist and pessimist variables measure the fact that individuals did not have perfect foresight a time  $t$ . An unforecastable improvement (deterioration) in the time  $t + 1$  financial situation of individual  $i$  implies the time  $t$  pessimist (optimist) dummy will take the value of one.

The remaining columns of Table 10 report the average values for the optimist and pessimist dummies by age and income. There is a very significant age decline in the average level of

optimism, from 0.32 for individuals in the 20-34 age group, to 0.16 for those over 65 years of age. This decline is compensated by an increase in the proportion of individuals who had the correct expectations. On the other hand, the proportions of pessimist observations are relatively stable over the life-cycle. Finally, the last three columns of Table 10 show that the proportion of optimist observations tends to be higher for individuals in higher income groups. Recall that individuals are assigned to income groups based on the time  $t$  distribution of labor income, one year prior to the time  $t + 1$  realizations that we use to construct the expectation errors.

Table 11 shows summary statistics for several variables of interest, for individual/year observations corresponding to optimism, pessimism, and neither. The average age is 46 years for observations for which the optimist dummy is equal to one, compared to 49 years for observations for which the pessimist dummy is equal to one. Positive values for the optimist dummy are associated with a higher average number of children than positive values for the pessimist dummy, although this could be related to the differences in average age across the two groups.

[Table 11 here]

The last three rows of Table 11 report the proportion of individuals who are better off, no change in financial situation, and worse off at  $t$ , conditional on the optimist and pessimist dummies taking the value of one at time  $t$ . For those observations for which individuals are optimist at time  $t$ , a larger proportion of them have experienced a deterioration than an improvement in financial situation (0.33 compared to 0.24, respectively). On the other hand, for those observations for which individuals are pessimist at time  $t$ , a smaller proportion of them have experienced a deterioration than an improvement in financial situation (0.22 compared to 0.32, respectively). This suggests that individuals may incorrectly expect some form of mean reversion in changes in financial situation. However, these unconditional means might reflect both differences across individuals and changes over time for the same individual. Therefore we turn our attention to regression analysis.

### 4.3 Experienced financial situation and optimism/pessimism

For a more comprehensive analysis of the determinants of optimism and pessimism, we estimate logit regressions similar to the ones in previous section, but where the left-hand side variables

are now the optimist and pessimist dummies (defined in (9) and (10), respectively), instead of the expectation dummies. As before, we control for both individual fixed effects and year fixed effects. An unexpected negative aggregate economic shock in a given year  $t + 1$  (e.g. a recession) will naturally lead to a large proportion of individuals being classified as optimist at time  $t$ . This, and other aggregate time series variation, are captured by the year fixed effects.

Table 12 shows the regression results. The first two columns report our baseline specification while columns (3) and (4) include the results from OLS regressions (with individual fixed effects), and columns (5) and (6) report the results of logit regressions without individual fixed effects. We start by discussing the results for the main specification and will consider the other two later on. The variation in the number of observations in columns (1) and (2) relative to the others is explained by the fact that the fixed effects logit estimator drops those observations for which there is no variation over time for the same individual (instead of estimating the fixed effects). In parenthesis, below each of the estimated coefficients, we report t-statistics.

[Table 12 here]

### 4.3.1 Baseline results

Column (1) of Table 12 shows the results for the regression with the optimist variable as dependent variable (pessimist in column (2)), on the dummy variables for better off and worse off. The first row of (1) shows that individuals who at time  $t$  experienced an improvement in their financial situation (better off equal to one) are more likely to, at this time, be optimistic about future changes in their financial situation.

In the previous section (Table 5) we documented that individuals tend to expect improvements in financial situation to be persistent, i.e. they are more likely to expect to be better off following improvements in their financial situation. The statistically significant positive coefficient on the better off dummy in the first regression in Table 12, further shows that individuals extrapolate more than they should, and thus tend to be excessively optimistic. The estimated coefficient is also economically meaningful: log-odds ratio of 0.13. This increased optimism is also matched by a lower probability of pessimism, as shown by the statistically significant -0.10 coefficient in the second regression.<sup>16</sup>

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<sup>16</sup>In the previous section, we concluded that the change in expectations following an improvement in financial

The second row shows the estimated coefficients for the worse off dummy. The statistically significant positive coefficient in column (2) shows that individuals who at time  $t$  experience a deterioration in their financial situation are more likely to be pessimistic about future changes. In the previous section, in Table 5, we found that these individuals increase their probability of a (repeated) negative financial change. This coefficient in Table 12 reveals that they are over-extrapolating from their current experience, i.e. the future is (on average) not as bad as they expect it to be.<sup>17</sup>

So far, we have established that the previously documented extrapolative expectations behavior is excessive, and that this is the case both after positive and negative changes in financial situation. However, in the previous section we had also documented that, following deteriorations in financial situation, individuals are also more likely to expect mean-reversion, i.e. an improvement in their finances in the following year. The statistically significant positive coefficient for the worse off dummy in the regression (1) shows that agents are being too optimistic when forming these expectations, i.e. they expect more mean-reversion than there is in the data.<sup>18</sup>

In summary, the results in the first two columns of Table 12 show that individuals tend to react too much, relative to the true data generating process, both when they expect persistence and when they expect mean-reversion. It is important to emphasize that these results are by no means implied by the ones in the previous section. For example, it could have been the case that following an improvement in their financial situation agents increase their expectation of a further improvement next year, but that this was either perfectly consistent with the actual persistence in the underlying variable, or that they would actually be under-estimating the true persistence. In the first case the estimated coefficients for the better off dummy in columns (1) and (2) would be (statistically) zero, and in the second case they would be negative and

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situation was not a parallel shift of the subjective probability distribution of future changes, but rather an increase of the mass in the right tail. The coefficient on better off in the second regression shows that there is in fact a reduction in the objective probability of a deterioration in financial situation, and since that it is not anticipated by individuals, i.e. it is not reflected in their expectations, it leads to a decrease in pessimism.

<sup>17</sup>Note that, by definition, individuals who expect to be worse off can only be pessimist or correct in their expectations.

<sup>18</sup>By definition, individuals who expect to be better off can only be optimist or correct in their expectations.



positive, respectively.<sup>19</sup>

With the evidence in [Rozsypal and Schlafmann \(2017\)](#) and [Das et al. \(2018\)](#) in mind, we include in the regressions dummy variables for the income group that the individual belongs to. We define these groups using the distribution of year  $t - 1$  earnings (before the year  $t$  change in financial situation), so that there may be variation over time for the same individual, and we are able to estimate the coefficients in spite of the individual fixed effects. The base group are those in the bottom one third of the income distribution. We find that higher income individuals are more likely to be optimist. This effect is consistent with the results in [Rozsypal and Schlafmann \(2017\)](#). Individuals in higher income groups at time  $t - 1$  are more likely to have in the past (prior to  $t - 1$ ) experienced earnings increases. These may contribute to them being more optimistic going forward. We have also estimated regressions where we control for log real time  $t - 1$  income (instead of using dummies for income group), and the conclusions are similar.

#### 4.3.2 Linear probability model and the role of individual fixed effects

In columns (3) and (4) of [Table 12](#), we present the results for the estimation of a linear probability model. Naturally the interpretation of the estimated coefficients is different from the one in columns (1) and (2) (they are no longer log-odds ratios), but the estimated signs, economic and statistical significance are similar.

In columns (5) and (6) we report the results from a logit estimation without the individual fixed effects. When studying the expectation formation process, we concluded that controlling for individual fixed effects only led to moderate changes in the quantitative estimates, and did not change the qualitative conclusions. However, in this case, the failure to control for potential (unobserved) individual heterogeneity would lead us to very different conclusions.

The most significant difference is that the coefficient on the better off dummy in the pessimist regression is now positive and, even more crucially, twice as large as its counterpart in the optimist regression. Therefore, based on these results, we would conclude that following improvements in financial situation individuals actually become more pessimistic on average. So, even though individuals are extrapolating from current events, as shown in the previous section, from these regressions we would incorrectly conclude that they are not extrapolating

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<sup>19</sup>Below we discuss results in which we indeed obtain some of these estimates.

enough relative to the true persistence of these events in the data.

Another important difference comes from comparing coefficients in the optimist regression. In column (5), we estimate a coefficient on the worse off dummy three times larger than the estimated coefficient on the better off dummy, while in column (1) it is actually smaller. These results would therefore lead us to the false conclusion that the increase in optimism following negative events is significantly larger than the one observed following positive events. Finally, comparing the estimated coefficient on the worse off dummy across the optimist and pessimist regressions (second row of columns (5) and (6)) we would incorrectly conclude that, following negative events, the increase in optimism is much more important than the increase in pessimism: coefficients of 0.77 and 0.10, respectively. In the specification with individual fixed effects (columns (1) and (2)), these two coefficients were much closer to each other (0.09 and 0.05, respectively).

## 4.4 Categorical answers and expectation errors

In the previous subsection, we have documented patterns in expectation errors which could be inconsistent with rational expectations, since under rational expectations the errors should be uncorrelated with any information available at time  $t$ . We say could because our survey data only provides us with a discrete range of answers, for both changes and expectations of financial situation, as opposed to a continuum of potential values. And the classification of an underlying continuous variable (change in financial situation) into three categories (better off, same or worse off) may lead to predictable patterns in the expectation errors.<sup>20</sup> In this section we explore different ways to address this particular concern.

### 4.4.1 Results with different classifications

If the results are biased by the group formation process, then we might expect that different methods of group construction lead to different results. We exploit this logic by constructing two alternative measures of the variables “optimist” and “pessimist.” The different classification methods are illustrated in the bottom two panels of Table 9, where in the first panel we have also included the previous classification.

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<sup>20</sup>For this reason, we have so far avoided referring to the expectations as being rational or irrational.

In the first alternative classification, in Panel B, we only classify individuals as optimist (pessimist) if at time  $t$  they expected an improvement (deterioration) in their financial situation that failed to materialize. In other words, relative to the previous classification, we now assign a value of zero to both variables, to individuals who expected their financial situation to remain unchanged. We denote these alternative dummy variables by `optimist2` and `pessimist2`. In the third classification, shown in Panel C, which we denote `optimist3` and `pessimist3`, we also exclude individuals for whom the financial situation at  $t+1$  remained unchanged. In other words, the dummy variable for optimist (pessimist) is only equal to one only for individuals who expected to be better off (worse off), but who were actually worse off (better off) in the following year. It is important to note that the three classifications methods differ along two dimensions. First, in how they treat the realizations at  $t+1$ , and second in how they treat the expectations at time  $t$ .

We repeat the FE logit estimations from the previous section using the dummy variables corresponding to these alternative classification methods. The results are shown in Table 13, where in columns (1) and (2) we have repeat the results with the original optimist/pessimist classification to facilitate the comparison.

[Table 13 here]

Before discussing the results, it is important to point out that the number of observations differs significantly across the alternative specifications. This is because in the FE logit estimation only those observations referring to individuals for whom there is variation in the endogenous variable over the sample are included in the estimation. This therefore confirms that the different dummy variables are indeed providing different definitions of optimism and pessimism. Focusing now on the coefficients on the better off and worse off dummies, we see that our previous conclusions are unchanged. First, following an improvement in financial situation, individuals have a higher probability of being optimist and a lower probability of being pessimist. Second, following a deterioration in their financial situation, both the likelihood being optimist and the likelihood of being pessimist increase.<sup>21</sup>

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<sup>21</sup>The magnitudes of the coefficients change across specifications, but this is expected since the mean of the left hand side variable is also changing.

These results show that our conclusions are robust to different group formation methodologies, which vary both in how they treat the time  $t$  expectations and the time  $t+1$  realizations. This provides support to the view that the conclusions are not driven by the categorical nature of our data.

#### 4.4.2 Further supportive evidence

Additional evidence against our findings being driven by the qualitative nature of our data has already been presented in Table 12. We have shown that the estimation without individual fixed effects (columns (5) and (6)) yields results that are very different from those in the baseline specification (columns (1) and (2)).<sup>22</sup> The inclusion or exclusion of individual fixed effects does not change the qualitative classification of the data. If the baseline results were generated solely by a bias implied by that classification, then we would not expect them to change sign between these two specifications.

#### 4.4.3 Discussion of an alternative approach

Another possible way to explore the hypothetical bias that may be created by the use of discrete data is to estimate the underlying stochastic process for the true (continuous) variable (for example, inflation), then estimate the cutoffs for the different groups, use them to classify the observations into groups, and perform the estimation. However, in our setting, this approach is not feasible for two main reasons.

First, the agents are not forecasting a single variable, such as inflation or aggregate stock returns. They are forecasting their future financial situation which, as discussed in Section 2, is determined by multiple factors: income, expenditures, transfers, etc. The estimation of stochastic processes for all of these is a significant statistical challenge, and that would still be the case if we restricted ourselves to income and expenditures.<sup>23</sup> Finally ignoring expenditures and focusing only on income would be at odds with the evidence in Table 1 which shows that they are both equally important.

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<sup>22</sup>The coefficient on the better off dummy in the pessimist regression actually changes sign.

<sup>23</sup>While we could follow previous literature and assume the same income growth processes for individuals with the same education and occupation, the stochastic process for expenditures is likely to vary much more across individuals, and it is probably more complex than that for income growth.

A second difficulty is the estimation of the cutoffs for the reporting of a significant change in financial situation. These cut-offs will almost surely differ across individuals (see [Manski \(2017\)](#)), and may plausibly also vary across time for the same individual, as macroeconomic conditions or other relevant circumstances change. The average individual in our sample has one better off event due to higher income and one worse off event due to higher expenditures. Therefore, it is not possible to estimate the thresholds at an individual level.

## 4.5 Cumulative experiences and cohort effects

Thus far we have studied the impact of current changes in financial situation on expectations and expectation errors. The previous literature has documented the importance of accumulated personal experiences for learning and for the shaping of individual beliefs, and how the updating of beliefs that takes place may not necessarily be optimal/rational (e.g. [Vissing-Jorgensen \(2003\)](#); [Greenwood and Nagel \(2009\)](#); [Malmendier et al. \(2011\)](#); [Malmendier and Nagel \(2016, 2011\)](#); [Kuchler and Zafar \(2018\)](#); [Malmendier et al. \(2018\)](#)). We explore that channel in this section.

### 4.5.1 Variable construction

In order to capture lifetime experiences, some of which may have happened before the beginning of our sample period, we follow [Malmendier and Nagel \(2011\)](#) and construct a cohort variable that measures cumulative past experiences. More precisely, we construct a variable equal to the ratio of the number of years in which the individual, aged 18 or more, experienced a large negative economic event, divided by the individual's current age minus 18. This variable therefore measures the percentage of (adult) years during which the individual experienced such an event.<sup>24</sup>

We do not observe individual experiences prior to the BHPS sample period, therefore the events that we consider are years with large negative aggregate economic conditions.<sup>25</sup> The

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<sup>24</sup>We obtain similar results if instead we consider a “starting age” of 16.

<sup>25</sup>In addition, one can also conjecture that individuals might learn about the frequency of shocks by observing the realizations for other individuals, i.e. if the frequency of negative shocks is particularly high in a given year, that might lead those individuals who have not been affected by such shocks to increase their subjective unconditional expectation of those events.

specific list of years that we include are: (i) the UK recession years of 1973-1975, 1980-1981 and 1990-1991; and (ii) the years corresponding to World War I (1914-1918) and World War II (1939-1945). The cohort variable has a mean of 0.15 and a median of 0.14, with a standard deviation of 0.07. It takes a value of zero for 10% of the observations and it reaches a value of 0.24 (0.30) at the 95th (99th) percentile. We add this variable to the explanatory variables that we have previously used to explain optimism and pessimism, and estimate fixed effects logit regressions.

#### 4.5.2 Results

The results are shown in Table 14. With the introduction of the cohort variable the significance of the estimated coefficients on the previous variables remains essentially unchanged, and the point estimates are almost exactly identical. Turning to the cohort variable itself, we find that it has a statistically negative coefficient in the optimist regression. This is consistent with the hypothesis that individuals who have experienced a higher fraction of major negative events in their adult life have been “traumatized” by such events, and therefore are less likely to be optimistic about the future.

[Table 14 here]

It is important to remember that we include individual fixed effects among the explanatory variables in our regressions. Since the value of the cohort variable changes only slowly over time, especially for those individuals who are older, its effects are partly captured by the individual fixed effects. This helps to explain why the cohort variable is not statistically significant in the pessimist regressions.

As an alternative approach we estimate cross-sectional regressions, where we average the optimist and pessimist dummy variables for each individuals and regress them on the average of the cohort variable. Thus, each observation corresponds to one individual. The results are reported in columns (3) and (4). The cohort variable is now statistically significant in both regressions, and it has the predicted signs: individuals who have experienced a higher frequency of negative events throughout their adult lives are both less likely to be optimist about the future and more likely to be pessimist. These regressions also confirm that the individual fixed effects included in our optimist and pessimist regressions capture, at least in part, the cohort effects.

It is interesting to contrast the results for the cohort variable with those for the current change in financial situation. Accumulated bad experiences, as measured by the cohort variable, decrease optimism on average. On the other hand, the coefficients on the dummy for worse off reveal that individuals who face such an event are more likely to become optimist for the following year. We interpret these, and provide further evidence in the next section, as individuals under-estimating the persistence of negative changes in financial situation.

The results for the cohort variable show that, in addition to the short-run effects of a negative experience, there is a second channel at work: the cumulative realization of a series of bad experiences leads individuals to shift the unconditional distribution of future shocks to the left (consistent with [Malmendier and Nagel \(2011, 2016\)](#) and [Kuchler and Zafar \(2018\)](#)). In summary, while the result for current changes in financial situation are about the (subjective) estimates of the serial correlation of the shocks, the result for the cohort variable is about the (subjective) estimates of their unconditional distribution.

## 5 Implications for future financial situation

We have documented that, following negative changes in financial situation, there is an increase in the dispersion of expectations about future finances: sometimes individuals increase their expectation of another negative change, while other times they expect mean-reversion (i.e. a positive future change).<sup>26</sup> More importantly, when studying expectation errors, we found that this behavior leads to an increase in both the percentage of individuals with (ex-post) optimistic beliefs, and in the percentage of those with (ex-post) pessimistic beliefs.

The increased optimism means that a significant number of individuals tend to underestimate the persistence of negative changes in financial situation, or at least the persistence of the effects of the such events in their financial situation. This conclusion is particular concerning because it documents individuals becoming optimistic at times when they also have lower financial resources. Putting it differently, we have also found that individuals become more optimistic after positive changes in financial situation. However, at these times they tend to have more financial resources (due to the events that triggered the improvement in financial

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<sup>26</sup>As shown in Section 3, although this result is also partially generated by heterogeneity across individuals, it is primarily driven by differences for the same individuals across time.

situation). Being optimistic at times when their financial situation has deteriorated may be more problematic, if it leads individuals to adjust their savings and/or borrowing behaviors in the expectation that their financial situation will recover faster than it actually will. In this section we explore this possibility.

## 5.1 Savings/borrowing after a deterioration in financial situation

We have shown, in Section 3, that individuals on average increase (decrease) their savings when their financial situation improves (deteriorates), and decrease (increase) them when they expect future improvements (future deteriorations). Motivated by our previous discussion, in this subsection we focus specifically on those individuals who are worse at time  $t$  and, within this group, we compare those who expect a future deterioration to those who expect an improvement in their finances. More precisely, in Panel A of Table 15 we report the proportion of savers at  $t$  in each the two groups, the difference between these two numbers, and the p-value of a t-test of equality of means. The different columns different in the observations included. In column (1) we calculate the averages using all the observations for which individuals were worse off.

[Table 15 here]

The results in column (1) suggest that there are no statistical differences in the extensive margin of savings between the two groups. However, the two groups might have already had differences in expectations in the past which, given our results in Section 3, would imply pre-existing differences in savings behavior. To control for that, in column (2) we restrict the sample to observations in for which individuals expected, in the previous period, their financial situation to have remained unchanged ( $E_{t-1}^i[\Delta FS_t^i] = 0$ ).<sup>27</sup> We now observe a statistically significant difference between the proportion of savers among those who expect future improvements in their financial situation (30.02) and those who expect a future deterioration (32.59). Finally, the difference is almost twice as large, and more statistically significant, when we add

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<sup>27</sup>In principle, we could also repeat the analysis for the subgroups of individuals who, at time  $t - 1$ , expected their financial situation to improve and/or those who expected their financial situation to deteriorate. However, for both of these groups, we have about half of the observations available when we consider those who expected no change in their financial situation, with a consequent impact on the statistical significance of the results, particularly when we add a further restriction to the sample (column (3)).



a further sample restriction, that controls for potential differences in the previous change in financial situation. More precisely, in column (3) we also condition on individuals who had no change in financial situation in the previous period ( $\Delta FS_{t-1}^i = 0$ ).

The extensive margin of savings is likely to exhibit significant persistence over time. In any given year, individuals who are currently savers are much more likely to be savers again the following year than those who did not currently save, even after conditioning on (past and current) changes in financial situation and (past and current) expectations of future financial situation. Therefore, in Panel B we calculate the change in the proportion of savers in each of the two groups. The differences are highly statistically significant even without controlling for past expectations and past changes in financial situation. Furthermore, they are also economically important. Both groups experience a decline in the fraction of savers, as expected since they just experienced a deterioration in their financial situation. However, while among those who expect a further negative change in the future the percentage of savers “only” falls by roughly 3.5% (depending on the controls), among those who expect mean-reversion the decline is roughly 10%.

In Panel C, we turn our attention to the intensive margin of savings, i.e the savings rate. The differences in savings rates between the two groups are statistically significant at less than 5% to 1%, depending on the case, i.e. with or without conditioning on past expectations and/or past changes in financial situation. However, the economic magnitude of the difference increases monotonically, as we make the two groups more comparable by controlling for both past expectations and realizations. With both sets of controls, the average savings rate of those who expect to be better off in the future is only 2.18%, compared with 2.87% for those who expect a further deterioration in their finances the following year. The difference of 0.67 percentage points corresponds to 17% of the average savings rate in the sample (4%).

As previously discussed, the BHPS also has information on new home equity loans. In Panel D of Table 15, we compare the proportion of individuals taking such loans in each of the two groups. In all three cases, those individuals who expect an improvement in their future finances are more likely to take on a new (home equity) loan. As in the previous panels, the differences are both statistically significant and economically large.

## 5.2 Future financial situation

Individuals who expect to be better off following a negative change in their financial situation are less likely to save and/or are more likely to take a loan. This may have important implications for their future household finances since, as documented in Section 4, these individuals often underestimate the degree of persistence of the negative changes in financial situation. As a result, in the future they might find themselves with zero savings and thus unable to smooth the persisting difficult financial situation, and/or might not be able to repay their debt as quickly as they might have anticipated. This is likely to be particularly problematic in case of loans that carry a high interest rate, such as for payday loans (Bhutta et al., 2015; Melzer, 2011; Morse, 2011). In this section, we investigate whether there is a relation between the potentially sub-optimal savings and borrowing behavior that we have documented, and the subsequent changes in financial situation.

More precisely, in Table 16 we again take the sample of individuals who are in a worse financial situation in a given year  $t$ , and calculate the proportion of those individuals who are worse off (Panels A.1 and B.1) and better off (Panels A.2 and B.2) in subsequent years. In panels A.1 and A.2 we report the results for the two groups that we have previously considered: those who at time  $t$  expect a further deterioration in their financial situation and those who expect an improvement, respectively. In panels B.1 and B.2 we instead compare those who had time  $t$  expectations that were optimistic or pessimistic (using our original classifications). As before, we control for potential differences in behavior resulting from previous differences in their financial situation and/or financial expectations. Therefore, in all cases, we restrict the sample to individuals who experienced no change in their financial situation in the previous year ( $\Delta FS_{t-1}^i = 0$ ) and who expected their financial situation to remain unchanged for the current year ( $E_{t-1}^i[\Delta FS_t^i] = 0$ ).

[Table 16 here]

The results in Panels A.2 (A.1) show that individuals who expect to be better off (worse off) the following period are indeed significantly more likely to have a future improvement (deterioration) in their financial situation. This is to be expected: changes in financial situation are not a random walk, and these expectations reflect all information that individuals currently have about their future finances.

We are particularly interested in the results for optimists and pessimists, reported in Panel B. We focus our discussion on the results for  $t+2$ ,  $t+3$  and  $t+4$ , since the ones for  $t+1$  are, to a large extent, due to the way we construct the data.<sup>28</sup>

Panel B.1 of Table 16 shows that those individuals who are optimist at time  $t$  are much more likely to find themselves in a worse financial situation in year  $t+2$  than those individuals who are pessimist at time  $t$ : 38.3% versus 26.3%. This difference of 12 percentage points corresponds to 50% of the unconditional probability of being worse off (24%). As shown in the previous subsection, individuals who, following a negative change in their financial situation, expect mean-reversion in the following year, decrease their savings by more and are more likely to borrow. We hypothesized that this was particularly concerning since, in Section 4 we had documented that those expectations are on average optimistic relative to the future realizations. These results confirm that those individuals are indeed significantly more likely to find themselves even more worse off in the future.

It is important to remember that the results in Panel A show that individuals who expected to be better off in future are indeed more likely to be better off and less likely to be worse off. The results in Panel B.1 show that, for the sub-sample of those that were optimist, the result not only disappears, but it actually reverses. Furthermore, the differences are economically very large, and persist into the future. At  $t+3$  the difference in the probability of being worse off is still 8.8 percentage points, and even at  $t+4$ , those who were optimist at  $t$  still have a 3.9 percentage points higher probability of being worse off, although the difference is no longer statistically significant, possibly due to the small number of observations.

Interestingly, the results in panel B.2 reveal that there are no statistically significant differences in the probability of being better off again in the future, across the two groups.<sup>29</sup> In fact, the difference between the two is sometimes positive ( $t+2$ ) and other times negative ( $t+3$  and  $t+4$ ). This suggests that there is no mechanical effect driving the results in Panel B.1, otherwise we would have expected to find the opposite patterns here, i.e. we would have expected a lower

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<sup>28</sup>individuals are classified into pessimist and optimist based on their year  $t$  expectations and their subsequent year  $t+1$  realizations. Pessimist individuals are those for whom the year  $t+1$  realized financial situation is better than the year  $t$  expectation. This explains the large proportion of those who are better off (equal to 0.457, Panel B.2), and the fact that none of them are worse off (as shown in Panel B.1). Similarly, optimist individuals are those for whom the year  $t+1$  realized financial situation is worse than the year  $t$  expectation.

<sup>29</sup>Except at  $t + 1$ , where the result is mechanical as previously explained.

probability of being better off in the future.

## 6 Conclusion

We have used almost two decades of panel data to study household finances, and how experienced changes in such finances affect the way in which households form expectations. We have shown evidence consistent with extrapolative expectations, both unconditionally and following an improvement in household finances. However, we have also shown that, following a deterioration in household finances, there is an increase in the dispersion of forecasts: households increase both the subjective probability of a further deterioration (consistent with extrapolative behavior) and the probability of future improvement (mean-reversion). We have found that when individuals expect mean reversion, they are too optimistic. In other words, they underestimate the degree of persistence of the changes in household finances. We show this evidence using fixed effects panel regressions, so that our results are explained by variation over time for a given individual, and not by variation across individuals.

The evidence that we present is important for two reasons. First, and although we also find support for extrapolative expectations, it shows that the process of expectations formation is perhaps more complex than a simple extrapolative model. Second, if households are too optimistic at times of a deterioration in household finances, and they save less and borrow more as a result, they may subsequently find themselves in an even worse financial situation, effects for which we found supportive evidence.

## References

- Bénabou, R. and J. Tirole (2002). Self-confidence and personal motivation. *Quarterly Journal of Economics* 117(3), 871–915.
- Bénabou, R. and J. Tirole (2011). Identity, morals and taboos: Beliefs as assets. *Quarterly Journal of Economics* 126(2), 805–855.
- Bhutta, N., P. M. Skiba, and J. Tobacman (2015). Payday loan choices and consequences. *Journal of Money, Credit and Banking* 47, 223–261.
- Bordalo, P., N. Gennaioli, R. L. Porta, and A. Shleifer (2017). Diagnostic expectations and stock returns. *NBER Working Paper 23863*.
- Brown, S. and K. Taylor (2006). Financial expectations, consumption and saving: A microeconomic analysis. *Financial Studies* 27, 313–338.
- Brunnermeier, M. and J. Parker (2005). Optimal expectations. *American Economic Review* 95(4), 55–80.
- Campbell, J. Y. (2006). Household finance. *Journal of Finance* 61(4), 1553–1604.
- Das, S., C. Kuhnen, and S. Nagel (2018). Socioeconomic status and macroeconomic expectations. *Review of Financial Studies*, *Forthcoming*.
- Ferland, E., C. M. Kuhnen, G. Li, and I. Ben-David (2018). Expectations uncertainty and household economic behavior. *Working Paper*.
- Gennaioli, N., Y. Ma, and A. Shleifer (2015). Expectations and investment. *NBER Macroeconomics Annual* 30, 379–442.
- Giglio, S., M. Maggiori, J. Stroebel, and S. Utkus (2019). Five facts about beliefs and portfolios. *Working Paper*.
- Greenwood, R. and S. Nagel (2009). Inexperienced investors and bubbles. *Journal of Financial Economics* 93, 239 – 258.

- Greenwood, R. and A. Shleifer (2014). Expectations of returns and expected returns. *Review of Financial Studies* 27, 714–746.
- Guiso, L. and P. Sodini (2013). Household finance: an emerging field. *Handbook of the Economics of Finance*, Constantinides, G., M. Harris and R. Stulz, Elsevier, 1397–1532.
- Guiso, Luigi, M. H. and T. Jappelli (1997). *Household Portfolios*. MIT Press.
- Kaustia, M. and S. Knupfer (2008). Do investors overweight personal experience? evidence from ipo subscriptions. *Journal of Finance* 63, 2679–2702.
- Kuchler, T. and B. Zafar (2018). Personal experiences and expectations about aggregate outcomes. *Journal of Finance Forthcoming*.
- Kuhnen, C. M. (2015). Asymmetric learning from financial information. *Journal of Finance* 70, 2029–2062.
- Makridis, C. (2019). Sentimental business cycles and the protracted great recession. *Working Paper*.
- Malmendier, U. and S. Nagel (2011). Depression babies: Do macroeconomic experiences affect risk-taking. *Quarterly Journal of Economics*.
- Malmendier, U. and S. Nagel (2016). Learning from inflation experiences. *Quarterly Journal of Economics*.
- Malmendier, U., S. Nagel, and Z. Yan (2018). The making of hawks and doves. *Working Paper*.
- Malmendier, U. and L. S. Shen (2018). Scarred consumption. *NBER Working Paper 24696*.
- Malmendier, U., G. Tate, and J. Yan (2011). Overconfidence and early-life experiences: The effect of managerial traits on corporate financial policies. *Journal of Finance* 66(5), 1687–1733.
- Manski, C. F. (2017). Survey measurement of probabilistic macroeconomic expectations: Progress and promise. *NBER Working Paper 23418*.

- Melzer, B. (2011). The real costs of credit access: Evidence from the payday lending market. *Quarterly Journal of Economics* 126(1), 517–555.
- Morse, A. (2011). Payday lenders: Heroes or villains? *Journal of Financial Economics* 102(1), 28–44.
- Puri, M. and D. T. Robinson (2007). Optimism and economic choice. *Journal of Financial Economics* 86, 71–99.
- Rozsypal, F. and K. Schlafmann (2017). Bias in individual income expectations and its aggregate implications. *Working Paper*.
- Souleles, N. S. (2004). Expectations, heterogeneous forecast errors, and consumption: Micro evidence from the michigan consumer sentiment surveys. *Journal of Money, Credit and Banking* 36(1), 39–72.
- University of Essex, . (July 2010). Institute for social and economic research, british household panel survey: Waves 1-18, 1991-2009. *7th Edition. Colchester, Essex: UK Data Archive*, SN: 5151.
- Vellekoop, N. and M. Wiederholt (2019). Inflation expectations and choices of households. *Working Paper*.
- Vissing-Jorgensen, A. (2003). Perspectives on behavioral finance: Does irrationality disappear with wealth? evidence from expectations and actions. *NBER Macroeconomics Annual*, 139–194.

**Table 1: Financial situation.**

Panel A reports the number of observations for which individuals in year  $t$  reported that they were financially significantly better off, about the same, and significantly worse off than in year  $t-1$ , for  $t=1991,\dots,2008$ . Panel B reports the reasons given by individuals for why they were financially better off (worse off) in year  $t$  than in year  $t-1$ . The data for the reasons for worse off is available from 1993 onward.

Panel A: Changes in financial situation.

	<u>Financial situation in year <math>t</math></u>			
	<u>Better off at <math>t</math></u>	<u>No change at <math>t</math></u>	<u>Worse off at <math>t</math></u>	<u>Total</u>
Number of obs.	28,830	63,695	29,755	122,280
Fraction of total	0.24	0.52	0.24	1.00

Panel B: Reasons for change in financial situation.

<u>Panel B.1</u>	<u>Better off</u>		<u>Panel B.2</u>	<u>Worse off</u>	
<u>Reason better off</u>	<u># obs.</u>	<u>Fraction</u>	<u>Reason worse off</u>	<u># obs.</u>	<u>Fraction</u>
Earnings $\uparrow$	14,080	0.54	Earnings $\downarrow$	6,206	0.24
Expenditures $\downarrow$	3,883	0.15	Expenditures $\uparrow$	13,530	0.53
Benefits $\uparrow$	2,739	0.10	Benefits $\downarrow$	990	0.04
Inv income $\uparrow$	749	0.03	Inv income $\downarrow$	878	0.03
Windfall payment	781	0.03	One-off expend.	513	0.02
Good management	1,310	0.05			
Other reasons	<u>2,508</u>	<u>0.10</u>	Other reasons	<u>3,672</u>	<u>0.14</u>
Total better off	26,050	1.00	Total worse off	25,789	1.00



**Table 2: Reasons for change in financial situation by age and income.**

This table reports the reasons given by individuals for why they were financially better off (worse off) in year  $t$  than in year  $t-1$  by the age of the household head and by income group. Low (high) income are those in the bottom (top) one third of the distribution of household income at  $t-1$  for that year.

	<u>Age group</u>				<u>Income group</u>		
	<u>20-34</u>	<u>35-49</u>	<u>50-64</u>	<u><math>\geq 65</math></u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
<u>Panel A: Change in financial situation, fraction of total</u>							
Better off	0.39	0.28	0.18	0.11	0.17	0.23	0.29
Same	0.37	0.47	0.56	0.67	0.60	0.53	0.47
Worse off	0.24	0.25	0.26	0.22	0.23	0.24	0.24
<u>Panel B: Reason for better off, as a fraction of better off</u>							
Earnings $\uparrow$	0.66	0.63	0.45	0.06	0.35	0.56	0.62
Expenditures $\downarrow$	0.13	0.14	0.19	0.17	0.14	0.15	0.16
Benefits $\uparrow$	0.02	0.03	0.13	0.55	0.30	0.08	0.02
Inv Income $\uparrow$	0.02	0.02	0.04	0.07	0.03	0.03	0.03
Windfall payment	0.02	0.03	0.06	0.04	0.03	0.03	0.03
Good management	0.06	0.05	0.04	0.04	0.05	0.05	0.05
Other reasons	0.09	0.10	0.09	0.07	0.10	0.10	0.12
<u>Panel C: Reason for worse off, as a fraction of worse off</u>							
Earnings $\downarrow$	0.30	0.28	0.31	0.07	0.12	0.26	0.33
Expenditures $\uparrow$	0.50	0.48	0.46	0.67	0.63	0.50	0.46
Benefits $\downarrow$	0.03	0.05	0.04	0.03	0.06	0.04	0.02
Inv Income $\downarrow$	0.00	0.01	0.04	0.10	0.04	0.04	0.03
One-off expenditure	0.04	0.02	0.01	0.01	0.01	0.02	0.03
Other reasons	0.14	0.16	0.14	0.13	0.14	0.14	0.13

**Table 3: Expectations by age and income.**

The table reports the proportion of observations for individuals who at time  $t$  expect to at time  $t + 1$  be significantly better off, about the same, and significantly worse off, for  $t=1991, \dots, 2007$ . The table also shows the proportions by age and income.

	<u>Overall</u>	<u>Age group</u>				<u>Income group</u>		
		<u>20-34</u>	<u>35-49</u>	<u>50-64</u>	<u><math>\geq 65</math></u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
Better off	0.24	0.46	0.30	0.17	0.05	0.16	0.25	0.29
Same	0.64	0.46	0.60	0.70	0.79	0.71	0.64	0.60
Worse off	0.12	0.08	0.10	0.13	0.16	0.13	0.11	0.11

**Table 4: Financial expectations: fixed effects regressions.**

This table reports the results of fixed-effects OLS regressions in which the endogenous variable is the time  $t$  expectation of future changes in financial situation,  $E_t^i[\Delta FS_{t+1}^i]$ . The independent variable in specifications (1) and (2) is experienced time  $t$  change in financial situation,  $\Delta FS_{t+1}^i$ . In specification (3) we capture the time  $t$  experienced change in financial situation using two dummies, one that takes the value of one for positive changes in financial situation, i.e. for  $\Delta FS_{t+1}^i > 0$ , and zero otherwise, and another dummy variable that takes the value of one for negative changes in financial situation, i.e. for  $\Delta FS_{t+1}^i < 0$ , and zero otherwise.

	(1)	(2)	(3)
	$E_t^i[\Delta FS_{t+1}^i]$	$E_t^i[\Delta FS_{t+1}^i]$	$E_t^i[\Delta FS_{t+1}^i]$
Change in Fin. Sit. ( $\Delta FS_{t+1}^i$ )	0.07*** (27.63)	0.06*** (23.13)	
Dummy for pos. change ( $\Delta FS_{t+1}^i > 0$ )			0.09*** (20.90)
Dummy for neg. change ( $\Delta FS_{t+1}^i < 0$ )			-0.02*** (-5.68)
<u>Control variables</u>			
Income group 2		0.01 (1.06)	0.01 (1.14)
Income group 3		-0.02*** (-3.66)	-0.02*** (-3.53)
Year FE	No	Yes	Yes
Ind. FE	Yes	Yes	Yes
Number of obs.	116,895	115,543	115,543

**Table 5: Expectations.**

This table shows the estimated coefficients of Logit regressions that explain time  $t$  expectations using the time  $t$  changes in financial situation. In columns (1)-(3) and (6)-(7) the dependent variables are dummy variables for expect better off, expect worse off, and expect the same. In columns (4) and (5) the dependent variables are the dummies dummy variables for expect better off and expect worse off that take the value of zero only when individuals expect the same. The independent variables are dummy variables that capture the experienced time  $t$  change in financial situation. The unit of observation is individual/year. The regressions also differ in the set of fixed effects included (individual and year or year only in the last two columns).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Expect <u>Better<sub>it</sub></u>	Expect <u>Worse<sub>it</sub></u>	Expect <u>Same<sub>it</sub></u>	Expect Better <u>vs Same<sub>it</sub></u>	Expect Worse <u>vs Same<sub>it</sub></u>	Expect <u>Better<sub>it</sub></u>	Expect <u>Worse<sub>it</sub></u>
Better off <sub>it</sub>	0.64*** (28.27)	-0.08* (-2.29)	-0.52*** (-25.49)	0.64*** (27.67)	-0.01 (-0.37)	1.43*** (67.94)	-0.18*** (-5.51)
Worse off <sub>it</sub>	0.74*** (30.23)	0.99*** (37.17)	-1.09*** (54.44)	0.91*** (35.26)	1.17*** (41.68)	0.91*** (41.47)	1.51*** (57.75)
Income group 2	0.03 (0.94)	-0.10** (-2.48)	0.04 (1.64)	-0.02 (-0.67)	-0.07 (-1.71)	0.47*** (18.65)	-0.25*** (-8.17)
Income group 3	-0.05 (-1.45)	0.05 (1.04)	0.06 (1.90)	-0.08 (-2.15)	0.04 (0.75)	0.60*** (21.97)	-0.16*** (-5.16)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes	Yes	No	No
Number of obs.	74,723	59,674	93,591	66,598	48,131	115,543	115,543

**Table 6: Heterogeneity in financial expectations, conditional on worse off event.**

The unit of observation is the individual. The table shows in the different rows the number (and proportion) of individuals who, after being worse off: (i) always expect to be better off; (ii) sometimes expect to be better off and other times expect to be worse off; (iii) always expect to be worse off. The second column reports individuals who were worse off at least once in the sample, while the other columns consider individuals who were worse off at least twice in the sample. The last three columns report the average age, income group, and the average value for the male dummy for individuals who are worse off at least twice during the sample, for the different expectations.

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	<u>Individuals who are worse off</u>				
	<u>At least once</u>	<u>At least twice</u>			
<u>Individuals who:</u>	<u>Number</u>	<u>Number</u>	<u>Age</u>	<u>Inc. group</u>	<u>Male</u>
always expect worse off	966 (0.10)	314 (0.05)	61.9	1.55	0.61
expect same or alternate	7171 (0.72)	5181 (0.84)	48.6	1.98	0.53
always expect better off	<u>1887 (0.18)</u>	<u>671 (0.11)</u>	34.6	2.06	0.54
	10024 (1.00)	6166 (1.00)			

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**Table 7: Expectations and Actions**

The dependent variables is a dummy variable for whether the individual is currently saving (in (1)), the saving rate calculated as a proportion of income (in (2) and (3)), and a dummy variable that takes the value of one if the individual took out a new home equity loan (in (4)). The dependent variables are the dummy variables that capture the time  $t$  expectations and the dummy variables that capture the time  $t$  realized change in financial situation. In column (3) we restrict the sample to those observations for which the saving rate is strictly positive. All the regressions include year and individual fixed effects.

	(1)	(2)	(3)	(4)
	<u>Current Saver<math>_{it}</math></u>	<u>Saving Rate<math>_{it}</math></u>	<u>Saving Rate<math>_{it}</math></u>	<u>New Home Loan<math>_{it}</math></u>
Expect Better $_{it}$	-0.15*** (-6.28)	-0.26*** (-3.99)	-0.20 (-1.52)	-0.02 (-0.36)
Expect Worse $_{it}$	0.07** (2.34)	0.49*** (6.02)	0.86*** (5.09)	-0.02 (-0.24)
Better off $_{it}$	0.45*** (19.90)	1.74*** (27.56)	1.88*** (15.59)	-0.02 (-0.31)
Worse off $_{it}$	-0.51*** (-21.04)	-1.04*** (-16.38)	-1.29*** (-9.09)	0.03 (0.54)
Income group 2	0.40*** (13.56)	-0.75*** (-9.57)	-5.73*** (-27.85)	0.25** (2.52)
Income group 3	0.77*** (22.30)	-1.26*** (-13.34)	-8.65*** (-37.58)	0.44*** (4.28)
Year FE	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes
Number of obs.	81,988	108,419	39,953	23,766
Estimation	FE Logit	FE OLS	FE OLS	FE Logit

**Table 8: Expectations compared to realizations.**

The table reports the proportion of observations for individuals who at time  $t + 1$  had a realized change in financial situation conditional on their time  $t$  expectation.

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	<u>Realization at t+1</u>		
<u>Expectation at t</u>	<u>Better off</u>	<u>Same</u>	<u>Worse off</u>
Better off	0.46	0.35	0.19
Same	0.18	0.64	0.18
Worse off	0.12	0.36	0.52

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**Table 9: Optimism and pessimism: definitions.**

Panel A presents a graphical representation of the definition of the optimist and pessimist dummies based on the time  $t$  expectations of individual  $i$  and on her time  $t+1$  realizations. Panels B and C show alternative definitions of the optimist and pessimist dummies.

<u>Panel A:</u>	<u>Realization at t+1</u>		
<u>Expectation at t</u>	<u>Better off</u>	<u>Same</u>	<u>Worse off</u>
Better off	—	Optimist	Optimist
Same	Pessimist	—	Optimist
Worse off	Pessimist	Pessimist	—

  

<u>Panel B:</u>	<u>Realization at t+1</u>		
<u>Expectation at t</u>	<u>Better off</u>	<u>Same</u>	<u>Worse off</u>
Better off	—	Optimist2	Optimist2
Same	—	—	—
Worse off	Pessimist2	Pessimist2	—

  

<u>Panel C:</u>	<u>Realization at t+1</u>		
<u>Expectation at t</u>	<u>Better off</u>	<u>Same</u>	<u>Worse off</u>
Better off	—	—	Optimist3
Same	—	—	—
Worse off	Pessimist3	—	—



**Table 10: Optimism and pessimism**

This table reports the proportion of observations for which individuals are optimistic and pessimistic. An individual is optimistic at time  $t$  if at this time he/she expected a change in financial situation that is better than the realized time  $t + 1$  change: the individual expected to be significantly better off but the realization is the same or significantly worse off, or alternatively the individual expected to be about the same the following year but the realization is worse off. An individual is pessimistic at time  $t$  if at this time he expected a change in financial situation that is better than the realized time  $t + 1$  change: the individual expected to be significantly worse off but the realization is the same or significantly better off, or the individual expected to be about the same the following year but the realization is better off. The result also reports the proportions by age groups and by income. Data for  $t=1991, \dots, 2007$ . The unit of observation is individual/year.

	<u>Overall</u>	<u>Age group</u>				<u>Income group</u>		
		<u>20-34</u>	<u>35-49</u>	<u>50-64</u>	<u><math>\geq 65</math></u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
Optimist	0.26	0.32	0.31	0.25	0.16	0.21	0.27	0.28
Pessimist	0.17	0.18	0.18	0.16	0.15	0.16	0.16	0.18
Neither	0.57	0.50	0.51	0.59	0.69	0.63	0.57	0.54

**Table 11: Optimism and pessimism: summary statistics.**

This table reports summary statistics for several variables of interest for individual/year observations in which individuals are optimistic, pessimistic and neither optimistic nor pessimistic. All the variables are measured at  $t$  with  $t=1991,\dots,2007$ . The unit of observation is individual/year.

	<u>Optimist</u>		<u>Pessimist</u>		<u>Neither</u>	
	<u>Mean</u>	<u>Stdev</u>	<u>Mean</u>	<u>Stdev</u>	<u>Mean</u>	<u>Stdev</u>
<u>Demographic variables</u>						
Age	45.83	15.97	49.10	17.59	52.68	18.19
Male	0.55	0.50	0.54	0.50	0.55	0.50
Married	0.64	0.48	0.62	0.49	0.59	0.49
Number of children	0.67	1.01	0.55	0.95	0.49	0.91
Log real income	9.93	0.78	9.90	0.83	9.82	0.81
<u>Education</u>						
No High School	0.29	0.45	0.33	0.47	0.39	0.49
High School	0.30	0.46	0.27	0.44	0.26	0.44
Other Higher Education	0.25	0.43	0.22	0.41	0.20	0.40
College Degree	0.16	0.36	0.18	0.38	0.15	0.36
<u>Financial change</u>						
Better off at $t$	0.24	0.43	0.32	0.47	0.22	0.41
No change at $t$	0.43	0.50	0.45	0.50	0.59	0.49
Worse off at $t$	0.33	0.47	0.22	0.42	0.19	0.39

**Table 12: Optimism and pessimism: regressions.**

The first four columns report the estimated coefficients of fixed effects Logit regressions that explain optimism/pessimism at time  $t$  using the experienced changes in financial situation. The unit of observation is individual/year. The last two columns report the results for ordinary least squares regressions. All the regressions include individual and year fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)
	<u>Optimist<sub>it</sub></u>	<u>Pessimist<sub>it</sub></u>	<u>Optimist<sub>it</sub></u>	<u>Pessimist<sub>it</sub></u>	<u>Optimist<sub>it</sub></u>	<u>Pessimist<sub>it</sub></u>
Better off <sub>it</sub>	0.13*** (5.95)	-0.10*** (-3.96)	0.024*** (6.04)	-0.016*** (-4.65)	0.24*** (13.20)	0.51*** (25.12)
Worse off <sub>it</sub>	0.09*** (4.24)	0.05* (1.98)	0.016*** (4.10)	0.007* (1.94)	0.77*** (43.31)	0.10*** (4.33)
Income group 2	0.13*** (4.49)	-0.08* (-2.29)	0.02*** (4.51)	-0.010* (-2.29)	0.30*** (16.06)	-0.06*** (-2.58)
Income group 3	0.19*** (5.59)	-0.04 (-0.91)	0.03*** (5.72)	-0.006 (-1.06)	0.31*** (16.69)	0.10*** (4.93)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes	No	No
Number of obs.	79,204	70,941	98,095	98,095	98,095	98,095
Estimation	FE Logit	FE Logit	FE OLS	FE OLS	Logit	Logit

**Table 13: Optimism and pessimism: regressions with alternative definitions.**

This table reports the estimated coefficients of fixed effects Logit regressions that explain optimism/pessimism at time  $t$  using the experienced changes in financial situation. The unit of observation is individual/year. The regressions differ in the definition of optimism and pessimism that is used for the dependent variable.

	(1)	(2)	(3)	(4)	(5)	(6)
	<u>Optimist<sub>it</sub></u>	<u>Pessimist<sub>it</sub></u>	<u>Opt2<sub>it</sub></u>	<u>Pess2<sub>it</sub></u>	<u>Opt3<sub>it</sub></u>	<u>Pess3<sub>it</sub></u>
Better off <sub>it</sub>	0.13*** (5.95)	-0.10*** (-3.96)	0.56*** (19.95)	-0.12*** (-2.36)	0.20*** (4.17)	-0.26*** (-3.28)
Worse off <sub>it</sub>	0.09*** (4.24)	0.05** (1.98)	0.68*** (23.22)	0.83** (21.70)	0.43*** (9.96)	0.54*** (7.09)
Income group 2	0.13*** (4.49)	-0.08* (-2.29)	0.10** (2.70)	-0.17** (-3.02)	0.13** (2.35)	-0.29** (-2.68)
Income group 3	0.19*** (5.59)	-0.04 (-0.91)	0.17*** (3.78)	-0.07 (-1.05)	0.23*** (3.35)	-0.20 (-1.60)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	79,204	70,941	56,298	35,652	29,858	12,859
Estimation	FE Logit	FE Logit	FE Logit	FE Logit	FE Logit	FE Logit

**Table 14: Cohort effects.**

Columns (1) and (2) report the estimated coefficients of FE logit regressions of optimism and pessimism on changes in financial situation and on the cohort variable. The unit of observation is individual/year. In columns (3) and (4) we regress the average over time of the optimist and pessimist dummies for each individual on the average of her cohort variable. The unit of observation is the individual.

	(1)	(2)	(3)	(4)
	<u>Optimist<sub>it</sub></u>	<u>Pessimist<sub>it</sub></u>	<u>Avg. Optimist<sub>i</sub></u>	<u>Avg. Pessimist<sub>i</sub></u>
Better off <sub>it</sub>	0.13*** (5.97)	-0.10*** (-3.96)		
Worse off <sub>it</sub>	0.09*** (4.23)	0.05* (1.99)		
Cohort variable <sub>it</sub>	-1.34** (-2.34)	0.18 (0.26)		
Avg. cohort var <sub>i</sub>			-0.61*** (-12.79)	0.17*** (3.81)
Income group 2	0.13*** (4.34)	-0.08* (-2.27)		
Income group 3	0.18*** (5.29)	-0.04 (-0.87)		
Year FE	Yes	Yes		
Ind. FE	Yes	Yes		
Number of obs.	79,204	70,941	13,369	13,369
Estimation	FE Logit	FE Logit	Tobit	Tobit

**Table 15: Savings and Borrowing behavior after a decline in financial situation.**

This table reports values, the difference, and p-values of t-tests of the equality of means for several variables of interest for individuals who expect better and who expect worse at time  $t$  conditional on a worse off event at time  $t$  (in column (1)), conditional on a worse off event at time  $t$  and the same expectation at time  $t - 1$  (in column (2)), and conditional on a worse off event at time  $t$  and the same expectation and the same realization at time  $t - 1$  (in column (3)). The variables of interest are the proportion of time  $t$  savers in each of the two groups (Panel A), the change in the proportion of savers (Panel B), the savings rate (Panel C), and the proportion of individuals who took a home equity loan (Panel D).

	(1)	(2)	(3)
Change at t	Worse off	Worse off	Worse off
Expectation at t-1	All	Same	Same
change at t-1	All	All	Same
<u>Panel A: Proportion of savers (%)</u>			
Expect Worse	27.67	32.60	33.06
Expect Better	27.04	30.02	28.09
Difference	0.63	2.57	4.96
p-value	0.38	0.04	0.00
<u>Panel B: Difference in the proportion of savers (p.p.)</u>			
Expect Worse	-3.60	-3.48	-3.42
Expect Better	-10.07	-10.28	-10.40
Difference	6.47	6.80	6.97
p-value	0.00	0.00	0.00
<u>Panel C: Savings rate (%)</u>			
Expect Worse	2.42	2.81	2.87
Expect Better	2.21	2.39	2.18
Difference	0.20	0.43	0.67
p-value	0.05	0.02	0.01
<u>Panel D: Proportion New Home Equity Loan (%)</u>			
Expect Worse	7.97	5.36	4.23
Expect Better	10.76	8.87	9.40
Difference	-2.80	-3.50	-5.10
p-value	0.00	0.00	0.00

**Table 16: Future changes in financial situation after a decline in financial situation.**

Panels A.1 and A.2 report the proportion of individuals who are worse off (Panel A.1) and better off (Panel A.2) in each period from  $t + 1$  to  $t + 4$  conditional on them being worse off at  $t$ , for those who at  $t$  expected to be worse off and for those who expected to be better off at  $t + 1$ . Panels B.1 and B.2 report the proportion of individuals who are worse off (Panel B.1) and better off (Panel B.2) in each period from  $t + 1$  to  $t + 4$  conditional on them being worse off at  $t$ , for those who at  $t$  were optimist and for those who were pessimist. The panels also report the differences in the proportions and the p-value of a t-test of the equality of means.

	At t+1	At t+2	At t+3	At t+4
<u>Panel A.1: Proportion worse off</u>				
Expect Worse at t	0.519	0.442	0.399	0.379
Expect Better at t	0.291	0.251	0.262	0.232
Difference	0.228	0.191	0.137	0.146
p-value	0.000	0.000	0.000	0.000
<u>Panel A.2: Proportion better off</u>				
Expect Worse at t	0.076	0.099	0.115	0.142
Expect Better at t	0.283	0.266	0.262	0.254
Difference	-0.207	-0.167	-0.147	-0.111
p-value	0.000	0.000	0.000	0.000
<u>Panel B.1: Proportion worse off</u>				
Pessimist at t	0.000	0.263	0.270	0.274
Optimist at t	0.747	0.383	0.357	0.313
Difference	-0.747	-0.120	-0.088	-0.039
p-value	0.000	0.000	0.000	0.140
<u>Panel B.2: Proportion better off</u>				
Pessimist at t	0.457	0.187	0.150	0.194
Optimist at t	0.000	0.165	0.170	0.197
Difference	0.451	0.022	-0.020	-0.003
p-value	0.000	0.228	0.298	0.882