Expenditures and financial well-being*

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ABSTRACT

Higher expenditures is the main reason given for significant deteriorations in household finances (twice as often as lower earnings). The expenditure increases are persistent and linked to: fluctuations in the prices of necessary goods that make a large proportion of households' budget, life events, and psychological variables. Households respond to worse finances by cutting down on discretionary spending. Furthermore, there is a reduction in psychological well-being that feeds back into an increased probability of a further deterioration in the finances. Good financial management mitigates these effects. Our results highlight the importance of expenditures as a source of background risk.

JEL classification: D14, E21, G02.

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1 Introduction

Theories of life-cycle consumption and savings decisions often assume incomplete markets where the primary risks that agents face arise from uncertain future earnings (e.g. Deaton (1991), Carroll (1997), Gourinchas and Parker (2002)). Subsequent work studied the importance of other sources of risk. For instance, the models of Palumbo (1999), De Nardi, French and Jones (2010) and Yogo (2013) focus on the role of uncertain medical expenditures. This framework has also been extended to incorporate uncertainty arising from investment returns.[1] There is however a lack of evidence on the relative importance of the different sources of risk for household finances.[2]

In this paper we use almost two decades of U.K. household panel data to address this question. Each year individuals are asked to report on the reasons for significant changes (if any) to their finances. While earnings increases are the main reason for an improvement in financial situation, a different picture emerges when we look at deteriorations in households' finances. The proportion of individuals who report being significantly worse off due to higher expenditures is twice as high as the proportion of individuals who report being worse off due to lower earnings (0.52 compared to 0.24, respectively). Furthermore we show that these fluctuations in expenditures are as persistent as those in earnings. About one third of those individuals who in a given year report being worse off due to an increase in expenditures, report again being worse off for the same reason the following year. Thus, in the data, increases in household expenditures seems to be of first order importance and an important source of background risk.

Motivated by these results we investigate the sources of the deteriorations in financial situation. After all, expenditures are chosen by the households themselves so to what extent can we interpret them as risks? When we look at the data a complex picture emerges, with cost of living measures, life events, and psychological variables all playing an important role. First, we show that households who spend a larger fraction of their income in necessary goods, such as home energy and food at home are more likely to report that they are financially worse off due to higher expenditures in years with high energy and food price inflation, respectively. Since these are necessary goods households are naturally reluctant to cut on

[1] See the early contributions of Guiso, Jappelli, and Terlizzese (1996), Heaton and Lucas (1996) and Cocco, Gomes and Maenhout (2005).

[2] Fagereng, Guiso and Pistaferri (2015) estimate the size of background risk arising from human capital to be a small value.

these expenditures even when faced with higher prices. Likewise, increases in the ratio of mortgage expenses to income contribute to a worse financial situation.

Second, we find that individuals who have recently been divorced or separated and individuals who have recently had their first child are more likely to become financially worse off as a result of higher expenditures. Naturally the decisions to divorce and/or to have children are often taken by the individuals themselves, but this does not imply that they can prepare fully in advance for the consequent increase in expenditures. For example, having a first child will generate a long-lasting increase in household expenditures, one which households are unlikely to be able to fully smooth out by saving a few years in advance. Consistent with the existing literature we find that deteriorations in health status are also important, but the increases in expenditures are more widespread, affecting a much larger proportion of the population.

Third, psychological characteristics matter: those individuals who in a given year report having difficulty facing problems are significantly more likely to be in a worse financial situation due to higher expenditures in the following year. This is the case even when we control for individual fixed effects and for the persistence in the expenditures variable. One possible way to understand the effects of these psychological characteristics is through preference shocks that increase the marginal utility of consumption at times of lower well-being.

Next we investigate how individuals respond to deteriorations in their financial situation. We document significant declines in household discretionary spending, namely in food away from home and leisure. Furthermore we find evidence of feedback effects from changes in financial circumstances to psychological well-being. Individuals who become worse off due to higher expenditures have significantly higher probabilities of feeling depressed and of losing sleep due to worry. This increase is estimated controlling for individual fixed effects and for the direct impact on well-being of the other previously documented factors that led to the expenditure increase such as a divorce.

In the final part of our paper we ask what can individuals do to mitigate the risk that they become financially worse off due to higher expenditures. We find evidence that a measure of self-assessed good financial management reduces such risk. Lusardi and Mitchell (2007) and van Rooij, Lusardi and Alessie (2012) investigate the role of financial education for optimal retirement savings decisions. Our results emphasize the importance of teaching individuals

about expenditure management, which so far has received limited attention in the financial literacy literature (Lusardi and Mitchell (2014) provide an excellent survey of this literature).

In addition to the previously cited literatures on background risk and financial literacy, our paper is also related to the behavioral economics literature, and in particular to the hyperbolic discounting model of Laibson (1997). We show that individuals who have more difficulties facing problems and who make use of expensive credit card debt are more likely to become financially worse off due to higher expenditures. Our paper is related to a growing literature on the links between household finances and psychological well-being. Taylor, Jenkins and Sacker (2011) document a link between financial capability and psychological well-being while Bridges and Disney (2010) focus specifically on the relation between financial indebtedness and depression. Praag, Frijters and Ferrer-i-Carbonell (2003) relate different aspects of life, including household finances, to subjective well-being. Brown and Taylor (2014) analyse the relationship between financial decision-making (unsecured debt and financial assets) and personality traits, while Xu, Briley, Roberts and Brown (2016) investigate the relative importance of genetic and environmental factors for this relationship.

The paper is organized as follows. Section 2 provides a simple framework to guide our empirical analysis and a description of the data. Section 3 uses regression analysis to study the determinants of individuals becoming worse off due to higher expenditures. In section 4 we study how households respond to the changes in financial situation. Section 5 studies the importance of cross-sectional traits and the role of financial management. The final section concludes.

2 Economic framework and data

2.1 A simple framework

We provide a simple framework to guide the empirical analysis. Consider an individual i who chooses date t real consumption c_{it} so as to maximize the present discounted value of his/her utility. Assuming a within period preference specification similar to Palumbo (1999) and De Nardi, French, and Jones (2010), where h_{it} denotes period t health status (that can

either be good, $h_{it} = 1$, or bad, $h_{it} = 0$), the individual's value function is:[3]

$$V(Z_{it}) = \underset{\{c_{it}\}}{MAX} \left\{ (1 + \delta_i h_{it}) \frac{c_{it}^{1-\gamma_i}}{1 - \gamma_i} + E_{it} \beta_i V(Z_{i,t+1}) \right\} \tag{1}$$

where Z denotes the vector of state variables of the problem, γ is the coefficient of relative risk aversion, δ is a preference parameter that determines the impact of health status on utility, and β is the discount factor. We will consider a broad definition of health status that takes into account both physical and psychological health.

The equation describing the evolution of *nominal* cash-on-hand (X) is:

$$X_{i,t+1} = (X_{it} - p_{it} c_{it})(1 + R_{i,t+1}) + B_{i,t+1} - M_{i,t+1} + Y_{i,t+1}, \tag{2}$$

where p_{it} is the date t price of the consumption basket of individual i, $R_{i,t+1}$ is the return on his/her portfolio of assets, and $B_{i,t+1}$ denotes government transfers and other benefits. $M_{i,t+1}$ captures other expenditures that the individual must meet, such as out-of-pocket medical expenditures, car repairs, mortgage payments, among others. This is similar to the approaches of De Nardi, French and Jones (2010) for medical expenditures and Fratantoni (2001) for mortgage payments. However, we would like to emphasize that we think of them as including not only these two sources of expenditure risk, but also others such as those arising from divorce, children, among others. Finally $Y_{i,t+1}$ denotes income.

In the previous equation all variables except consumption are written in nominal terms. One can also write the real counterpart of that equation as:

$$x_{i,t+1} = (x_{it} - \frac{p_{it}}{p_t} c_{it})(1 + r_{i,t+1}) + b_{i,t+1} - m_{i,t+1} + y_{i,t+1}, \tag{3}$$

where lower case letters denote the real counterpart of the nominal variables, and p_t denotes the date t price level.

The above equation is useful because it allows us to think of the different channels through which households can be made better or worse off. In addition to lower investment returns ($r_{i,t+1}$), an important channel that has been the focus of the literature on background risk is *real* earnings ($y_{i,t+1}$). But households can also be worse off (lower cash-on-hand) because of lower net government transfers (net of taxes, $b_{i,t+1}$), higher real expenditures (m_{it}), or

[3] Yogo (2013) considers a more general specification in a model where health status is endogenous.

because of a higher price for the goods that form their consumption basket (p_{it}). When this consumption basket is similar to the one used to compute the price level then p_t equals p_{it} and the two cancel out. When that is not the case, the evolution of the individual's financial situation will depend on the evolution of the prices of the goods that make a larger part of their expenditures. It will also depend on the extent the individual is willing to substitute among the different goods that make up the composite good when their price changes.

Individuals may also choose a too high level of consumption (c_{it}) because of poor financial planning (e.g. Lusardi and Mitchell (2007) or van Rooij, Lusardi and Alessie (2012)), leaving them with too little savings going forward and in a worse financial situation. Alternatively, individuals may lack self-control (as in Laibson, Repetto and Tobacman (1998) or Laibson (1997)), which leads them to spend more than they can afford and to make use of expensive credit card debt or payday loans (Melzer (2011), Morse (2011), Bhutta, Skiba and Tobacman,(2015)).

Our data allows us to quantify the importance of the different channels that drive changes in household finances (earnings, investment income, benefits, expenditures). But the primary focus of our study are the different channels through which individuals can be worse off due to higher expenditures (cost of living, life events, emotions, and behaviors). This choice is motivated by two observations: the existing literature has explored mainly the other channels, and higher expenditures is the main reason why households report being financial worse off in our data.

Finally our data also allows us to study the impact of a change in financial situation on psychological well-being. In terms of the above equations, a drop in earnings or an increase in expenditures will lead to lower cash-on-hand and these events may also affect utility through the term h_{it}, if the worse financial situation makes individuals depressed. De Nardi, French, and Jones (2010) estimate δ equal to -0.36, so that the health preference parameter shifter implies a higher marginal utility of consumption when health status is bad. Note that, ceteris paribus, this implies that individuals will increase their consumption when depressed, which in turn may lead to a further deterioration in their financial situation.[4]

[4] One potentially important aspect of individuals' financial situation that is not directly reflected in the equations above are changes in the value of housing. However, changes in housing value does not appear as one of the categories in the survey. There is a residual category of other reasons, but it is not quantitatively very important. One possible explanation is that individuals do not think of fluctuations in the value of their house as making them financially better or worse off since they must live in the house, so that they are implicitly hedged against fluctuations in its value (Sinai and Souleles (2005)).

2.2 Data sources

Our main data source is the British Household Panel Survey (BHPS), which is a representative panel of U.K. households. 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).

Each year individuals are asked a wide range of questions about their circumstances including income, financial situation, demographic variables, expenditures, psychological well-being, 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. Not all households appear in each of the eighteen waves, so that we use an unbalanced panel. Furthermore, similar to the PSID, the data lacks detailed yearly information on household wealth. However, it is fairly rich in terms of income, both labor and asset income (interest, dividends, etc.), mortgage debt, and other information. The retail price indices data that we use are from the U.K. Office of National Statistics.

2.3 Changes in financial situation

In the survey individuals are asked about changes in their financial situation. More precisely, in each year they are asked whether they are *significantly* better off, about the same, or *significantly* worse off financially than they were a year ago. In Panel A of Table I 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 (we use the responses of the household head). Roughly half of the responses are for about the same, and the remainder are equally split between better off and worse off.

In Panel B we report the probability of year t responses conditional on year $t-1$ responses by the same individual. Out of those who reported being better off in year $t-1$ than in year $t-2$ (first row of Panel B), 44% reported being better off at t than at $t-1$, 39% reported being about the same, and the remainder 17% reported being worse off. In Panel B of Table I the main diagonal always has the highest value, so that in the data there is persistence in *changes* in financial situation, with some households benefiting from consecutive years

of improvement, and others facing consecutive years of deterioration in their finances. In addition to this persistence, the probabilities off the main diagonal are economically large, so that there is meaningful time series variation in the responses of each individual.

2.4 Reasons for the change in financial situation

From 1993 onwards, those participants who responded that they were significantly better off or worse off than in the previous year were asked to provide the main reason for the change.

2.4.1 Unconditional univariate results

In Panel A of Table II we tabulate the answers for those individuals who are better off. Unsurprisingly, the main reason is higher earnings (54%). The second highest category is lower expenses, with a response rate of 15%. Interestingly, five percent of the responses are for good financial management, an issue which we investigate later in the paper. In the first two columns of Panel B we tabulate the answers for those individuals who report being worse off than a year ago. Strikingly, the main reason is higher expenditures (52%), a reason that is given twice more often than lower earnings (24%).[5]

There is a vast literature that estimates the properties of individual earnings, how they change over the life-cycle, and the nature of the earnings shocks that different individuals face (more recently, for example, Guvenen, Ozkan and Song (2014), and Low, Meghir, and Pistaferri (2010)). While earnings fluctuations are clearly important, the data in Panel B of Table II suggests that more attention should be given to the expenditure part of the budget equation, since in the data it is the main reason for a worse financial situation, explaining 52% of such occurrences. Multiplying the latter value by the probability that individuals are financially worse off reported in Table I (24%), gives a value of 12.5%. This means that, in a typical year, an average individual in our sample had a 12.5% probability of being worse off due to higher expenditures. This probability is likely to be higher for some individuals than for others, the determinants of which we will study in the regression analysis.

In the permanent income model of consumption (Friedman (1957)) and the buffer-stock consumption models (Deaton (1991), Carroll (1997), Gourinchas and Parker (2002)) expen-

[5] The number of observations for the reasons why individuals are better off and worse off in Table II add to 51,838 whereas in Table I they add to 55,585. The main reason is that, as previously mentioned, the question on "why the change in financial situation" is only available from 1993 onwards.

ditures are chosen by consumers in response to fluctuations in earnings. In these models there is no risk arising from the expenditure side. This assumption is relaxed in the models of Hubbard, Skinner and Zeldes (1995), Palumbo (1999), De Nardi, French, and Jones (2010) and Yogo (2013) in which fluctuations in out-of-pocket medical expenditures that consumers must meet introduces expenditure risk. In these models large medical expenditures affect the resources available for other consumption through the budget constraint.

This channel is likely to be at work in our data but given the large proportion of individuals who cite higher expenditures as the reason for being financially worse off, medical expenditures alone are unlikely to be the explanation. In the last two columns of Table II we provide some initial evidence. We report the reasons for being worse off in year t for those individuals who are in excellent health both in years t-1 and t. Their responses are quantitatively similar to the full sample of individuals.[6]

2.4.2 Age and income splits

In order to gain some initial insights into life-cycle effects in columns two to five of Table III we report responses by age. There is a marked age decline in the proportion of individuals who are financially better off, from 0.38 for the 20 to 35 age group to 0.10 for those above 65. This decline is mirrored by an increase in the proportion of those who are about the same, while the fraction of those who are worse off remains stable over the life-cycle.

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

In the last three columns of Table III we report the responses by income group. In each year $t-1$ we divide individuals in our data into three groups based on their household

[6] We do not observe medical expenditures in our data, but we have detailed information on health status. In addition, due to the features of the National Health Service, out-of-pocket medical expenditures are likely to be less significant in our data than in U.S. data (Banks, Blundell, Level, and Smith (2015) compare the differences in level, age paths, and uncertainty in medical expenses between the U.K. and the U.S.).

income. The low (high) income group refers to individuals in the bottom (top) one-third of the distribution of household income for that year. We then tabulate the year t answers. Higher (lower) income individuals are more (less) likely to become significantly better off, an event which occurs with probability 0.3 (0.17). An increase in earnings is the main reason for better off among the high income group. 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 0.64, but it still is the most important category for the high income group, with 0.46 (compared to 0.35 for lower earnings, Panel C).

2.4.3 Persistence

In Table IV we investigate the persistence in changes in financial situation, by reason given for the change. We focus on the two largest categories, namely earnings and expenditures increases/decreases.[7] The first row of Panel A reports the transition probabilities for individuals who in year t reported being better off than in year $t-1$ due to higher earnings. Out of these, 36% report being better off at $t+1$ than at t again for the same reason, so that they benefit from consecutive years of earnings increases. And 16% are better off due to earnings increases for three years in a row. The persistence of an earnings decrease is smaller: only 18% report an additional decrease at $t+1$, and this proportion drops to 4% when we condition on an earnings decrease for three consecutive years.

Interestingly, for changes in expenditures we observe exactly the opposite pattern, with increases being much more persistent than decreases. Of those individuals who in t are worse off due to an increase in expenditures, 33% of them face a further deterioration in their financial situation at $t+1$ for the same reason. And 15% are hit by this event yet again two years later. On the other hand, being better off due to a decrease in expenditures is an event that is much less likely to repeat itself in consecutive years. Overall these results show that the main factors driving both improvements and declines in financial situation (increases in earnings and increases in expenditures, respectively) often compound themselves over time, i.e. have significant persistence in growth rates.

In Panel B of Table IV we measure the expected duration of the changes or, alternatively, their persistence in levels. For example, in the first row we report the probability that an

[7] More detailed information on the transition probability matrix is provided in the Appendix, Table AI.

increase in earnings at time t is not reversed in year $t+1$, by year $t+2$, or by year $t+3$. Since we are not able to identify precisely when the reversal has taken place, we report two estimates that provide an upper and lower bound.[8] The probability that an earnings increase is not reversed in the following year is between 0.83 and 0.93. Even three years later, the probability that the initial change in earnings is still there is at least 0.61 and as high as 0.82. Thus these events are extremely persistent and, similarly to what we found for growth rates, increases in the level of earnings are more persistent than decreases.

When we consider changes in the level of expenditures the asymmetry is less pronounced than for growth rates, but it still is the case that increases in expenditures are more persistent than decreases. In summary, the events most commonly cited for both improvements and deterioration in households' financial situation are very persistent.

2.4.4 Sample attrition and cross validation

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

Our dataset includes information on earnings which we use to gain some insights on the quantitative magnitudes behind the qualitative answers. More precisely we have computed the average percentage change in income for individuals who report a change in financial situation due to a change in earnings. Those who report being better off (worse off) due to

[8] The lower bound is obtained by considering that a reversal has taken place only if the individual responds that he/she is worse off because of lower earnings. This represents a lower bound because it is possible that in some other instances the individual is worse off for multiple reasons, one of them being lower earnings, but in the survey he/she reports another reason. The survey asks for the main reason why the individual is worse off. The upper bound is computed by taking all events with a "worse off" response regardless of the listed reason.

an earnings increase (decrease) had an average 8.7% (-7.4%) change in income during the year.[9] The BHPS also contains information on income in the month prior to the interview which could arguably provide a better measure of the household's financial situation at the time that the survey is carried out. In fact those who state that they are better off (worse off) due to an earnings increase (decrease) report an average 12.7% (-13.8%) change in their last-month's income relative to the one obtained thirteen months ago. These numbers speak to the importance of these self-reported changes in financial situation as reflecting very important events for households' finances.

2.5 Explanatory variables

Part of the variation in our data is driven by changes in individual specific circumstances, such as a deterioration in health status, while the other part is driven by aggregate economic fluctuations, which are also reflected in individual level variables (e.g. earnings). In our regressions we include year fixed effects. We explore the macro effects captured by them in more detail later on in the paper.

The explanatory variables can broadly be classified into four categories: demographic information and life events, cost of living, psychological variables, and saving behavior. In Table V we report means for several of these variables. The second column reports means across all observations in our sample, the third and fourth columns consider observations in which individuals report being better off and better off due to an earnings increase, respectively. Finally the last two columns consider individuals who report being worse off and worse off due to higher expenditures. The number of observations reported in the first row of Table V correspond to observations for which we have information on whether there has been a change in financial situation. For some of the other variables there is sometimes missing information, which reduces the number of observations available for the regression analysis.

Demographics and life events

Panel A reports demographic information. Individuals who report being better off are on average much younger than those who report being worse off. A large proportion of individuals are better off due to higher earnings, and earnings profiles are on average steeper

[9] Those who report no significant change in financial situation had an average earnings increase of 2.4%.

earlier in life. The proportion of married individuals is lowest amongst those who report being worse off due to higher expenditures.

The next five rows of Table V report the average values for dummy variables for different health status, from excellent health to very poor health. Individuals who report being better off financially are on average healthier than the sample mean, more so when compared to those who report being worse off. For example, 73% of those who report being better off have excellent or good health. The corresponding value for those who report being worse off is only 61%. A worse health status may affect the ability of individuals to work and generate earnings, and there may be medical expenses that they need to meet.

On average, households who are better off tend to have more children. This may be because as we have seen there is some persistence in the households who report being better off, and those who expect to be better off financially decide to have more children. Alternatively, this may simply be a reflection of the fact that those individuals who are better off are on average younger, and at a stage when children have not left the household.

Cost of living and income

Panel B reports information on household budgets and cost of living measures. The data contains information on the amount the household has spent on food at home and home energy. We compute measures of their relative importance by scaling them by household income. These goods are particularly interesting because they are likely to be necessities, i.e. have a low price elasticity. When their price increases households will therefore be reluctant to cut down significantly on these expenditures and as a result will be made particularly worse off financially.

There is significant heterogeneity in the data in the income shares of energy and food. The average food-to-income ratio is 20.3% but the 25th percentile is only 9.89% while the 75th percentile 25.3%. Similarly, while the average energy-to-income ratio is 5.0%, the 25th percentile is only 2.02% while the 75th percentile is 6.51%. Those individuals who report being worse off have much higher budget shares on both home food and energy than those who state that they are better off (first two rows of panel B).

The next two rows report average values for food inflation and energy inflation. In any given year, the values for food (and energy) inflation are the same for all individuals. Therefore, any variation in means across the different columns in Table V is driven by differences in the year in which households report being better or worse off. Consistent with

the above hypothesis, across the four groups, the average inflation values are highest for individuals who report being worse off due to higher expenditures.

Our measure of income is obtained by adding the labor income, benefit income, social security income, transfers and asset income of the head of the household and his/her partner, if present. We use the retail price index to convert nominal variables into their real counterparts. In order to mitigate the influence of outliers we winsorize income (and other continuous variables) at the 5th and 95th percentiles of their respective distributions.

Psychological variables

The survey includes information on respondents' well-being. Each year individuals are asked how they have been feeling over the last few weeks, including whether they have been finding it difficult to face problems, whether they have been feeling depressed or unhappy, and whether they have been losing much sleep over worry. For each of these variables we construct a dummy variable that takes the value of one if the household head answers more than usual or much more than usual and zero otherwise.

Panel C of Table V reports the average values for these dummy variables. For one in ten (one in five) observations individuals report having difficulties facing problems (or are depressed). These proportions are significantly larger among those who also report that they are worse off financially: one in five have difficulties facing problems and almost one in three are unhappy or depressed. One should be careful interpreting these differences. The worse financial situation may be the result, for example, of individuals feeling depressed and spending money to try to overcome it, or even of another life event such as a divorce that leads to individuals feeling both depressed and being financially worse off.

Saving behavior

In each year individuals in the survey are asked whether they are saving regularly. The last row of Table V reports the mean for this variable. The average values are significantly lower for those individuals who report being worse off than for those who report being better off. Saving behavior is of course endogenous and expenditure shocks may make it difficult for individuals to save. This is something that we must keep in mind in the next section where we consider a more formal regression analysis.

3 Determinants of higher expenditures

The majority of households who are financially worse off give higher expenditures as the main reason. We use regression analysis to study the determinants of this event. We discuss our choice of econometric model before presenting the results.

3.1 Econometric approach

We use a standard binary choice model. The outcome variable y_{it} is equal to one if individual i in year t reports being financially worse off due to higher expenditures (and zero otherwise). Later on we will consider a more general model with several outcomes (higher/lower earnings and higher/lower expenditures), but the results for being worse off due to higher expenditures are similar. We model

$$Prob(y_{it} = 1|\mathbf{x}_{it}, u_i) = F(\mathbf{x}_{it}, u_i) \tag{4}$$

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 to modeling individual heterogeneity that 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 gives us the effect of each element of $\mathbf{x}_i$ on the log-odds ratio.

In Appendix A.1 we elaborate further on these alternative econometric models and report the results of Hausman tests that we use to chose among them. We conclude that the random effects estimators are inconsistent and therefore use the conditional FE logit model. As a further alternative way to control for persistence in unobserved individual characteristics we estimate a dynamic logit model.

Among the set of explanatory variables we include variables that characterize the household at time $t-1$ and variables that capture changes between time $t-1$ and t. The former tell us about the beginning of period household characteristics that make it more likely that households become worse off. The latter capture the changes that have taken place during

the year that make it more or less likely that households become financially worse off due to higher expenditures. The inclusion of variables that refer to changes from time $t-1$ to t creates a potential endogeneity problem in the regression, if some of those changes have been caused by the increase in expenditures and not the other way around. We discuss this potential concern below.

3.2 Logit regressions

Table VI shows the estimation results. The second column reports the results for a pooled logit regression and the third and fourth column for (conditional) fixed effects logit models. We include year fixed effects and a second order polynomial in age in all regressions and report t-statistics clustered by individual below the estimated coefficients.

Income

In the first two rows of Table VI we report the estimated coefficients for log real income at $t-1$ and changes in log real income between $t-1$ and t. These are included as controls. The estimated coefficients on lagged log real income are negative, so that those with lower income are more likely to become worse off due to higher expenditures as they face a tighter budget. However, the estimated coefficients on this variable are mostly statistically insignificant. And, as expected, increases in earnings between $t-1$ and t reduce the likelihood of households becoming worse off at time t due to higher expenditures.

Cost of living: food, energy and mortgage payments

The next group of explanatory variables measures expenditures in important categories, such as food at home, energy, and mortgage payments. The second and third columns report the results for a regression with both energy and food expenditure shares. In the fourth column we exclude the former due to the high collinearity between the variables and the fact that information on energy expenditures is not available for all years in the survey.[10]

A significant positive coefficient on the beginning of period ratios of food expenditure to income and mortgage payments to income tells us that households who allocate a higher fraction of their income to these categories are more likely to become financially worse off due to higher expenditures. All the statistically significant coefficients in the regressions are

[10] Excluding the energy variables allows us to significantly increase the sample size. The much lower number of observations for the fixed effects logit regressions than the pooled regressions is due to the fact that the former only uses information for those individuals whose outcome variable changes during the sample.

indeed positive. Households who spend a higher fraction of their income in these categories are likely to face a tighter budget. And those on a tight budget are more likely to become significantly worse off when such expenditures increase. Some coefficients are not significant, but there is collinearity between these variables. For example, the correlation between the ratio of energy expenditure to income and the ratio of food expenditure to income is 73%.

To test this channel more explicitly we include in the regression measures of food and energy price inflation between time $t-1$ and t interacted with the ratios of food expenditure and energy expenditure to total income at time $t-1$, respectively.[11] The coefficients on the interaction terms are both positive so that those households who at the beginning of the period spent a higher fraction of their income in these goods are more likely to be affected by increases in their prices. Likewise households whose mortgage payments increase more relative to their income during the year are more likely to become worse off due to higher expenditures.[12] In the third column the interaction term between the ratio of food expenditure to income and the RPI food is not statistically significant but in column four we exclude the energy expenditure variables from the regression and the estimated coefficients on the food expenditure variables are both statistically significant.[13]

Life events: health status, marital status and number of children

The next set of explanatory variables capture the effects of life events, including health status, children, and marital status. We use dummies for the different health status at time $t-1$. Omitted from the table is the dummy for the base case of excellent health, so that the others should be interpreted as the additional probability effect relative to this base case. Across all specifications, the estimated coefficients are positive and statistically significant. Furthermore, they tend to increase as health status becomes worse, although the monotonicity is less pronounced for the fixed effects regressions than the pooled logit regression (possibly because health status is persistent and its effect is captured by the individual fixed effect).

[11] Recall that we have year dummies so that we cannot include food and energy price inflation in the regression.

[12] The results in this regression are qualitatively identical and quantitatively almost the same if we exclude from the sample the years in which households are taking a new mortgage. Thus our results are not driven by the mortgage choices made by these individuals. Mortgages in the U.K. are mostly adjustable-rate, which have higher cash-flow risk than the fixed-rate mortgages that are more common in the U.S.

[13] In addition during our sample period energy price inflation was considerably more volatile than food price inflation. The standard deviation of the RPI Energy index was 7.62% compared with 2.33% for the RPI Food index.

Changes in health status between $t-1$ and t are also important. An improvement (deterioration) in health status reduces (increases) the probability of households becoming financially worse off due to higher expenditures. An explanation for these results is that health status affects medical expenditures. Unfortunately our data does not contain information on their value so that we cannot test this channel explicitly. Therefore we cannot rule out other possibilities, such as those in poorer health increasing expenditures in other categories, perhaps in an attempt to make them feel better.

To assess the effects of household composition, as emphasized for example in Fernández-Villaverde and Krueger (2007), we include marital status and additional dummy variables capturing separation events and birth of first child. The estimated coefficient on a dummy for separated or divorced is not always statistically significant, but for the specification where it is, the estimated positive coefficient tells us that individuals who separated are more likely to become worse off due to higher expenditures: the estimated log-odds in the fixed effects regression is as high as 0.27.

For children related variables, in Table VI we report the results for a variable that captures the first child born between $t-1$ and t. This variable has a large impact on the probability of households becoming worse off due to higher expenditures: the estimated log-odds ratio in the fixed effects regressions are around 0.6. Although not reported in Table VI, we have tried the number of children and a dummy variable that takes the value of one if there is an additional child born between time $t-1$ and t, regardless of whether or not it is the first child. The estimated coefficients on these variables were statistically insignificant. This suggests that there is something about the first child, either because expenses are relatively higher for the first child (since younger siblings typically use prams, clothes, etc. of older siblings) or because parents are less prepared for the required expenditure than when having subsequent children.[14]

Psychological variables: depression, ability to face problems and loss of sleep

We use several variables to capture psychological characteristics. The first is a dummy variable that takes the value of one if at time $t-1$ the individual reports that he/she has been having difficulties facing problems more than usual or much more than usual, and zero otherwise. We estimate a positive log odds ratio of 0.1 in the logit FE regressions.

[14] Love (2010) solves a life-cycle model of consumption and portfolio choice which explicitly considers the impact of demographic shocks and studies how these variables empirically affect observed household portfolio allocations.

Since the question in the survey is fairly general, and it does not ask specifically about what sort of problems individuals have been having difficulty facing, there are at least two possible explanations for the positive and statistically significant estimated coefficient. First, individuals may be dealing with a personal problem that they have difficulty facing, and they spend more to make them feel better. Second, individuals who have difficulty facing problems take a more passive attitude towards managing their finances are more likely to become financially worse off due to higher spending than what they can afford. The other psychological variables capture individuals who report being more depressed/unhappy than usual and those who report losing more sleep over worry than usual. Although, as before, it is hard to identify the precise channel, the positive and statistically significant coefficients that we estimate on these variables show that emotions play an important role. The only exception is for the variable depressed which is no longer statistically significant when we control for individual fixed effects (this suggests that its effect on expenditures acts mainly as an individual trait).

Saving Behavior

The last explanatory variable captures the impact that saving behavior has on the probability that the individual becomes financially worse off. The estimated negative coefficient in the second column (logit regression) shows that those who were saving at time $t-1$ were less likely to become worse off due to higher expenditures at t. While this may not be surprising, it is interesting to note that once we include fixed effects in the regression the saving behavior variable is no longer statistically significant. This points towards saving behavior and its importance for expenditure risk being an individual trait.

Predicted probabilities

The estimated coefficients in the fixed effects logit regressions are the log-odds ratios, which contain information on the economic importance of the explanatory variables. In this model we cannot estimate the traditional marginal effects since it does not recover the distribution of the individual fixed effects. In order to obtain additional evidence on economic magnitudes, in appendix table AII we report predicted probabilities for the FE logit model under the assumption that the fixed-effects are zero and for the pooled logit model which does not control for unobserved heterogeneity. The predicted probabilities are economically and statistically very meaningful.

3.3 Dynamic logit and persistence

An individual who is in a worse off financial situation at t is more likely to find himself/herself in the same situation at $t+1$. An alternative approach to the fixed effects model to capture this persistence is to include the lagged dependent variable in the regression. The results for this dynamic logit model are reported in the last column of Table VI.

The estimated coefficient on the lagged dependent variable is positive and highly statistically significant (t-statistic of 42). This reflects the degree of persistence in our outcome variable. Most explanatory variables remain significant as before, but the magnitude of the estimated coefficients and/or t-statistics of some are more affected than others. This reflects the persistence of these explanatory variables and the extent to which it leads to persistence in the outcome variable itself. We investigate this further in the appendix (Table AIII) where we study the persistence of our explanatory variables.

3.4 Multinomial logit

Our previous analysis focused on the determinants of individuals being worse off due to higher expenditures. In this section we study a wider set of outcomes by estimating a multinomial logit (**ML**) model where the outcome variable y_{it} takes one of five possible values that capture better/worse off due to higher/lower earnings, better/worse off due to lower/higher expenditures and the remainder (base case). The estimated coefficients in the regressions are differences relative to the base outcome.

The second and third columns of Table VII report the estimated parameters for the regressions for better off due to higher earnings and worse off due to higher expenditures, respectively.[15] The results for the higher expenditures equation are very similar to those reported in Table VI, for the comparable logit model without fixed effects, both in terms of statistical significance and the values of the coefficients. Therefore we focus our comments on the equation explaining the higher earnings event (second column of Table VII).

We estimate a positive coefficient on lagged income, showing that high earners are also more likely to experience further increases in income. The coefficient on the ratio of food expenditure to income is negative and statistically significant which again shows that poorer households, who spend a higher proportion of their income on food at home, are less likely

[15] These are the two main reasons given for a change in financial situation (the complete estimation results are included in appendix Table AIV).

to become better off due to an earnings increase.

More interesting is the positive estimated coefficient on the ratio of mortgage payments to income. It shows that those households who devote a larger fraction of their income to mortgage payments are more likely to become better off due to higher earnings. This can be explained by those households who expect higher future income taking larger loans relative to their current income. In other words, mortgage loan amount (and payments) relative current labor income has predictive power for future income growth.

The variables related to health status consistently show that households in poorer health are less likely to enjoy future increases in income. Having a first child being born during the year has a negative impact on household income growth which might be due to the fact that the labor supply of one or both members of the household is likely to have decreased during this period.

Endogeneity

Our regression estimates thus far are subject to potential endogeneity concerns since our explanatory variables include some that refer to changes from time $t-1$ to t. For example, one could argue that households who face an increase in expenditures unrelated to their health must cut back on their medical expenditures, and that it is this that leads them to suffer a decrease in health status.

The nature of our data and the large degree of persistence among the variables makes it difficult to make causal statements from our analysis. In fact, it is likely that many of the effects that we discuss feed on each other. For instance it may be the case that higher stress generated by increased expenditures and a difficult financial situation lead to an increase in the probability of a divorce/separation. Instead the focus of our paper is on understanding the nature of the events that took place between $t-1$ and t and how they relate to certain outcomes. With this said, it is also interesting to try to understand what we can explain if we remove from the regressions the variables subject to endogeneity concerns. The last two columns of Table VII report the estimation results for a multinomial logit model where we exclude all contemporaneous household-level variables.[16] Comparing the results in the two alternative multinomial logit specifications we see that they are almost identical.

[16] We still include the RPI variable since this is an aggregate variable and the endogeneity concern does not apply. For consistency we have excluded the "change in mortgage payments between t-1 and t" and "first child born between t-1 and t" even though for these variables the endogeneity would probably imply a coefficient with the opposite sign from the one that we have estimated in the regressions.

3.5 Aggregate versus individual specific variation

In the previous regressions we have included year fixed effects among the explanatory variables that capture the effects of aggregate economic conditions on the outcome variable. In this section we explore the importance of these aggregate conditions and their determinants.

As a first step, we compute the proportion of individuals who in any given year report being financially worse off due to higher expenditures. It varies between 7.1% and 23.9% indicating significant time series variation. The highest value is for the last year in our sample, 2008, which corresponds to the year of the global financial crisis. The time series standard deviation of this proportion is 3.9%. For comparison, the cross-sectional standard deviation in the same variable ranges from a minimum of 25.7% (in 2002) and a maximum of 42.7% (in 2008). These values tell us about the relative importance of aggregate versus individual shocks/events (or of individual characteristics that determine differential responses to aggregate shocks) in determining the likelihood of individuals becoming worse off due to higher expenditures.[17]

Table VIII reports time-series correlations between the fraction of the individuals who report a given event and real GDP growth, inflation and the unemployment rate (p-values are shown in parenthesis).

The fraction of households who are worse off (better off) due to higher (lower) expenditures is positively (negatively) correlated with inflation and negatively (positively) correlated with real GDP growth. When inflation is high the cost of the representative consumption basket increases more, so that, ceteris paribus, a higher proportion of households are likely to face a tight budget. Periods of low real GDP growth tend to be periods of low real earnings growth, so that households are also more likely to face a tighter budget and to be negatively affected by increases in expenditures. We had previously found evidence for these two channels in the panel regressions controlling for aggregate effects, and it is reassuring to also find them present at the aggregate level.

For earnings changes we find an interesting asymmetry. Years when a large fraction of individuals report being better off due to higher earnings tend to be those with high real GDP growth.[18] However, the fraction of those who report being worse off due to lower

[17] In Table VI we have included among the regressors variables such as health status (individual event) and variables such as the interaction between energy inflation and the (lagged) percentage of the household's income that was spent on energy (an aggregate shock that has a differential impact across households, depending on the proportion of the household budget that is spent on energy).

[18] For the period post 2000, the Office of National Statistics also reports information on real average

earnings is largely correlated with the unemployment rate (correlation of 0.9), and not with real GDP growth. Thus, in our sample, individuals being worse off due to lower earnings is mainly unemployment spells which is also consistent with the smaller persistence of this variable relative to the one that measures earnings increases.

4 Expenditure responses and psychological well-being

In this section we study households' response to changes in financial situation, focusing on spending on discretionary categories, and study their relation with psychological well-being.

4.1 Expenditure responses

For part of the sample period the data includes information on the amount spent by the household on food away from home and on leisure, which may be seen as discretionary spending categories, as opposed to food at home and energy, which are more likely to be necessary goods. We compute for each household the *inflation-adjusted* percentage change spent on each of these four categories between years $t-1$ and t. We then regress these changes in real consumption on the four dummy variables that take the value of one if the individual reports being better off (worse off) due to higher (lower) earnings or lower (higher) expenditures. The underlying hypothesis is that, in response to a deterioration in their financial situation, households will be reluctant to cut back on their consumption in food and energy and more likely to adjust spending on food away from home and leisure. As previously shown, deteriorations in financial situation are sometimes associated with increases in the price of necessary goods. To the extent that households only adjust this particular consumption marginally, or not at all, it further explains why movements in the prices of these goods are a particular cause of significant deteriorations in their financial situation.

There may be other explanatory factors behind changes in expenditures in each of these goods, such as a deterioration in health status or the birth of a child. For this reason we include these and other control variables among the set of explanatory variables. We estimate fixed-effects panel regressions. The estimation results are shown in Table IX. The

earnings growth. This variable has a correlation with real GDP growth of 0.8. We have decided to use real GDP growth due to the larger number of observations available.

estimated coefficients on the change in financial situation dummies have the expected signs and are significant both statistically and economically. For example, households who report being worse off due to higher expenditures spend 10% less on food away from home and on leisure. By comparison expenditures on food at home and energy only decrease marginally, 1% and 2% in real terms respectively, with the coefficient on the second not even statistically significant.

Interestingly, those who report being worse off due to a decline in earnings cut spending on food away from home and leisure by more, by 20% and 16% respectively. Thus, even though households being worse off due to higher expenditures is a more common occurrence than households being worse off due to lower earnings, the latter elicits a stronger response suggesting that it is perceived by households to be a more serious event. It is interesting to see that this is the case for both positive and negative changes in financial situation. As before, the responses of food at home and energy are much weaker, revealing a lower income elasticity for these goods. Overall these results indicate that, households respond to deteriorations in financial situation by decreasing their expenditures in consumption goods, but this reduction is particularly concentrated in discretionary categories.

As expected several of the control variables are significant and their results are intuitive. For instance, households who have had their first child spend considerably less both on food away from home and on leisure, but spend considerably more on food at home and, to a lower extent, on energy. Likewise, individuals who separated between $t-1$ and t also spend less on food at home, but do not cut back on food away from home.

4.2 Psychological well-being

We now focus on the relation between changes in financial situation and psychological well-being. The outcome variables are whether individual i in year t has been feeling more depressed or unhappy than usual, whether he/she has been losing more sleep than usual due to worry, and whether he/she has been having more difficulties facing problems. We estimate panel fixed effects logit regressions so that individual specific traits will be captured by the fixed effects.

There may be factors that are the reason for households becoming more depressed and at the same time financially worse off, such as for example a divorce or a deterioration in health status. To try to at least partly control for these factors we include them among the

explanatory variables. But naturally it is very difficult to isolate the impact of one set of variables versus the other. For instance, stressed household finances may lead to conflicts among married couples. Alternatively, marriage difficulties may lead to workplace difficulties or to individuals spending more in an attempt to make them feel better (or to save their marriage).

Table X reports the results. Individuals who are financially worse off due to higher expenditures have an increased probability of being depressed, of loosing sleep due to worry, and are also more likely to report that they have difficulties facing problems. Furthermore, the increase in these probabilities is large, with estimated log-odds ratios on the higher expenditures variable varying between 0.30 and 0.44.

These results are important for two reasons. First, they reveal an important psychological channel through which households may be made worse off, in utility terms, as a result of the higher expenditure (a deterioration in psychological health, with a utility impact through the h_{it} term in equation (1)). Second, combined with the results in the previous section, which show that individuals who have more difficulty facing problems are more likely to become worse off due to higher expenditures, these estimates highlight a potential vicious circle in household finances.

The remaining dummy variables that measure the change in financial situation are also statistically and economically very significant with the expected signs. For instance, individuals who are financially better off due to higher earnings are much less likely to feel depressed or to lose sleep due to worry. Interestingly for both individuals who are better off and who are worse off, the (absolute) value of the estimated coefficients on the earnings variables are higher than those on the expenditure variables. This tells us that even though individuals being worse off due to an expenditure increase is a more common occurrence, the impact of an earnings decrease on individuals' well-being is larger. This pattern is consistent with the larger response of expenditure on discretionary goods to changes in earnings.

It is re-assuring to see that many of the estimated coefficients on the remaining variables are statistically and economically significant with the expected signs. A deterioration (an improvement) in health status has a large positive (negative) impact on psychological well being. The first child being born reduces significantly the probability of individuals being depressed. Perhaps surprisingly, particularly for those with children, the estimated coefficient on the first child variable in the loss of sleep regression is not statistically significant, but

the survey asks specifically about loss of sleep due to worry. Divorce or separation leads to a large increase in the probability that the individual is depressed or loses sleep due to worry (log-odds ratios of around 0.8).[19]

5 Individual traits and financial management

5.1 Cross-sectional analysis of individual traits

To study the role of individual traits in more detail we move away from the fixed-effects panel specification and consider cross-sectional regressions where the dependent variable is the average of our dummy variable for worse off due to higher expenditures over time for a given individual. In particular we want to investigate whether individual's borrowing behaviour is related to the frequency of these events. In other words are individuals who borrow more doing so because they rationally anticipate higher future labor income or lower future expenditures, or are they engaging in this behaviour because they have a lower discount rate (for example, due to hyperbolic preferences), thus leaving themselves more financially vulnerable going forward. For three of the waves (years) the BHPS has supplementary information on whether the individual owes money and whether he/she made use of credit cards to borrow. While the limited information on these debt related variables means that we could not include them in our main regressions without sacrificing most of our observations, we can use them in cross-sectional tests.

Of course the use of debt might also be the result of optimal consumption smoothing in the presence of an increasing income profile or a result of an expenditure shock that leads households to borrow. We control for this in two ways. First, we include average income growth among the set of explanatory variables.[20] Second, we divide the data in two and compute the dependent variable over the second half of the sample: it is the fraction of the years during 2000 to 2008 in which each individual reported being worse off due to higher expenditures. Then we take credit card usage in 1995 to explain outcomes in the 2000 to 2008 period, when the effects of any shocks that the household has had in 1995 (or before) are likely to have died down. One way of interpreting these Tobit regressions is to view the

[19] In the appendix Table AVI we report predicted probabilities for the pooled logit and FE logit model, calculated in a similar way to what we have done before.

[20] In this way, even if debt usage is driven by expected income growth, the estimated coefficients on these variables and their statistical significance are unaffected.

1995 realizations as instruments for these same variables in the period 2000 to 2008.

The results in the second column of Table XI show that those who borrow and those who have lower income growth are more likely to be worse off due to higher expenditures. In the third column we include the credit card usage variable. The estimated positive coefficient confirms the hypothesis that individuals who make more use of credit card debt are, on average, making themselves more financially vulnerable and thus face a higher probability of being worse off due to higher expenditures. When we include the owe money and credit card use variables in the regression, the estimated coefficients are positive but not always significant, reflecting the degree of collinearity between the two variables. Overall there results highlight the role of individual traits.

5.2 Financial management

There is a small proportion of individuals who in some of the years report that they are better off due to good management (Table II). If these individuals are able to make better financial decisions/planning, then we might expect that good management *reduces* the probability that in other years these same individuals become worse off due to higher expenditures.

Naturally we do not observe those events directly in our data since there is no survey question asking individuals if they would have been worse off but were able to avoid this due to good financial management/planning. We are therefore required to estimate their likelihood. We first calculate for the 1990 to 1999 period the proportion of times that each individual in our sample reports being better off due to good management relative to the total number of years in which he/she appears in the sample. The higher this number the more likely it is that the individual is particularly good at financial planning and/or managing expenditures, and therefore we call this variable "good management."

We then regress the proportion of times that the same individual reports being worse off due to higher expenditures over the 2000 to 2008 period on our "good management" variable. The fifth column of Table XI reports the results. The negative estimated coefficient on the good management variable shows that indeed good management reduces the frequency with which individuals are worse off due to higher expenditures. It suggests that households with better financial/expenditure management skills are better able to prepare themselves for uncertain future events.

In the last column of Table XI we perform a placebo test by asking whether good man-

agement increases the probability that individuals are better off due to higher earnings. One might argue that individuals with good management skills might also be more dedicated workers and thus one might still find an effect. But on one hand this only works against our placebo hypothesis, and even then we would still expect a weaker effect. The estimated coefficient is not statistically significant, ruling out any potential mechanical effect in our previous results.

6 Conclusion

We have used almost two decades of household level panel data to show that higher expenditures is the main reason for a deterioration in household finances and that these increases in expenditures are persistent. We have traced their source to increases in the prices of necessary goods that constitute an important fraction of households' budget, such as food at home, energy and mortgage payments, and to life events, including divorce, a deterioration in health status, and the birth of the first child. We have shown that psychological variables, such as individuals' ability to face problems, also matter, and that there are important links between changes in financial situation and psychological well-being, with worse off individuals more likely to feel depressed and to lose sleep over worry. These in turn increase the probability of a further deterioration in household finances. Behaviors and traits are important too: those who save regularly and those who do not use (expensive) credit card debt to borrow are less likely to become financially worse off due to higher expenditures.

It is important to acknowledge that the persistence in the variables studied and the feedback effects that we have identified mean that it is very hard to completely isolate the effects of the individuals' financial situation on psychological well-being (or vice versa). Furthermore, our results are on individuals' financial situation and psychological well-being, and not on overall utility. In any case, we have shown that, for many households, expenditures are an important source of background risk and that there are important links between financial and psychological well-being. In addition our results highlight the importance of expenditure management in financial education.

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Table I
Financial situation.

Panel A reports the number of observations for which individuals in year t reported that they were financially significantly better off, no significant change, and significantly worse off than in year t-1, for t=1991,...,2008. Panel B reports the probability that individuals report each of these alternatives in year t, conditional on their year t-1 answer, i.e. on whether in year t-1 they reported that they were significantly better off, no significant change, or significantly worse off than in year t-2.

Panel A: 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: Fin. situation in year t conditional on year t-1 response				
	Better off at t	No change at t	Worse off at t	Total
Better off at t-1	0.44	0.39	0.17	1.00
No change t-1	0.16	0.67	0.17	1.00
Worse off at t-1	0.19	0.37	0.45	1.00

Table II
Reasons for change in financial situation.

This table reports the reasons given by individuals for why they were financially better off (worse off) in year t than in year t-1. The last two columns report the reasons given by individuals in excellent health both in year t-1 and in year t for why they were financially worse off in year t than in year t-1.

Panel A	Better off		Panel B	Worse off		Worse off/excellent health	
Reason better off	# obs.	Fraction	Reason worse off	# obs.	Fraction	# obs.	Fraction
Earnings ↑	14,080	0.54	Earnings ↓	6,206	0.24	1,348	0.28
Expenditures ↓	3,883	0.15	Expenditures ↑	13,530	0.52	2,395	0.50
Benefits ↑	2,739	0.11	Benefits ↓	990	0.04	118	0.02
Inv income ↑	749	0.03	Inv income ↓	878	0.03	163	0.03
Windfall payment	781	0.03	One-off expend.	513	0.02	126	0.03
Good management	1,310	0.05					
Other reasons	2,507	0.10	Other reasons	3,672	0.14	688	0.14
Total better off	26,049	1.00	Total worse off	25,789	1.00	4,838	1.00

Table III
Reasons for change in financial situation by age and income.

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

	Age group				Income group		
	21-35	36-50	51-65	>65	Low	Medium	High
Panel A: Change in financial situation, fraction of total							
Better off	0.38	0.27	0.18	0.10	0.17	0.23	0.30
Same	0.38	0.48	0.57	0.68	0.60	0.53	0.46
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	0.62	0.41	0.05	0.34	0.54	0.63
Expenditures ↓	0.13	0.15	0.18	0.18	0.14	0.15	0.15
Benefits ↑	0.02	0.03	0.17	0.54	0.31	0.09	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	0.05	0.03
Good management	0.06	0.05	0.04	0.04	0.05	0.09	0.05
Other reasons	0.10	0.09	0.10	0.08	0.10	0.04	0.09
Panel C: Reason for worse off, as a fraction of worse off							
Earnings ↓	0.30	0.28	0.31	0.05	0.11	0.25	0.35
Expenditures ↑	0.49	0.48	0.45	0.69	0.64	0.50	0.46
Benefits ↓	0.03	0.05	0.04	0.02	0.06	0.04	0.01
Inv Income ↓	0.00	0.01	0.04	0.10	0.04	0.05	0.02
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 IV
Persistence in changes in financial situation, by reason given for change.

Panel A reports the probability that an individual gives the same reason for change in financial situation in year t and in each of the subsequent future years until t+k, for k=1,2,3. Panel B reports the lower and upper bound probabilities of the event at t not being reversed in year t+1, by year t+2, and by year t+3. The lower bound is obtained by considering that a reversal has taken place only if the individual responds in a future year better off (having reported worse off at t) because of a similar reason. The upper bound is computed by taking all future events with a "better off" response regardless of the listed reason.

	Panel A: Prob. of consecutive events			Panel B: Probability of non-reversal		
Event at t	Repeat t+1	Repeat t+2	Repeat t+3	At t+1	By t+2	By t+3
Earnings ↑	0.36	0.16	0.07	0.83 - 0.93	0.71 - 0.87	0.61 - 0.82
Expenditures ↓	0.13	0.03	0.00	0.84 - 0.92	0.73 - 0.86	0.62 - 0.78
Earnings ↓	0.18	0.04	0.01	0.76 - 0.84	0.60 - 0.72	0.48 - 0.60
Expenditures ↑	0.33	0.15	0.09	0.83 - 0.97	0.73 - 0.95	0.67 - 0.93

Table V
Summary statistics.

This table reports the mean for several variables for both the full sample and specific subsamples. The second column reports the mean for all observations, the third (fourth) column reports the means for observations corresponding to individuals who report being better off (better off due to earnings increase) in year t than in year t-1. The fifth (sixth) column reports the means for observations corresponding to individuals who report being worse off (worse off due to expenditures increase) in year t than in year t-1. The mean ratio of mortgage payments to income is for those individuals who have a mortgage outstanding.

Variable	All obs.	Better off	Earnings ↑	Worse off	Expenditures ↑
Number of obs.	126,539	28,830	14,080	29,755	13,530
Panel A: Demographics and life events					
Age	50.4	42.6	37.4	49.3	51.2
Male	0.55	0.55	0.57	0.55	0.53
Married	0.60	0.65	0.71	0.60	0.57
Excellent health	0.22	0.28	0.32	0.19	0.18
Good health	0.44	0.45	0.47	0.42	0.42
Fair health	0.22	0.19	0.17	0.24	0.25
Poor health	0.09	0.06	0.04	0.11	0.11
Very poor health	0.03	0.02	0.01	0.04	0.04
Number of children	0.54	0.63	0.72	0.55	0.51
Panel B: Cost of living and income					
Food exp./Total inc.	0.203	0.170	0.155	0.217	0.222
Energy exp./Total inc.	0.050	0.039	0.034	0.054	0.056
Food inflation	0.023	0.021	0.019	0.026	0.027
Energy inflation	0.052	0.047	0.045	0.055	0.062
Mortgage payment/Total inc.	0.154	0.152	0.152	0.170	0.171
Real total inc (pounds)	22,967	27,584	31,012	21,194	20,661
Panel C: Psychological variables					
Depressed	0.21	0.18	0.16	0.32	0.31
Diff. facing problems	0.12	0.09	0.06	0.18	0.18
Loss of sleep due to worry	0.19	0.16	0.15	0.28	0.26
Panel D: Saving behavior					
Saves regularly	0.40	0.52	0.54	0.29	0.31

Table VI
Logit and (conditional) logit fixed effects panel regressions for explaining worse financial situation due to higher expenditures.

The dependent variable is a dummy variable that takes the value of one if the individual reports that he/she is financially worse off in year t than in year t-1 due to an increase in expenditures, and zero otherwise. The second column reports the estimated coefficients from a pooled logit regression. The third and fourth column report the estimated coefficients (the log-odds ratios) for panel logit regressions with individual fixed effects. The last column reports the estimated coefficients for a logit regression that includes the lagged endogenous variable among the explanatory variables. T-statistics clustered by individual are shown below the estimated coefficients. The baseline case for health status at t-1 is excellent. We include a second order polynomial in age and year fixed effects in all specifications (coefficients not reported).

Independent variables	Logit Coefficients	FE Logit Coefficients	FE Logit Coefficients	Dynamic Logit Coeff.
Log real inc_{t-1}	-0.02	-0.03	-0.06	-0.01
	(-0.60)	(-0.83)	(-2.48)	(-0.43)
Δ log real inc_t	-0.11	-0.15	-0.20	-0.12
	(-2.77)	(-3.08)	(-4.08)	(-2.93)
Cost of living				
$(\text{Energy Exp./Inc})_{t-1}$	-0.15	-0.41		-0.50
	(-0.21)	(-0.38)		(-0.78)
$(\text{Food Exp./Inc})_{t-1}$	0.17	0.55	0.64	0.22
	(0.81)	(1.85)	(2.60)	(1.09)
$(\text{Mortgage payments/Inc})_{t-1}$	0.74	0.72	0.04	0.57
	(3.97)	(1.95)	(0.13)	(3.46)
(Energy Exp./Inc) at t-1 x $\text{RPI}_t^{Energ.}$	13.58	21.17		18.14
	(1.94)	(2.19)		(2.68)
$(\text{Food Exp./Inc})_{t-1}$ x RPI_t^{Food}	17.80	5.66	15.64	14.07
	(2.37)	(0.62)	(2.01)	(1.83)
$(\Delta$ Mort. $\text{payments/Inc})_t$	1.78	2.02	1.63	1.90
	(8.00)	(6.12)	(6.33)	(7.84)
Life events				
Good health_{t-1}	0.08	0.11	0.10	0.07
	(1.84)	(1.51)	(2.06)	(1.72)
Fair health_{t-1}	0.27	0.28	0.22	0.24
	(4.94)	(3.32)	(3.38)	(4.96)
Poor health_{t-1}	0.31	0.28	0.17	0.28
	(4.60)	(2.61)	(2.20)	(4.50)
Very poor health_{t-1}	0.40	0.21	0.07	0.34
	(3.98)	(1.48)	(0.56)	(3.73)
Health $\text{improvement}_{t-1,t}$	-0.11	-0.10	-0.06	-0.09
	(-2.98)	(-2.03)	(-1.67)	(-2.55)
Health $\text{deterioration}_{t-1,t}$	0.12	0.09	0.07	0.12
	(3.69)	(1.83)	(2.10)	(3.60)

(Table VI continued in the next page)

Table VI Continued
Logit and (conditional) logit fixed effects panel regressions for explaining worse financial situation due to higher expenditures.

Independent variables	Logit Coefficients	FE Logit Coefficients	FE Logit Coefficients	Dynamic Logit Coeff.
(Table VI continued from the previous page)				
Life events				
Marital status$_{t-1}$	0.00	-0.01	-0.09	0.01
	(0.10)	(-0.13)	(-1.63)	(0.18)
Separated$_{t-1,t}$	0.12	0.26	0.27	0.13
	(1.06)	(1.41)	(2.14)	(1.04)
First child born$_{t-1,t}$	0.58	0.61	0.65	0.62
	(5.89)	(3.66)	(7.32)	(6.00)
Psychological variables				
Difficulty facing problems$_{t-1}$	0.15	0.12	0.11	0.12
	(3.04)	(1.66)	(2.36)	(2.48)
Depressed$_{t-1}$	0.14	-0.08	-0.02	0.06
	(3.39)	(-1.39)	(-0.44)	(1.46)
Losing sleep due to worry$_{t-1}$	0.21	0.11	0.10	0.17
	(5.23)	(2.30)	(2.71)	(4.33)
Saving behavior				
Saves$_{t-1}$	-0.14	0.05	-0.01	-0.07
	(-4.32)	(0.82)	(-0.42)	(-2.31)
Other variables				
Worse off due to $\uparrow$ expenditures$_{t-1}$				1.56
				(42.10)
Year fixed effects	Yes	Yes	Yes	Yes
Individual fixed effects	No	Yes	Yes	No
Second order polynomial in age	Yes	Yes	Yes	Yes
Number of obs.	61,445	27,174	47,300	61,445

Table VII
Multinomial Logit Regressions.

This table reports the estimated coefficients for multinomial logit regressions for two alternative specifications. In each specification the outcome variable takes one of possible five values: (i) better off due to higher earnings; (ii) better off due to lower expenditures; (iii) worse off due to lower earnings; (iv) worse off due to higher expenditures; and (v) the remainder. The remainder is the base group. The table reports results for groups (i) and (iv), but a full set of results is included in the appendix. The specifications differ in the set of explanatory variables: for specification (2) we exclude variables that may give rise to endogeneity concerns. T-statistics clustered by individual are shown below the estimated coefficients. The baseline case for health status at t-1 is excellent. We include a second order polynomial in age and year fixed effects in all specifications (coefficients not reported).

	Multinomial logit specification (1)		Multinomial logit specification (2)	
Independent variables	Earnings ↑	Expenditures ↑	Earnings ↑	Expenditures ↑
Log real inc$_{t-1}$	0.08	0.01	0.08	0.01
	(3.18)	(0.38)	(3.77)	(0.55)
Cost of living				
(Food Exp./Inc)$_{t-1}$	-0.79	0.11	-0.77	0.06
	(-4.48)	(0.73)	(-3.79)	(0.31)
(Mortgage payments/Inc)$_{t-1}$	0.78	0.80	0.83	0.35
	(5.53)	(4.81)	(5.74)	(1.76)
(Food Exp./Inc)$_{t-1}$ x RPI$_t^{Food}$	-15.82	17.35	-14.67	16.42
	(-2.10)	(2.84)	(-1.81)	(2.40)
(Δ Mort. payments/Inc)$_t$	-0.23	1.86		
	(-1.19)	(10.12)		
Life events				
Good health$_{t-1}$	-0.30	0.02	-0.21	-0.01
	(-9.28)	(0.71)	(-6.32)	(-0.33)
Fair health$_{t-1}$	-0.50	0.17	-0.33	0.10
	(-10.70)	(3.20)	(-7.31)	(2.24)
Poor health$_{t-1}$	-0.91	0.20	-0.71	0.12
	(-12.41)	(3.09)	(-9.44)	(1.90)
Very poor health$_{t-1}$	-1.09	0.28	-0.85	0.17
	(-9.76)	(3.06)	(-7.05)	(2.12)
Health improvement$_{t-1,t}$	0.23	-0.09		
	(8.23)	(-2.81)		
Health deterioration$_{t-1,t}$	-0.14	0.10		
	(-5.22)	(3.97)		
Marital status$_{t-1}$	0.18	0.02	0.16	0.03
	(4.39)	(0.55)	(4.36)	(0.81)
Separated$_{t-1,t}$	-0.70	0.17		
	(-5.53)	(2.10)		
First child born$_{t-1,t}$	-0.40	0.70		
	(-4.39)	(9.80)		

(Table VII continued in the next page)

Table VII Continued
Multinomial Logit Regressions.

This table reports the results for multinomial logit regressions.

	Multinomial logit specification (1)		Multinomial logit specification (2)	
Independent variables	Earnings ↑	Expenditures ↑	Earnings ↑	Expenditures ↑
	(Table VII continued from the previous page)			
Psychological variables				
Difficulty facing problems$_{t-1}$	-0.09	0.16	-0.11	0.16
	(-2.02)	(3.56)	(-2.16)	(3.61)
Depressed$_{t-1}$	-0.02	0.16	-0.03	0.16
	(-0.65)	(4.32)	(-0.99)	(4.78)
Losing sleep due to worry$_{t-1}$	0.07	0.25	0.05	0.26
	(1.87)	(9.11)	(1.25)	(7.85)
Saving behavior				
Saves$_{t-1}$	0.11	-0.15	0.12	-0.15
	(3.79)	(-5.66)	(4.02)	(-5.77)
Other variables				
Year fixed effects	Yes	Yes	Yes	Yes
Individual fixed effects	No	No	No	No
Second order polynomial in age	Yes	Yes	Yes	Yes
Number of obs.	87,694		89,693	

Table VIII
Correlation with aggregate variables.

The first row reports the time series correlation between the proportion of individuals who in each year report being better off due to Earnings ↑ and real GDP growth, inflation, and the unemployment rate. Below the estimated correlations we report p-values for a test that the correlation is zero. We report similar correlations and corresponding p-values for the other variables.

	Real GDP growth	Inflation	Unemp. rate
Earnings ↑	0.63	-0.57	-0.09
	(0.01)	(0.02)	(0.74)
Expenditure ↓	0.57	-0.52	-0.04
	(0.02)	(0.04)	(0.88)
Earnings ↓	0.20	0.24	0.90
	(0.46)	(0.38)	(0.00)
Expenditure ↑	-0.73	0.61	0.38
	(0.00)	(0.01)	(0.15)

Table IX
Expenditure response to changes in financial situation.

In the second (third) column the dependent variable is the percentage change in real household spending in food away from home (leisure) in year t relative to year $t-1$. In the fourth (fifth) column the dependent variable is the percentage change in real household spending in food at home (energy) in year t relative to year $t-1$. The table reports the estimated coefficients from panel regressions with individual fixed effects. The T-statistics shown below the estimated coefficients are clustered for individual. We include a second order polynomial in age and year fixed effects in all the specifications (coefficients not reported).

Independent variables	Δ Food away from home	Δ Leisure	Δ Food at home	Δ Energy
Change in financial situation				
Earnings ↑ at t	0.16	0.14	0.03	-0.03
	(10.26)	(7.19)	(6.55)	(-0.97)
Expenditure ↓ at t	0.07	0.06	0.03	-0.05
	(2.80)	(1.98)	(3.93)	(-0.92)
Earnings ↓ at t	-0.20	-0.16	-0.04	-0.04
	(-9.13)	(-5.84)	(-7.21)	(-1.06)
Expenditure ↑ at t	-0.10	-0.10	-0.01	-0.02
	(-5.99)	(-4.63)	(-2.99)	(-0.71)
Life events				
Health improvement bet. t-1 and t	0.00	0.00	0.00	-0.01
	(0.10)	(-0.24)	(-1.00)	(-0.38)
Health deterioration bet. t-1 and t	-0.04	-0.01	-0.01	-0.01
	-2.97	(-0.56)	(-2.02)	(-0.38)
First child born bet. t-1 and t	-0.12	-0.20	0.15	0.06
	(-3.25)	(-4.25)	(16.63)	(0.77)
Separated bet. t-1 and t	-0.04	0.08	-0.14	-0.16
	(-0.89)	(1.33)	(-12.86)	(-1.89)
Lagged control variables				
Good health at t-1	0.00	0.01	-0.01	-0.01
	(-0.17)	(0.69)	(-1.52)	(-0.27)
Fair health at t-1	-0.01	0.03	-0.01	-0.01
	(-0.60)	(0.90)	(-1.25)	(-0.15)
Poor health at t-1	-0.04	0.04	0.00	-0.04
	(-1.21)	(0.96)	(0.42)	(-0.63)
Very poor health at t-1	0.00	0.18	0.03	-0.15
	(0.02)	(2.61)	(2.41)	(-1.63)
Log real total inc at t-1	-0.04	-0.04	-0.02	-0.02
	(-5.80)	(-4.83)	(-11.97)	(-1.59)
Other control variables				
Year fixed effects	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes
Second order polynomial in age	Yes	Yes	Yes	Yes
Number of obs.	59,362	55,178	98,136	63,629

Table X
Relation to psychological well-being.

In the second column the dependent variables is a dummy variable that takes the value of one if in year t the individual reports being more depressed than usual and zero otherwise. In the third column it is a dummy variable that takes the value of one if the individual reports having more difficulties facing problems than usual. In the last column it is a dummy variable that takes the value of one if the individual reports that he/she is loosing more sleep due to worry than usual. The table reports the estimated coefficients from panel logit regressions with individual fixed effects The T-statistics shown below the estimated coefficients are clustered for individual. We include a second order polynomial in age and year fixed effects in all the specifications (coefficients not reported).

Independent variables	Depressed	Loss of sleep due to worry	Difficulties facing problems
Change in financial situation			
Earnings ↑ at t	-0.35	-0.22	-0.37
	(-9.02)	(-4.90)	(-6.52)
Expenditure ↓ at t	-0.16	-0.21	-0.13
	(-3.33)	(-3.22)	(-1.80)
Earnings ↓ at t	0.62	0.53	0.62
	(16.11)	(10.30)	(10.24)
Expenditure ↑ at t	0.44	0.30	0.36
	(12.44)	(8.32)	(7.30)
Life events			
Health improvement bet. t-1 and t	-0.53	-0.42	-0.57
	(-14.96)	(-10.71)	(-12.47)
Health deterioration bet. t-1 and t	0.65	0.51	0.73
	(21.16)	(17.41)	(19.38)
First child born bet. t-1 and t	-0.31	-0.07	-0.18
	(-4.31)	(-0.70)	(-1.34)
Separated bet. t-1 and t	0.82	0.86	0.63
	(7.60)	(11.46)	(4.95)
Lagged control variables			
Good health at t-1	0.46	0.37	0.42
	(10.38)	(10.58)	(8.88)
Fair health at t-1	0.96	0.79	1.01
	(14.49)	(13.71)	(15.25)
Poor health at t-1	1.38	1.04	1.58
	(15.31)	(13.43)	(15.16)
Very poor health at t-1	1.80	1.40	2.05
	(16.17)	(11.35)	(14.66)
Log real total inc at t-1	0.03	0.02	0.01
	(1.58)	(0.94)	(0.65)
Other control variables			
Year fixed effects	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes
Second order polynomial in age	Yes	Yes	Yes
Number of obs.	58,927	55,333	40,933

Table XI
Cross-sectional traits and financial management.

This table reports the results of cross-sectional Tobit regressions. The dependent variable in the second to fourth columns is the proportion of times that household is worse off due to higher expenditures in the 2000 to 2008 period, and in the last column it is the proportion of times that the household is better off due to higher earnings during the same period. The explanatory variables are: average income growth over the 2000 to 2008 period, dummy variables for whether the individual owes money and whether he/she makes use of credit cards to borrow in 1995, and a measure of good financial management calculated over the 1990 to 1999 period.

Independent variables	Exp. ↑ 2000-2008	Exp. ↑ 2000-2008	Exp. ↑ 2000-2008	Exp. ↑ 2000-2008	Earnings ↑ 2000-2008
Δlog real inc$_i$ 2000-2008	-0.27	-0.265	-0.267	-0.254	
	(-3.36)	(-4.04)	(-3.74)	(-3.37)	
Owe money$_i$ in 1995	0.035		0.024	0.023	0.169
	(2.87)		(1.71)	(1.74)	(13.44)
Credit card use$_i$ in 1995		0.043	0.026		
		(2.60)	(1.36)		
Good management$_i$ 1990-1999				-0.240	0.139
				(-2.96)	(1.59)
Number obs.	3,759	3,756	3,756	3,513	3,566