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, with increases in the likelihood of both a further deterioration (consistent with extrapolative behavior) and of a future improvement (mean-reversion). In particular, 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 household finances and on expectations of future changes. More precisely, in each year, individuals are asked whether they are financially better off, about the same, or worse off than they were one year before, and they are also asked about their expectations for the following year. These 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 is that the data includes detailed information on many other individual characteristics and decisions, including on saving and borrowing, that we relate to the 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 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 first show that, controlling for individual fixed effects, there is an overall positive relationship between the experienced changes in financial situation and the expectations of future changes.

Interestingly, we show that this overall relation hides considerable diversity, that depends on the nature of the realized change in financial situation. Following an improvement, the expectation of a further improvement increases (and the expectation of a future deterioration declines), again consistent with extrapolative expectations. However, following a deterioration in household finances, there are increases in the subjective probabilities of a further deterioration (consistent with extrapolative expectations) and of a future improvement (consistent with mean-reversion).[1] Thus, following negative events, there is an increase in the dispersion of forecasts.

[1] With a compensating decline in the number of individuals who expect to be the same.

We analyze the sources of the increased dispersion. The fixed effects that we include in our regressions control for the average expectations, i.e. whether some individuals are on average more likely to expect to be better off or worse off, but not for the average expectations *c*onditional on a deterioration in household finances. Therefore, there are two possible scenarios that could give rise to increased dispersion: (i) some individuals always expect to be better off while others always expect to be worse off (increased dispersion across individuals); or (ii) the *same* individuals sometimes expect to be better off and other times expect to be worse off. The evidence supports the latter scenario, i.e. the heterogeneity in responses is mostly due to an increase in the dispersion of the forecasts of the same individuals.

A possible interpretation of our results is that individuals face greater uncertainty about the future after a deterioration in their finances. This greater uncertainty leads the same individuals to sometimes respond in one direction and other times in the other direction. This interpretation would be consistent with the evidence in Fermand et al. (2018), who show that individuals are more uncertain about their expectations in bad times, and behave accordingly by exhibiting precautionary saving behavior. While this channel may also be at work in our data, we show that it cannot be the full explanation: those individuals who, following a negative financial situation, expect mean reversion save less and borrow more than those who extrapolate.

This analysis gives rise to the interesting economic question of why, following a deterioration in household finances, a given individual sometimes expects mean reversion while at other times he/she extrapolates. We show that it is related to age and to the reason for the worse financial situation. Individuals are more likely to expect mean reversion when they are young and when the reason for the deterioration in finances was an earnings decline (as opposed to, for example, higher expenditures).

The expectation of mean reversion following a deterioration of household finances may arise from motivated beliefs (Bénabou and Tirole (2002), Bénabou and Tirole (2011), Brunnermeier and Parker (2005)). Individuals may be feeling down because of the deterioration in their finances, and they form expectations of mean-reversion that allow them to psychologically cope with the situation. Our results are consistent with a motivated beliefs interpretation in which such beliefs are not an individual fixed effect, but are more likely among the young who suffer a deterioration in their finances due to lower earnings.

With these results in mind, we turn our attention to expectation errors. Since our data is

a panel, we can use the year t expectations and the year $t+1$ realizations to construct, for each year/individual, an ex-post expectation error, that we classify into optimism, pessimism or perfect forecast. An optimistic observation corresponds to an individual i and year t for whom the expectation is better than his/her year $t+1$ realized change. On the other hand, a pessimistic observation corresponds to an individual/year who expects a change that is worse than the realized one. It is important to note that we construct optimism and pessimism using expectation errors, and not raw expectations. An observation with a better off expectation and a better off subsequent realization is classified as a perfect forecast.

Naturally, the expectation errors could simply reflect the ex-post realization of ex-ante unpredictable shocks. However, our analysis shows that both the degrees of extrapolation and of mean-reversion are excessive relative to the future realizations. When individuals extrapolate from their current experience, they expect too much persistence compared to the one that there actually is in the data. Similarly, when individuals expect mean-reversion, they expected too much mean reversion.

The expectation of too much mean reversion following a deterioration in financial situation is particularly important since these are times when 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 finances. We explore this possibility using the information on income, savings and debt in our data. Those individuals who expect the deterioration in their finances to mean-revert are more likely to cut back on savings and/or take on an extra loan than those who do not have optimistic expectations. Importantly, we find that the optimist individuals are indeed more likely to be financially worse off again in the future.

A final contribution is to relate our results 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)).[2] We follow Malmendier and Nagel (2011) in constructing a cohort variable that measures past large negative experiences (economic recessions and wars). Consistent with this literature, we find that individuals who have experienced a greater incidence of such events tend to be more

[2]See Malmendier et al. (2011), Kuchler and Zafar (2018), Malmendier et al. (2018).

pessimist (less optimist) about their future finances. In other words, their subjective probability distribution is shifted towards pessimism. These cohort results are about the (subjective) estimates of the unconditional distribution of outcomes, whereas the results on optimism/pessimism 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), Gennaioli et al. (2015), Bordalo et al. (2017), Giglio et al. (2019)) and, in particular, to those papers that focus on the role of personal experiences for expectations and individual decisions (see also the contributions of Kaustia and Knupfer (2008); Kuhnen (2015); Malmendier and Shen (2018); Das et al. (2018)). Most of these papers focus on the expectations of aggregate variables, such as stock returns or inflation.[3]

Our paper differs from these, in that we provide evidence on expectations of household finances using panel data. In these dimensions, our paper is closest to Brown and Taylor (2006) and Rozsypal and Schlafmann (2017). Relative to these, our main contributions are the finding of the increase dispersion of forecasts following a deterioration in finances, and how the expectation of too much mean reversion has negative future consequences. Finally, our paper contributes to the literature on individual sentiment and financial decisions (Souleles (2004); Puri and Robinson (2007)), and the household finance literature more generally (see Campbell (2006), Guiso and Sodini (2013), and Guiso and Jappelli (1997) for overviews).

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 the implications for the future financial situation. The final section concludes.

[3] Kaustia and Knupfer (2008) consider expectations of the individual's own investment ability and Kuhnen (2015) presents experimental evidence on how individuals form expectations differently following gains and losses.

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). 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 the change in financial situation

The data includes information on the reason for the change in household finances. More precisely, from 1993 onward, those participants who responded that they were better or worse off than in the previous year were 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 reasons for being (significantly) better off. 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 reasons for being worse off. The main one is higher expenditures (53%), a reason that is given twice as often as lower earnings (24%).[4]

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 over 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 is higher earnings. During this part of the life-cycle earnings

[4]The number of observations for better off/worse off in Panel A add to 58,585 whereas in Panel B they add to 51,839. This happens because information on the reason is only available from 1993 onward.

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 higher earnings as the reason for being better off. For the over 65 age group the main reason is higher benefits.

In Panel C we tabulate the reasons for 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, with a fraction of roughly 0.30.

In the last three columns of Table 2 we focus on the role of income. In each year $t-1$, we divide households in our data into three groups based on their income (household income includes the income of household head and partner, if present). The low (high) income group includes those households in the bottom (top) one-third of the income distribution for that year. We then study the changes in year t financial situation. High (low) income households 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 is also 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. But since the panel is unbalanced 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 be dropped 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 $t-1$. The unconditional probability is 8.5%. For all four of our major categories the attrition rates are very similar. For those who are better off due to an increase in earnings (decrease in expenditures), the proportion is 8.4% (8.6%). For those who are 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.

3 Expectations

In this section, we study individual expectations in relation to 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."[5]

Table 3 reports summary statistics for these expectations. The second column reports the unconditional distribution. The unit of observation is individual/year. The majority of responses (almost two thirds) are for the expectation of an unchanged financial situation. 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 unconditional distribution of the realized changes shown in Panel A of Table 1, it seems that individuals are remarkably good at anticipating improvements in their finances: the average expectation and realization are both equal to 24%. On the other hand, individuals appear to under-estimate the probability of becoming worse-off: 12% in expectation compared to 24% in realization. The latter result is consistent with theories of over-confidence. It may also arise from motivated beliefs, as being optimistic about the future may allow individuals to psychologically cope with adversity. We investigate this further below.

Naturally, the higher proportion of worse off realizations compared with the expectations, could also be the result of our sample including a significant proportion of unexpected negative events. For example, if individuals tend to be worse off in recessions, and there was a relatively large proportion of unexpected recessions in our sample, this could potentially explain the difference.

[Table 3 here]

The remaining columns of Table 3 report expectations by age and income. The patterns

[5]Respondents are not asked for the reason for their expectation (earnings, expenditure, etc.).

are broadly similar 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.

The University of Michigan Consumer Survey includes a similar expectations question, in which respondents are asked about 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 our data is a panel. Therefore, 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)). This is particularly important in light of the evidence presented by Giglio et al. (2019), who show that beliefs are characterized by large and persistent individual heterogeneity. In our econometric analysis we will capture this heterogeneity using individual fixed effects.

3.2 Experienced changes and expectations

In this section, we study how current changes in financial situation affect expectations. We use the individual i/time t change in financial situation to construct a variable (ΔFS_t^i) that takes one of three possible values:

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

Similarly we construct another variable ($E_t^i[\Delta FS_{t+1}^i]$) that measures the individual i's time t expectations of future changes in financial situation:

$$E_t^i[\Delta FS_{t+1}^i] = \begin{cases} 1 & \text{if individual } i \text{ expects to be better off at time } t+1 \\ 0 & \text{if individual } i \text{ expects to be about the same at time } t+1 \\ \text{-1} & \text{if individual } i \text{ expects to be worse off at time } t+1 \end{cases}$$

In order to estimate the relation between experienced changes and expectations we first estimate the following regression:

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

where we control for individual fixed effects (f^i) and ϵ_t^i denotes the residual. The fixed effects control for unobserved individual heterogeneity, including in the way that different individuals interpret the questions that they are asked. We estimate the regressions using ordinary least squares, but the main conclusions are similar for a multinomial logit model.

Column (1) of Table 4 shows the results. We estimate a positive coefficient β equal to 0.07, with a t-statistic of 27.6. Therefore, individuals who have experienced an improvement (a deterioration) in their financial situation are more likely to expect, for the following year, another improvement (deterioration). In other words, the positive statistically significant estimated β coefficient is evidence of extrapolative expectations.

[Table 4 here]

In column (2) we report the results for a regression where we also control for the income group and year fixed effects. The estimated β coefficient is almost identical (0.06) and again highly significant (t-statistic of 23.1). These results are 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 show that such expectation formation process is also at work in the context of household finances.

In column (3) of Table 4 we report the results of a more flexible specification, in which the degree to which individuals form extrapolative expectations may depend on the nature of the experienced change in financial situation. We do so, by decomposing the ΔFS_t^i variable into two different dummies, one that takes the value of one for positive changes ($\Delta FS_t^i = 1$) and zero otherwise, and another dummy that takes the value of one for negative changes ($\Delta FS_t^i = -1$), and zero otherwise.[6]

The estimates in column (3) show an estimated positive (negative) coefficient following an improvement (deterioration) in household finances. Therefore, after an improvement (deterioration), $E_t^i[\Delta FS_{t+1}^i]$ is more likely to be positive (negative). This is again consistent with extrapolative behavior. However, the absolute value of the estimated coefficient for positive

[6]The no change in financial situation is captured by the (unreported) constant in the regression.

changes is almost five times larger than that for negative changes (0.09 versus 0.02), which shows that on average the extrapolative behavior is stronger after an improvement than after a deterioration in household finances. We build on this result next.

3.3 Experienced changes and the distribution of expectations

The previous section focused on the average expectations. We now study how the nature of the current changes affects the distribution of expectations.

3.3.1 Variable construction and econometric approach

In order to characterize the distribution of expectations, and how it relates to the realized changes in financial situation, we construct three dummy variables. The first is equal to one if the individual expects an improvement in her t+1 finances, and zero otherwise:

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

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

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

Finally, the third dummy variable takes a value of one when individuals expect a deterioration, and zero otherwise:

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

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 expectations dummy variables.[7] We model:

[7]The null set for each of these dummy variables combines two alternative outcomes. For instance, the expect better dummy takes the value of zero for those who expect no change and for those who expect to be worse off. At the end of this section, we estimate alternative specifications where we only compare expectations of

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

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 (β) gives us the effect of each element of $\mathbf{x}_i$ on the log-odds ratio:

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

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 similar when we estimate a linear probability model.

3.3.2 Baseline results

The estimation results are shown in Table 5. In columns (1) to (3) we regress the expectations dummy variables on the dummy variables that measure the experienced change in financial situation.

[Table 5 here]

improvement or of deterioration with expectations of no change.

The positive 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 negative coefficients in the first row of columns (2) and (3) reveal that the increase in the probability of a further improvement is compensated by declines in the probabilities of a t+1 deterioration and, particularly, of no change. The values of the estimated coefficients are economically important. The log-odds ratio for the increase in the subjective probability of being better off next year is 0.64, and those for the subjective probability of being worse off and no change are -0.08 and -0.52, respectively. These estimates show that the extrapolative pattern is not the outcome of a parallel shift of the subjective probability distribution of future changes, but it is driven by an increase in 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 a deterioration in financial situation, shown in the second row of Table 5, reveal a different pattern. The estimated coefficients on the worse off dummy are positive in both the regression for expectations of a future improvement (column (1)) and the regression for expectations of a future deterioration (column (2)). In the previous section, we showed that, on average, following a deterioration, individuals increased their expectation of further deterioration, consistent with extrapolative behavior. However, by separately studying the revisions in the subjective probabilities of the three different categories, we uncover a more complex pattern. Following a worse off event, there are increases in the subjective probability of being worse off again (consistent with extrapolative expectations), and in the subjective probability of being better off (mean reversion).[8] Therefore, there is an increase in the dispersion of expectations following negative events.[9] In the regressions shown in Table 5 only one of the estimated coefficients on the income group dummies is marginally significant. This is because in the regressions we are controlling for individual fixed effects, and there is

[8]These increases are compensated by a decline in the number of those who expect no future changes in their financial situation (column (3)).

[9]The results in the previous section show an extrapolative pattern in average expectations that is much weaker following a deterioration than following an improvement in financial situation. This can be understood from the results in the second row Table 5. After a negative change, 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 a small average negative change.

significant persistence in the income group to which the household belongs to. [10]

One possible explanation for the increase in dispersion, is that individuals are more uncertain about what negative events mean for their future finances, which is then reflected in the dispersion of their expectation. Such an explanation would be consistent with the results of Fermand et al. (2018), who show that, in bad times, agents are more uncertain about the future, and they behave more conservatively by saving more (higher precautionary savings) and making more cautious investment decisions. Although this effect could also be present in our data, the evidence for saving behavior in Section 3.5, reveals that a different mechanism is at work in our sample.[11]

The mean-reversion pattern in expectations could arise from some agents having motivated beliefs. In bad times, those who have motivated beliefs believe they will be better off in the future, as this belief increases their current utility and it allows them to cope. This combined with heterogeneity in how individuals react to negative events would explain the patterns: some have motivated beliefs, hence the positive coefficient on the worse off dummy in column (1), while others are extrapolative, giving rise to the positive estimated coefficient on the worse off dummy in column (2).[12] It is important to note that the fixed effects that we include in the regression do not necessarily control for this heterogeneity, if it arises during bad times. We study the nature of this heterogeneity in Section 3.4.

3.3.3 Robustness

In the previous regressions, the null set of the dependent variables combines two alternative outcomes. For example, those who do not expect to be better off can either expect to be the same or worse off. We estimate an alternative specification where the expect better and expect worse responses are only compared to those for expect no change. We define the following dummy variables:

[10] When we remove the fixed effects the income dummies become significant.

[11] Furthermore, as we explain in Section 3.5, to the extent that higher uncertainty in bad times leads to an increase in precautionary savings, that would work against finding the savings responses that we identify in our data.

[12] 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.

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

and

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

The results are shown in columns (4) and (5) of Table 5. They deliver the same conclusions as their counterparts in columns (1) and (2). The estimated coefficient on the better off dummy in the expect worse vs same regression is not statistically different from zero, but this leads to a similar overall conclusion: following an improvement in financial situation, individuals form on average extrapolative expectations, due to an increase of the mass in the right tail of the distribution and a decrease of the mass in the center of the distribution.

In the last two columns of Table 5, we report the results, for our original expectation dummies, for 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.[13] We 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. Individuals in higher income groups 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)).

As we have shown in Table 3, there are life-cycle patterns in the changes in financial situation. In the baseline specification, we have controlled for individual and for year fixed effects. This means that we cannot simultaneously include age dummies in the regression (age is co-linear with individual and year fixed effects). In appendix Table A1, we replace the year fixed effects with age fixed effects to show that the estimated coefficients on the better off/worse off dummies are not sensitive to the set of fixed effects that is included.

[13]The inclusion of individual fixed effects makes a substantial difference for the qualitative conclusions for regressions in which the dependent variables measure expectation errors, as shown later in the paper.

3.4 Heterogeneity after a deterioration in financial situation

We have shown 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 negative changes; 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 worse off event. Included individual fixed effects control for the average expectation, i.e. whether some individuals are on average more likely to expect to be better off or worse off, but not for the average expectation *following* a deterioration in household finances.

In order to disentangle between (i) and (ii), we restrict the sample to those individuals who have been financially worse off in at least one year, and to those observations in which they have been worse off. We then calculate the number of those who *always* expected to be worse off in the following year. Similarly, we calculate the number of those who *always* expected to be better off. Therefore, the unit of observation is the individual. The results in the third column of Panel A 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. This shows that the dispersion of expectations following a deterioration in financial situation is largely due to within individual variation (72%).

The sample of individuals who were worse off at least twice during the sample is more interesting, since these individuals could actually be giving different expectation answers each time that the worse off event took place. For this restricted sample, the proportion of those who always expect to be worse off (better off) is even smaller, and equal to 5% (11%). These numbers confirm that the heterogeneity in responses after a worse off event is not primarily an individual fixed effect, but that it arises from an increase in the dispersion of forecasts by the same individuals. They 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 was the case, we would expect that the same individuals revise their expectations in the same manner after every negative event. Of course, this does not rule out the possibility that the same agents sometimes behave in an extrapolative manner and at other times they are more influenced by motivated beliefs.

[Table 6 here]

For the same sample of individuals who were worse off at least twice during the sample, we calculate the averages of their age and income group. The last two columns of Panel A of Table 6 show the results. Those who always expect to be worse off at t+1 off following a worse off event at t, have the highest average age and they tend to be in lower income groups (recall that one is the lowest income group). On the other hand, those who always expect to be better off are younger and in higher income groups.[14]

In order to further investigate these age effects, we focus on those individuals for whom there is variability in the expectations, and restrict the sample to those individuals who expect to be better off at least once, and who also expect to be worse off at least once, in periods when there is a worse off event. Therefore, and by definition, we only consider individuals who are at least worse off twice. They are a subsample of those included in the same or alternate category shown in Table 6.

This restricted sample allows to compare the periods in which individuals expect to be better off to those periods when the *same* individuals expect to be worse off, in both cases following a deterioration in financial situation. The summary statistics shown in the Panel B of Table 6 show that when individuals are younger they are more likely to expect negative events to mean revert, but that as they age the same individuals are more likely to expect them to persist.

The last two columns of Panel B of Table 6 show that the expectations are also related to the source of the worse off event. The dummy variable that takes the value of one if the reason for the worse off event is an earnings decline has a mean value of 0.32 at times when individuals expect the negative event to mean revert, compared to 0.16 when they expect it to persist. On the other hand, the dummy variable that takes the value of one if the reason for the worse off event is higher expenditures has a mean value of 0.41 at times when individuals expect the negative event to mean revert, compared to 0.61 when they expect it to persist. Thus individuals are more likely to expect earnings declines to mean revert and expenditure

[14]The correlation between income groups and the expectations may in part arise from the fact that individuals who always expect to be worse off, may also on average have more negative income realizations, and thus be in lower income groups. This caveat does not apply to the regressions that we estimate below.

increases to persist. Naturally, these are simply expectations, which may or may not have been correct. We study expectation errors in Section 4.

3.5 Expectations and actions

One potential shortcoming of expectation surveys, is that the responses may be affected by framing and/or by some individuals not actually meaning what they say. As discussed in Greenwood and Shleifer (2014), this concern can be addressed by showing that individuals behave in line with the expectations that they report. This is an approach that has been followed by several papers in the literature. Giglio et al. (2019) show that beliefs influence both portfolio allocations and trading behavior. Fermand et al. (2018) show that individuals with more uncertain expectations exhibit more precautionary behavior.[15] In this section, we show that, in our data, expectations are related to savings behavior.

3.5.1 Savings and borrowing variables

The BHPS data 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 who respond Yes, and zero for those who respond 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,[16] 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. To reduce the influence of outliers we winsorize the variable at the one percent level.

[15] See also Makridis (2019) who finds that investors self-reported expectations of future economic activity have a casual impact on their consumption, and Vellekoop and Wiederholt (2019) who show that households with higher inflation expectations save less.

[16] For couples we multiply this amount by 2.

The last variable that we consider are borrowing decisions. 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 the savings variables on the expectation dummies, controlling for the current change in financial situation. Since the decision to save is also likely to depend whether the individuals experienced an improvement or a deterioration in their financial situations. 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 experience an improvement (deterioration) in their financial situation are more (less) likely to be active savers. Turning our attention to the expectation variables, we estimate a statistically significant and negative (positive) coefficient on the dummy variable for expect to be better off (worse off). This shows that individuals who expect an improvement (deterioration) in their financial situation are less (more) likely to be savers today. This shows that individuals do indeed act in line with their reported expectations.

[Table 7 here]

In columns (2) and (3) of Table 7, we report the results of regressions with the savings rate as the dependent variable. In column (2) we include all available observations, while in column (3) we restrict the sample to observations with a strictly positive savings rate. In both cases, the results again confirm that individuals' savings behavior is consistent with their reported expectations: individuals who expect to be better off (worse off) in the future decrease (increase) their savings rates.[17]

[17]We include individual fixed effects in the regression that capture differences in average savings rates across

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 regression, we do not find any statistical significant results for either expectations or realizations. As explained before, this variable is only defined for homeowners. Furthermore, even among these, only a small number of individuals actually take a new home loan in a given year (the variable takes the value of one for only 3.6% of the observations).

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.

4.1 Variables construction

Table 8 compares the time t expectations ($E_t^i[\Delta FS_{t+1}^i]$), with the subsequent realizations, i.e. the actual changes in time $t+1$ financial situation (ΔFS_{t+1}^i). For example, the first row shows that 46% of the individuals who at time t expected to be financially better off at time $t+1$ had their expectation confirmed by the 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 shown by the fact that the main diagonal values are the highest in each row: of those who expect to be about the same the following year, 64% are right; of those who expect to be worse off, 52% have correct expectations. The second important conclusion from the table is that, in spite of the fact that the majority have the correct expectations, there is a significant number of individuals who fail to make accurate forecasts. Naturally, this could be due to either incorrect expectations or realizations of unforecastable shocks.

individuals. The regression explains increases/decreases in the savings rate, relative to its average, in response to changes in the explanatory variables.

In order to investigate the source of the errors, 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 (ΔFS_{t+1}^i). As it is clear from Table 9, this happens when: (i) the individual expects to be better off but the realized change is the same or worse off; or (ii) the individual expects the same but the realization 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:

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

Similarly, an individual i is at time t pessimistic if her expectation is of a worse change than the subsequent realization. This happens when: (i) the individual expects to be worse off but the realized change is the same or better off; or (ii) the individual expects the same, but the realization 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:

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

It is important to note that the optimist and pessimist variables are based on the realized forecasting error, and not simply on the expectation. An individual i who at time t expects to be better off at time $t+1$, and who indeed is better off when time $t+1$ arrives has the correct time t expectations (she is not optimistic).

4.2 Summary statistics

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

[Table 10 here]

The remaining columns of Table 10 report the average values of 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 proportion of pessimist observations is relatively stable over the life-cycle. 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 $t-1$ distribution of labor income, one year prior to the time t expectations 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 age differences among 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.

A larger proportion of the individuals who are optimistic at t have experienced a deterioration than an improvement in financial situation: 0.33 compared to 0.24, respectively. On

the other hand, a smaller proportion of those who are pessimistic at t have experienced a deterioration than an improvement in their finances: 0.22 compared to 0.32, respectively. These proportions suggest that individuals may incorrectly expect some form of mean reversion after negative changes in financial situation. However, these unconditional means reflect both differences across individuals and changes over time for the same individual. Therefore, we turn our attention to regression analysis.

4.3 Experienced changes and optimism/pessimism

We estimate fixed effects logit regressions similar to the ones in the previous section, but where the left-hand side variables are the optimist and pessimist dummies (defined in (9) and (10), respectively). As before, we control for individual 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, is captured by the year fixed effects.

4.3.1 Baseline results

Table 12 shows the regression results. Column (1) shows the results for the regression with the optimist dummy as dependent variable (pessimist in column (2)), on the dummy variables that measure the experienced change in financial situation.

[Table 12 here]

In Table 5 we showed 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 column (1) of Table 12, shows that individuals extrapolate too much and are thus more likely to be optimistic. The estimated coefficient is also economically meaningful: log-odds ratio of 0.13. This increased optimism is accompanied by a lower pessimism, as shown by the statistically significant estimated -0.10 coefficient on the better off dummy in column (2).

The second row shows the estimated coefficients for the worse off dummy. Recall that for the expectations regressions there was, after these worse off events, an increase in the dispersion of

forecasts, i.e. there were increases in the likelihood of better off expectations (mean reversion) and in the likelihood of worse off expectations (extrapolation). The estimated positive coefficient for the worse off dummy in regression (1) of Table 12 shows that agents are being too optimistic when forming the mean reversion expectations, i.e. they expect more mean-reversion than there is in the data.[18] On the other hand, the estimated positive coefficient in column (2) shows that those who extrapolate, are over-extrapolating from their current experience, i.e. the future is (on average) not as bad as they expect it to be.[19]

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 mean reversion and when they expect persistence.[20]

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, but that the increase: (i) is perfectly consistent with the actual persistence in the underlying variable; or (ii) that it actually under-estimates the true persistence. In the first case the estimated coefficients on the better off dummy in columns (1) and (2) would be (statistically) zero, and in the second case they would be negative and positive, respectively.

Several of the estimated coefficients on the income group dummies are statistically significant. Recall that we define these groups using the distribution of year $t-1$ earnings (before the year t change in financial situation), so that there is 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 includes those in the bottom one third of the income distribution. We find that higher income individuals are more likely to be optimistic. This result is consistent with the evidence in Rozsypal and Schlafmann (2017).

[18] By definition, individuals who expect to be better off can only be optimist or correct in their expectations.

[19] Note that, by definition, individuals who expect to be worse off can only be pessimist or correct in their expectations.

[20] In appendix Table A2, we replace the year fixed effects with age fixed effects to show that the estimated coefficients on the better off/worse off dummies are not sensitive to the set of fixed effects that is included.

4.3.2 Linear probability model and the role of individual fixed effects

In columns (3) and (4) of Table 12, we report the estimates for a linear probability model with individual fixed effects. The larger number of observations compared to columns (1) and (2) is due to 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). Naturally, the interpretation of the FE OLS estimates 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. For example, column (3) shows that the probability of being optimist after a better off event increases by 0.024, which is roughly 10% of the unconditional mean of the optimism dummy. The estimated log-odds ratio on the better off dummy in column (1) is 0.13.

In columns (5) and (6) we report the results for a logit model without controlling for 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 it did not affect the qualitative conclusions. However, this is not the case for the optimism/pessimism regressions. The failure to control for individual fixed effects lead to significantly larger estimated coefficients, with some changing signs.

For example, there is an important difference between the optimist regressions (1) and (5). In column (1) we estimate a coefficient on the better off dummy that is larger than in the worse off dummy, but in column (5) the reverse is true, and the latter is three times larger than the former. Therefore, the failure to control for individual fixed effects, would lead us to the false conclusion that the increase in optimism after worse off events is significantly larger than the one observed after better off events. Another example is that the comparison of the estimated coefficients on the worse off dummy in the optimism and pessimism regressions (second row of columns (5) and (6))would incorrectly lead us to conclude that, following negative events, the increase in optimism is larger than the increase in pessimism (estimated coefficients of 0.77 and 0.10, respectively). In the specifications with individual fixed effects (columns (1) and (2)), the estimated coefficients are more similar (0.09 and 0.05, respectively). These estimates show that it is important to control for unobserved individual heterogeneity.

4.4 Heterogeneity after a deterioration in financial situation

In the expectations section, we studied the restricted sample of individuals who expected to be better off and who expected to be worse off at least once during the sample, following a worse off event. Our aim was to study what explains why some individuals expect to be worse off at some times, but the same individuals expect to be better off at other times. In this section, we perform a similar analysis, but for optimism/pessimism. More precisely, we take the observations for individuals who were optimistic and pessimistic at least once during the sample, following a worse off event. We then compare the observations in which they were optimistic and pessimistic. We are interested in understanding why individuals are optimistic at some times, and pessimistic at other times.

The results are shown in Table 13. On average, individuals tend to be relatively more optimistic when they are younger, when they are in a higher income group, and when the reason for the worse off financial situation was an earnings decline (as opposed to higher expenditures). Therefore, and comparing with the results in Panel B of Table 6, we see that the factors that are associated with an expect better event also tend to be associated with optimism. There are, however, larger differences in the mean of the several variables between those who expect better and those who expect worse, compared with the differences between the optimistic and pessimistic observations. For instance, the average age difference is 6.5 for expectations, compared to 0.9 for expectation errors. This naturally reflects the fact that some of the expected changes are predictable and that individuals accurately forecast them.

[Table 13 here]

4.5 Categorical answers and expectation errors

A prediction of the rational expectations hypothesis is that the expectation errors are uncorrelated with any information available at time t. Therefore, the relations between expectation errors and the experienced changes in financial situation that we have estimated seem to be at odds with this hypothesis. We say seem, because our survey data only provides a discrete range of answers for both realizations and expectations, and the classification of an underlying continuous variable (change in financial situation) into three discrete categories (better off, same

or worse off), may introduce predictable patterns in the expectation errors.[21] In this section we explore several ways to address this particular concern.

4.5.1 Different classifications

If the results are biased by the group formation process, then one might expect that different methods of group construction lead to different results. We exploit this logic and construct two alternative measures of "optimism" and "pessimism." These different classification methods are illustrated in the bottom two panels of Table 9.

In the first alternative classification, Panel B, we only classify observations as optimist (pessimist) if at time t the individual expects an improvement (deterioration) in the financial situation that fails to materialize. In other words, relative to the previous classification, we now assign a value of zero to observations with an expectation of an unchanged financial situation. We denote these alternative dummy variables optimist2 and pessimist2. In the third classification, shown in Panel C, which we denote optimist3 and pessimist3, we also exclude individual observations for which the realized t+1 financial situation is unchanged. In other words, optimist3 (pessimist3) is only equal to one when individuals expect to be better off (worse off), but they are actually worse off (better off) in the following year. It is important to note that the three classifications methods differ along two dimensions: in how they treat the time t expectations, and in how they treat the time t+1 realizations.

We repeat the FE logit estimations, but with these alternative measures of optimism/pessimism as dependent variables. Table 14 shows the results. To facilitate the comparison, in columns (1) and (2) we report again the results for the original optimist/pessimist dummies.

[Table 14 here]

Before discussing the results, it is important to point out that the number of observations differs significantly across the columns. 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. The variation in the number of observations across the columns therefore confirms that the different classification methods make a difference for the sample, and provide different definitions of optimism/pessimism.

[21] For this reason, we have avoided referring to the expectations as being rational or irrational.

In spite of the difference in sample size, and for both alternative definitions, the estimated coefficients on the better off and worse off dummies show that our previous conclusions remain solid. First, following an improvement in financial situation, there is an increase in the likelihood of optimism and a reduction in the likelihood of pessimism. Second, following a deterioration, both the likelihood of optimism and pessimism increase. The economic magnitudes of the estimated coefficients differ across specifications because of the differences in mean of the left hand side variable.

4.5.2 Discussion

Additional evidence against our findings being driven by the qualitative nature of the data has already been presented in Table 12. There, we have shown that the estimated coefficients in the regressions without individual fixed effects (columns (5) and (6)) are very different from those in the baseline specification (columns (1) and (2)). The inclusion/exclusion of individual fixed effects does not change the qualitative classification of the data. If the baseline results were solely due to a bias implied by the classification, then we would not expect the estimated coefficients to change sign when we remove the fixed effects from the regression.

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 cut-offs for the different groups, use the cut-offs to classify the observations into groups, and finally perform the estimation. 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 shown in Section 2, is affected by multiple factors: income, expenditures, transfers, etc. The estimation of stochastic processes for all of these represents a significant statistical challenge, even if we restricted ourselves to the two largest categories, namely income and expenditures.[22]

A second difficulty in the estimation of the cut-offs for the better off/worse off categories, is that these cut-offs will almost surely vary across individuals (see Manski (2017)), and may

[22]While we could follow previous literature and assume the same income growth process for individuals with the same education and occupation, the stochastic process for expenditures is likely to be more complex and vary much more across individuals.

also vary across time for the same individual, as macroeconomic conditions or other relevant circumstances change. Therefore, it is not feasible to estimate individual thresholds.

4.6 Cumulative experiences and cohort effects

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 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 investigate whether this latter channel is also at work in our data.

4.6.1 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.[23]

We do not observe individual specific experiences prior to the beginning of the BHPS sample period, therefore the events that we consider are years with large negative aggregate economic conditions.[24] The 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

[23] We obtain similar results if we consider a "starting age" of 16.

[24] In addition, one can also conjecture that individuals may learn about the frequency of the events by observing the realizations for other individuals, i.e. if the frequency of negative events is particularly high in a given year, that might still lead those individuals who have not been significantly affected by the events to increase their subjective unconditional expectation of their occurrence.

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.

4.6.2 Results

Table 15 shows the results. With the inclusion of the cohort variable, the significance of the estimated coefficients on the better off/worse off dummies 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 during their adult life have been "traumatized" by such events, and therefore are less likely to be optimistic about the future.

[Table 15 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 in which we regress the average of the optimist and pessimist dummy variables for each individual on the average of the cohort variable. Thus, each observation corresponds to one individual. The results are reported in columns (3) and (4) Table 15. 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 optimistic about the future and more likely to be pessimistic. These regressions also confirm that the individual fixed effects included in the 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 the other hand, the estimated coefficient on the worse off dummy in column (1) shows that some of the individuals who face such a negative event are more likely to become optimistic for the following year. We interpret these, and provide further evidence in the next section, as individuals under-estimating the short-term persistence of these negative changes in their financial situation.

5 Implications for future financial situation

We have shown that, following a deterioration in financial situation, there is an increase in the dispersion of the expectations of future changes: sometimes individuals increase their expectation of further deterioration, while at other times they expect mean reversion (i.e. a positive future change).[25] 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 the negative changes in financial situation, or at least the persistence of the effects of the events on their finances. This is a particular concern since individuals are optimistic at times when they have lower financial resources. On the other hand, 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 situation). Being optimistic at times when the financial situation has deteriorated may be more problematic, if it leads individuals to adjust their savings and/or borrowing behavior in the expectation that their financial situation will recover faster than it actually will. In this section, we explore this possibility.

5.1 Savings behavior after a deterioration in financial situation

We have shown, in Section 3.5, that individuals on average increase (decrease) their savings when their financial situation improves (deteriorates), and decrease (increase) them when they

[25] As shown in Section 3, although this result is partially generated by heterogeneity across individuals, it is primarily driven by differences for the same individuals over time.

expect future improvements (deteriorations). In this subsection we focus the observations in which individuals who are worse off (in a given period t), and for this restricted sample, we compare the savings of who expect to be better off to those who expect to be worse off. More precisely, in column (1) of Panel A of Table 16 we report the average saving rate for each of these two groups and the p-value of a t-test of equality of means.

[Table 16 here]

Column (1) shows that those who expect to be worse off have a higher saving rate than those who expect to be better off, equal to 2.42% and 2.21%, respectively. The difference in saving rates is significant at the 5% level. Those who expect better and those who expect worse, may have already had different past expectations which, given our results in Section 3.5, would imply pre-existing differences in savings behavior. Therefore, in column (2) we restrict the sample further to observations for which individuals expected, in the previous period, their financial situation to remain unchanged ($E^i_{t-1}[\Delta FS^i_t] = 0$).[26] The difference in savings rate between the two groups increases. In column (3) we make the expect better and expect worse groups even more comparable, by also restricting the sample to those that experienced an unchanged financial situation in the previous period ($\Delta FS^i_{t-1} = 0$)). The difference in saving rates increases further and it is now statistically significant at the 1% percent level. The difference of 0.67 percentage points corresponds to 17% of the average savings rate in the sample (4%).

In Panel B we focus on the intensive margin of saving, and compare the proportion of savers who expect worse off to the proportion of savers who expect better off. In column (1) the difference is not statistically significant, but this is not the case when we make the groups more comparable, by restricting the data further. In column (2) we see that the proportion of savers is larger (33%) among those who expect worse than among those who expect better (30%). The difference between the two groups is almost twice as large, and more statistically significant, when we add the third sample restriction.

The extensive margin of savings exhibits significant persistence over time. In any given year, individuals who are savers are much more likely to be savers again the following year than those who are not savers. Therefore, in Panel B we calculate the change over time in the proportion of

[26] We focus on the group of individuals who expected their financial situation to remain unchanged since the number of observations is larger.

savers in each of the two groups. The differences across the two groups are highly statistically significant. Furthermore, they are also economically important. Both groups experience a decline in the fraction of savers at the time of the worse off event (time t) . This is normal, in light of the experienced deterioration in financial situation. However, while among those who expect a further deterioration the proportion of savers declines by roughly 3.5% (depending on the sample restrictions), among those who expect mean reversion the decline is as large as 10%.

In Panel D of Table 16, we report the proportions of individuals taking a new home equity loan. Those individuals who expect an improvement in their future finances are more likely to take on a new (home equity) loan, and as before, the difference between those who expect worse and those who expect better become larger as we make the groups more comparable.

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 we have shown, these individuals tend to underestimate the degree of persistence of the negative changes in financial situation. In the future they may find themselves with little savings and/or may not be able to repay their debt as quickly as they may have anticipated. The latter is likely to be particularly problematic in the case of loans that carry a high interest rate, such as payday loans (Bhutta et al., 2015; Melzer, 2011; Morse, 2011). 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.

In Table 17, and as in the last column of the previous table, we restrict the sample to those observations in which the individuals were financially worse off at time t, but at time $t-1$ expected no change in their financial situation and did not experience any change in their financial situation at $t-1$. We 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 each of the years from $t+1$ to $t+4$. 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. In panels B.1 and B.2 we instead compare

those who had time t pessimistic and optimistic expectations (using our original definition of optimism/pessimism).

[Table 17 here]

The $t+1$ proportions in Panels A.1 (A.2) show that those individuals who expect to be worse off/better off at $t+1$ are indeed significantly more likely experience a $t+1$ deterioration (improvement) in their financial situation. This reflects the fact that changes in financial situation are not a random walk, and that a significant proportion of individuals in our sample form correct expectations.

We are particularly interested in the results for optimism and pessimism shown in Panel B. We focus the discussion on the results for $t+2$ onward, since those for $t+1$ are, to a large extent mechanical, due to the way in which we construct the variables.[27]

Panel B.1 of Table 17 shows that those individuals who are optimistic at time t are much more likely to find themselves in a worse financial situation in year $t+2$ than those individuals who are pessimistic at time t: 38.3% versus 26.3%, respectively. This difference of 12 percentage points corresponds to 50% of the unconditional probability of being worse off (24%). We have shown, in Section 5.1, that those individuals who, following a deterioration in their finances, expect mean reversion tend to decrease their savings more and are more likely to borrow. We hypothesized that this may be particularly concerning since as shown in Section 4 these expectations are on average too optimistic. The results in Panel B.1 confirm that the optimistic individuals are indeed significantly more likely to find themselves worse off in the subsequent periods.

It is important to point out that the results in Panel A show that individuals who expect to be better off are indeed more likely to be better off and less likely to be worse off in the future. The results in Panel B.1 show that, for the sub-sample of those who were optimistic, the result

[27]Recall that individual observations are classified as pessimistic and optimistic based on their year t expectation and their subsequent year $t+1$ realization. Pessimistic observations are those in which the year $t+1$ realized financial situation is better than the year t expectation. This explains the large incidence of better off at $t+1$ (equal to 0.457, Panel B.2), and the fact that there are no worse off observations also at $t+1$ (as shown in Panel B.1). Similarly, optimistic observations are those for whom the year $t+1$ realized financial situation is worse than the year t expectation.

not only disappears, but it actually reverses. Furthermore, the differences are economically very large, and persist well into the future. At $t+3$ the probability of being worse off is still 8.8 percentage points higher for the time t optimists than for the time t pessimists. At $t+4$ the difference is still equal to 3.9 percentage points, but it is no longer statistically significant.

Interestingly, the results in panel B.2, show that there are no statistically significant differences in the probability of being better off again in the future.[28] In fact, the difference between the two is sometimes positive ($t+2$) and other times negative ($t+3$ and $t+4$). This suggests that it is not a mechanical effect that is driving the results in Panel B.1. Otherwise we would expect to find an analogous pattern to Panel B.1 in Panel B.2.

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. The panel nature of the data allows us to include individual fixed effects in the regression, that control for unobserved individual heterogeneity, including in the interpretation of the survey questions. 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, with increases in the likelihood of both a further deterioration (consistent with extrapolative behavior) and of a future improvement (mean-reversion). We have found that when individuals expect mean reversion, they are too optimistic and they underestimate the degree of persistence of the negative changes in household finances. Younger individuals and those who have experienced an earnings decline are more likely to do so.

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 provide supportive evidence.

[28] Except at $t+1$ when, as previously explained, the result is mechanical.

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Table 1: Financial situation.

Panel A reports the number of observations for which individuals in year t reported that they were financially better off, about the same, and worse off than in year t-1, for t=1991,...,2008. Panel B tabulates the reasons given by individuals for being better off/worse off. The latter are available from 1993 onward.

Panel A: Changes in financial situation.

	Financial situation in year t			
	Better off at t	No change at t	Worse off at t	Total
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.

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

Table 2: Financial situation by age and income.

This table reports the proportion of better off/same/worse off observations and the reason for the year t change in financial financial situation, by 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 incomes for that year.

	Age group				Income group		
	20-34	35-49	50-64	≥65	Low	Medium	High
Panel A: Change in financial situation, fraction of total							
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
Panel B: Reason for better off, as a fraction of better off							
Earnings ↑	0.66	0.63	0.45	0.06	0.35	0.56	0.62
Expenditures ↓	0.13	0.14	0.19	0.17	0.14	0.15	0.16
Benefits ↑	0.02	0.03	0.13	0.55	0.30	0.08	0.02
Inv Income ↑	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
Panel C: Reason for worse off, as a fraction of worse off							
Earnings ↓	0.30	0.28	0.31	0.07	0.12	0.26	0.33
Expenditures ↑	0.50	0.48	0.46	0.67	0.63	0.50	0.46
Benefits ↓	0.03	0.05	0.04	0.03	0.06	0.04	0.02
Inv Income ↓	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.

This table reports the proportion of observations for which individuals expect their one year ahead financial situation to be better off, about the same, and worse off. The table also shows the proportions by age of the household head and by income group.

	Overall	Age group				Income group		
		20-34	35-49	50-64	≥65	Low	Medium	High
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 panel fixed effects ordinary least squares regressions in which the dependent 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 the experienced time t change in financial situation, ΔFS_{t+1}^i. In specification (3) we measure the time t experienced change in financial situation using two dummy variables: (i) 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 (ii) another 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. (ΔFS_{t+1}^i)	0.07***	0.06***	
	(27.63)	(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)
Control variables			
Income group 2		0.01	0.01
		(1.06)	(1.14)
Income group 3		-0.02***	-0.02***
		(-3.66)	(-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 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	Expect	Expect	Expect Better	Expect Worse	Expect	Expect
	$\underline{\text{Better}_{it}}$	$\underline{\text{Worse}_{it}}$	$\underline{\text{Same}_{it}}$	$\underline{\text{vs Same}_{it}}$	$\underline{\text{vs Same}_{it}}$	$\underline{\text{Better}_{it}}$	$\underline{\text{Worse}_{it}}$
Better off$_{it}$	0.64***	-0.08*	-0.52***	0.64***	-0.01	1.43***	-0.18***
	(28.27)	(-2.29)	(-25.49)	(27.67)	(-0.37)	(67.94)	(-5.51)
Worse off$_{it}$	0.74***	0.99***	-1.09***	0.91***	1.17***	0.91***	1.51***
	(30.23)	(37.17)	(-54.44)	(35.26)	(41.68)	(41.47)	(57.75)
Income group 2	0.03	-0.10**	0.04	-0.02	-0.07	0.47***	-0.25***
	(0.94)	(-2.48)	(1.64)	(-0.67)	(-1.71)	(18.65)	(-8.17)
Income group 3	-0.05	0.05	0.06	-0.08	0.04	0.60***	-0.16***
	(-1.45)	(1.04)	(1.90)	(-2.15)	(0.75)	(21.97)	(-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.
In Panel A 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. In Panel B the unit of observation is individual/year, but the sample is restricted to observations for individuals who were optimistic and pessimistic at least once during the sample, following a worse off event. The columns report the mean of several variables of interest for those observations in which they were worse off and expected to be better off and for those observations in which they were worse off and expected to be better off. Panle B also reports the p-value of a test of the equality of means. The Earnings ↓ (Expenditures ↑) is a dummmy variable that takes the value of one when the reason for the worse off event was lower earnings (higher expenditures), and zero otherwise.

Panel A: Individuals who are worse off during the sample

	At least once		At least twice			
Individuals who	Number	Fraction	Number	Fraction	Age	Inc. group
Always expect worse off	966	0.10	314	0.05	61.9	1.55
Expect same or alternate	7171	0.72	5181	0.84	48.6	1.98
Always expect better off	1887	0.18	671	0.11	34.6	2.06
	10024	1.00	6166	1.00		

Panel B: Expect better off and worse off at least once

	Age	Income group	Earnings ↓	Expenditures ↑
Expect worse off	49.5	2.04	0.156	0.608
Expect better off	43.0	2.13	0.321	0.410
Difference	6.50	-0.09	-0.164	0.197
p-value	0.00	0.00	0.00	0.00

Table 7: Expectations and Actions

The dependent variable 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 independent 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 (2) we include observations for which the saving rate is zero, but in (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)
	Current Saver$_{it}$	Saving Rate$_{it}$	Saving Rate$_{it}$	New Home Loan$_{it}$
Expect Better$_{it}$	-0.15***	-0.24***	-0.21	-0.02
	(-6.20)	(-3.68)	(-0.82)	(-0.49)
Expect Worse$_{it}$	0.07**	0.48***	0.82***	-0.02
	(2.33)	(6.02)	(4.73)	(-0.21)
Better off$_{it}$	0.47***	1.73***	1.83***	-0.01
	(20.69)	(27.53)	(14.89)	(-0.28)
Worse off$_{it}$	-0.53***	-1.00***	-1.20***	0.02
	(-22.21)	(-15.93)	(-8.26)	(0.36)
Year FE	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes
Number of obs.	83,181	109,300	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 had a given time $t+1$ realized change in financial situation (ΔFS^i_{t+1}) as a function of their time t expectation of that financial situation ($E^i_t[\Delta FS^i_{t+1}]$).

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

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 ($E_t^i[\Delta FS_{t+1}^i]$) and on her time $t+1$ realizations (ΔFS_{t+1}^i). Panels B and C show alternative definitions of the optimist and pessimist dummies.

Panel A:	Realization at t+1		
Expectation at t	Better off	Same	Worse off
Better off	—	Optimist	Optimist
Same	Pessimist	—	Optimist
Worse off	Pessimist	Pessimist	—
Panel B:	**Realization at t+1**		
Expectation at t	Better off	Same	Worse off
Better off	—	Optimist2	Optimist2
Same	—	—	—
Worse off	Pessimist2	Pessimist2	—
Panel C:	**Realization at t+1**		
Expectation at t	Better off	Same	Worse off
Better off	—	—	Optimist3
Same	—	—	—
Worse off	Pessimist3	—	—

Table 10: Optimism and pessimism by age and income.

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. An individual is pessimistic 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 table reports the proportion of observations that were neither optimistic nor pessimistic, corresponding to correct expectations. The table also reports the overall proportions, and by age and by income group. The unit of observation is individual/year.

	Overall	Age group				Income group		
		20-34	35-49	50-64	≥65	Low	Medium	High
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. The unit of observation is individual/year.

	Optimist		Pessimist		Neither	
	Mean	Stdev	Mean	Stdev	Mean	Stdev
	Demographic variables					
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
	Financial change					
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.

Columns (1) and (2) report the estimated coefficients of fixed effects Logit regressions that explain optimism/pessimism using the experienced changes in financial situation. Columns (3) and (4) report the results of fixed effects ordinary least squares regressions. The unit of observation is individual/year. The last two columns report the results of Logit regressions. All the regressions include year fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\underline{\text{Optimist}_{it}}$	$\underline{\text{Pessimist}_{it}}$	$\underline{\text{Optimist}_{it}}$	$\underline{\text{Pessimist}_{it}}$	$\underline{\text{Optimist}_{it}}$	$\underline{\text{Pessimist}_{it}}$
Better off$_{it}$	0.13***	-0.10***	0.024***	-0.016***	0.24***	0.51***
	(5.95)	(-3.96)	(6.04)	(-4.65)	(13.20)	(25.12)
Worse off$_{it}$	0.09***	0.05*	0.016***	0.007*	0.77***	0.10***
	(4.24)	(1.98)	(4.10)	(1.94)	(43.31)	(4.33)
Income group 2	0.13***	-0.08*	0.02***	-0.010*	0.30***	-0.06***
	(4.49)	(-2.29)	(4.51)	(-2.29)	(16.06)	(-2.58)
Income group 3	0.19***	-0.04	0.03***	-0.006	0.31***	0.10***
	(5.59)	(-0.91)	(5.72)	(-1.06)	(16.69)	(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: Heterogeneity in optimism/pessimism, conditional on worse off event.
The sample is restricted to observations for individuals who were optimistic and pessimistic at least once during the sample, following a worse off event. The columns report the mean of several variables of interest for those observations in which they were worse off and pessimistic and for those observations in which they were worse off and optimistc. The Table also reports the p-value of a test of the equality of means. The Earnings ↓ (Expenditures ↑) is a dummmy variable that takes the value of one when the reason for the worse off event was lower earnings (higher expenditures), and zero otherwise.

	Pessimistic and optimistic at least once			
	Age	Income group	Earnings ↓	Expenditures ↑
Pessimistic	50.7	1.98	0.190	0.570
Optimistic	49.8	2.06	0.264	0.464
Difference	0.91	-0.08	-0.07	0.106
p-value	0.05	0.00	0.00	0.00

Table 14: Optimism and pessimism: regressions with alternative definitions.
This table reports the estimated coefficients of fixed effects Logit regressions that explain optimism/pessimism 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, described in Table 9. All the regressions include individual and year fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\underline{\text{Optimist}_{it}}$	$\underline{\text{Pessimist}_{it}}$	$\underline{\text{Opt2}_{it}}$	$\underline{\text{Pess2}_{it}}$	$\underline{\text{Opt3}_{it}}$	$\underline{\text{Pess3}_{it}}$
Better off$_{it}$	0.13***	-0.10***	0.56***	-0.12***	0.20***	-0.26***
	(5.95)	(-3.96)	(19.95)	(-2.36)	(4.17)	(-3.28)
Worse off$_{it}$	0.09***	0.05**	0.68***	0.83**	0.43***	0.54***
	(4.24)	(1.98)	(23.22)	(21.70)	(9.96)	(7.09)
Income group 2	0.13***	-0.08*	0.10**	-0.17**	0.13**	-0.29**
	(4.49)	(-2.29)	(2.70)	(-3.02)	(2.35)	(-2.68)
Income group 3	0.19***	-0.04	0.17***	-0.07	0.23***	-0.20
	(5.59)	(-0.91)	(3.78)	(-1.05)	(3.35)	(-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 15: 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 his/her cohort variable. The unit of observation is the individual.

	(1)	(2)	(3)	(4)
	Optimist_{it}	Pessimist_{it}	Avg. Optimist_{i}	$\text{Avg. Pessimist}_{i}$
Better off_{it}	0.13***	-0.10***		
	(5.97)	(-3.96)		
Worse off_{it}	0.09***	0.05*		
	(4.23)	(1.99)		
$\text{Cohort variable}_{it}$	-1.34**	0.18		
	(-2.34)	(0.26)		
$\text{Avg. cohort var}_{i}$			-0.61***	0.17***
			(-12.79)	(3.81)
Income group 2	0.13***	-0.08*		
	(4.34)	(-2.27)		
Income group 3	0.18***	-0.04		
	(5.29)	(-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 16: Savings and Borrowing behavior after a decline in financial situation.
This table reports the average time t values for several variables of interest for those who expect better/worse, their difference, and the p-values of t-tests of the equality of means. The columns differ in the data sample that is included to calculate the means. Column (2) includes those observations for which individuals were worse off at time t. Column (2) restricts the sample to a worse off event at time t and the same expectation at time $t-1$. Column (3) restricts the sample to those observations with a worse off event at time t, the same expectation and the same realization at time $t-1$. The variables of interest are the: in Panel A, the savings rate; in Panel B, the proportion of savers; in Panel C, the change in the proportion of savers; and in Panel D, the proportion of individuals who took a new home equity loan.

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

Table 17: 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 year from $t+1$ to $t+4$, distinguishing between those who expected to be worse off and those who expected to be better off at t. 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 year from $t+1$ to $t+4$, distinguishing between those who at t were optimistic and who were pessimistic. The sample is restricted to those observations for which individuals were worse off at t and had the same $t-1$ realization and expectation. 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
	Panel A.1: Proportion worse off			
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
	Panel A.2: Proportion better off			
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
	Panel B.1: Proportion worse off			
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
	Panel B.2: Proportion better off			
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

Appendix to "Evidence on expectations of household finances"

Table A1: Expectations: age fixed effects.

This table shows the estimated coefficients of Logit regressions that explain time t expectations using the time t changes in financial situation. The dependent variables are dummy variables for expect better off and expect worse off. 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.

	(1)	(2)	(3)	(4)
	Expect	Expect	Expect	Expect
	Better$_{it}$	Worse$_{it}$	Better$_{it}$	Worse$_{it}$
Better off$_{it}$	0.68***	-0.09*	0.64***	-0.07**
	(30.59)	(-2.44)	(28.47)	(-1.95)
Worse off$_{it}$	0.74***	1.09***	0.72***	1.07***
	(30.82)	(41.96)	(29.69)	(40.96)
Income group 2	0.03	-0.07*	-0.03	-0.04
	(0.83)	(-1.92)	(-1.15)	(-1.12)
Income group 3	-0.09	0.07	-0.13***	0.14***
	(-2.46)	(1.56)	(-3.55)	(2.94)
Year FE	No	No	No	No
Ind. FE	Yes	Yes	Yes	Yes
Age FE	No	No	Yes	Yes
Number of obs.	74,723	59,674	74,723	59,674

Table A2: Optimism and pessimism: age fixed effects.

The table reports the estimated coefficients of fixed effects Logit regressions that explain optimism/pessimism using the experienced changes in financial situation. The unit of observation is individual/year. The regressions also differ in the set of fixed effects included.

	(1)	(2)	(3)	(4)
	$\underline{\text{Optimist}_{it}}$	$\underline{\text{Pessimist}_{it}}$	$\underline{\text{Optimist}_{it}}$	$\underline{\text{Pessimist}_{it}}$
Better off_{it}	0.13***	-0.08***	0.13***	-0.09***
	(5.49)	(-3.39)	(5.59)	(-3.67)
Worse off_{it}	0.09***	0.07*	0.09***	0.05*
	(4.48)	(2.81)	(4.30)	(1.93)
Income group 2	0.13***	-0.07**	0.12***	-0.08**
	(4.67)	(-2.11)	(4.24)	(-2.37)
Income group 3	0.19***	-0.04	0.17***	-0.05
	(5.62)	(-1.00)	(4.81)	(-1.24)
Year FE	No	No	No	No
Ind. FE	Yes	Yes	Yes	Yes
Age FE	No	No	Yes	Yes
Number of obs.	79,204	70,941	79,204	70,941
Estimation	FE Logit	FE Logit	FE Logit	FE Logit