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The asymmetric effect of expectations on subjective well-being*

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Abstract

We empirically explore the relationship between expectations and subjective well-being. Theoretical models predict that expectations can influence experienced utility in two ways: (i) directly as anticipatory emotions in the form of savouring or dread; (ii) indirectly as internal reference levels in the form of deviations between expectations and actual achievements. We use twelve waves of the British Household Panel Survey to empirically investigate the double effect of expectations on experienced utility, as proxied by subjective well-being. We find a strong asymmetry in the way expectations affect subjective well-being. Negative deviations from expectations have a strong negative effect on subjective well-being, while the effect of positive deviations is weaker and sometimes insignificant. Expecting a worsening has a larger impact on subjective well-being than expecting an improvement.

Keywords: Subjective well-being, expectations, disappointment aversion, panel data, BHPS.

JEL Classification: C23, D84, I31.

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1. Introduction

Empirical evidence shows that people do not evaluate outcomes only in absolute terms but also relative to some reference levels. People compare their situation to that of others (external reference levels) and to their own situation in the past or the future (internal reference level). A large empirical literature has investigated the effects of external reference levels on subjective well-being (SWB henceforth), finding that SWB is significantly influenced by relative positions (see e.g. Clark and Oswald, 1996; Clark et al., 2008; Luttmer, 2005; Frey and Stutzer, 2002; Ferrer-i-Carbonell, 2005; McBride, 2001). The study of internal reference levels is more recent and it has predominantly concentrated on the effect of aspirations and the phenomenon of adaptation (see e.g. Frederick and Loewenstein, 1999; Stutzer, 2004; Knight and Gunatilaka, 2012; Schwandt, 2013).

This study contributes to the literature evaluating the effect of expectations on SWB. We study two channels through which expectations can influence SWB: a direct channel, in the form of anticipatory emotions. And an indirect channels, in the form of (internal) reference levels. While the direct effect of expectations has been previously documented (see e.g. Senik, 2008; Frijters et al., 2012), the role of expectations as reference levels has been underexplored to date in survey data. The effect of expectations as reference levels is interesting because is related to the literature on inequality and social comparisons. As suggested by Hirschman, 1973, individuals in a society compare their own situation with the one of the others. In moments of economic growth, people expect their economic situation to improve, but if growth is unequal, the deviations from expectations generate disappointment and social tensions. Theories of disappointment aversion assume that deviations from expectations reduce SWB if the actual achievement is lower than what expected (disappointment), and increase SWB if higher (elation) (see e.g. Bell, 1985; Loomes and Sugden, 1986). Within the behavioural economics literature, Kőszegi and Rabin, 2006, provide a model of reference-dependent preferences where expectations are taken as reference points. In the empirical literature, the role of expectations as reference levels have received little attention to date. To the best of our knowledge, the only evidence on effect of deviations from expectations is provided by Ekici and Koydemir, 2014, who use three waves of British data to study the effect of expectations on SWB. Our study differs from the one of Ekici and Koydemir, 2014, in several aspects: first, we use a much longer panel dataset that runs from 1996 to 2008; second, we use a different measure of SWB comparing the effect of expectations on satisfaction and a separate measure of psychological well-being; third, we study the effect of expectations along the income distribution in order to capture the effect of disappointment for different income quartiles; last, we compare not only the effect of deviations

between expectations and perceived financial situations, but we also analyse the effect of expectations using variations in actual household income.

Our results indicate a strong asymmetry in the effect of expectations as reference levels, with the effect of negative deviations being much stronger than a comparable effect of positive ones. Also, we find that the effect of negative deviations changes according to the position in the income distribution, being about 50 percent higher in absolute terms for the people in the bottom quartile than those in the upper quartile. The asymmetry between negative and positive deviations, which is at the basis of the loss aversion hypothesis, together with the evidence that negative deviations matter more for the poorest, can give a further explanation of the so called Easterlin's paradox (see e.g. Easterlin, 1974, 2001; Clark et al., 2008): despite the economic growth, in developed countries average life satisfaction appears stable over time. If growth is unequal, and inequality has indeed significantly increased in many western countries in the last three decades (see e.g. Gottschalk and Smeeding, 2000), the effect of disappointment experienced by the poorest in the society might counterbalance the positive effect of growth experienced by the rest of the society.

However expectations influence SWB not only indirectly as reference levels, but also directly in the form of anticipatory emotions (see e.g. Loewenstein, 1987; Caplin and Leahy, 2001): current expectations influence SWB for the anticipatory feelings they produce, i.e. savouring if a person expects something good to happen and dread if she expects something bad. Contrary to the effect of aspirations which is assumed, and found, to be negative (see e.g. Stutzer, 2004), expectations can have either a positive or a negative effect on SWB. The positive effect of savouring is used for example to explain the preference for increasing wage profiles (see Loewenstein and Sicherman, 1991), or for postponing a dinner at a fancy restaurants (see Loewenstein and Prelec, 1991). Senik, 2008, uses nine waves of Russian data to explore the effect of expectations about financial situation on life satisfaction. Expecting an improvement in financial situation significantly increase SWB today, while the opposite occurs if expecting a worsening, suggesting a preference of individuals for growth. Frijters et al., 2012 use Chinese cross-sectional data to explore the effect of expectations about household income, finding that compared to having pessimistic expectations, having positive expectations leads to about a 20 percent increase in the happiness level. In this paper we contribute to the literature on expectations as anticipatory emotions providing new evidence from a developed country, UK; also, we check the robustness of our results using an instrumental variable approach. We find that the effect of expectations as anticipatory emotions is robust to the type of SWB measure and empirical specification used, suggesting that expectations play an important role as determinants of individual's well-being. However, we find again a strong asymmetry in the effect of expectations: compared to expecting the situation to remain the same in the year ahead, expecting a worsening

strongly reduce SWB, but the effect is insignificant in the case of positive expectations. For both the direct and indirect effect we thus find that negative conditions matter more than positive ones.

The rest of the paper is organized as follows: section 2 describes the data. Section 3 contains the effect of deviations from expectations on SWB for the total sample and by income quartile. The effect of income changes controlling for previous expectations is explored in Section 4. Section 5 studies expectations as anticipatory emotions and contains robustness checks. Section 6 concludes.

2. Data

The dataset used in this study is the British Household Panel Survey (BHPS), a longitudinal survey conducted yearly since 1991 to 2008 in the United Kingdom, containing about 10000 individuals from 5500 British households. Our main dependent variable, life satisfaction, has been asked since 1996, so for the purposes of this analysis we are using only the last twelve waves, from 1996 to 2008. We use people aged between 22 and 64 to limit the sample to adults in working age. Summary statistics for the total sample are provided in Appendix A1.

In the BHPS life satisfaction is measured on a 7-pt scale (1 not at all satisfied, 7 completely satisfied). For comparison, we also use a second measure of SWB, the 12-Item General Health Questionnaire (GHQ-12). This is a measure of psychological health composed of 12 items each one related to a particular feeling, such as been able to enjoy normal day-to-day activities, been losing confidence in himself, felt constantly under strain (see Appendix, Table A2, for the full GHQ-12 questionnaire). For each of the items the individual is asked how often they have experienced the feeling over the past few weeks using a 4-point Likert scale (not at all, less than usual, more than usual, much more than usual). The answers from the 12 items are used to construct the "caseness GHQ" score, which is calculated counting the number of cases in which the respondent answers "more" or "much more than usual" to negative feelings, and "not at all" or "much less than usual" to positive ones. The total Caseness score ranges from 0 to 12. In the following analyses we reversed the score so that higher values indicate better psychological state, with 12 being the maximum. Throughout the chapter we will refer to it as "GHQ-12 score" for simplicity. The GHQ-12 score has been widely used in psychological and medical research and has been shown to have satisfactory reliability and validity (see e.g. Werneke et al., 2000). In economics previous empirical work has used the GHQ-12 score as a measure of subjective well-being, for example in the context of unemployment (see e.g. Clark, 2003, Gathergood, 2013).

The distributions of the two variables appear to be very different (see Figure 1A in Appendix), and their correlation is not too high (0.51). Life satisfaction is slightly left skewed, with a large proportion of people reporting a life satisfaction between 5 and 6 (the variable has mean 5.14 and median 5), but a very small number (less than 10 per cent) in the highest category. The GHQ-12 score has instead more than half of the sample reporting the highest psychological well-being (12), and very low frequencies in each of the values from 0 to 11. In the sample the GHQ-12 score has mean 10.2 and median 12. The two measures therefore capture different aspects of subjective well-being. Life satisfaction can be considered as a cognitive evaluation of own life, while GHQ-12 score reflects feelings a person experiences and emotional well-being. Throughout the paper we use life satisfaction as main dependent variable, and the GHQ-12 score as comparison.

In order to estimate the effect of expectations and their fulfilment on SWB, we use two questions of the BHPS related to the perceived change in financial situation from the last year, and the expected future change in the next year. Specifically, the questions in the survey are the following: *"Would you say that you yourself are better off or worse off financially than you were a year ago?"*. And for expectations: *"Looking ahead, how do you think you will be financially a year from now, will you be. . ."*. For both questions the possible answers are "better off", "about the same" or "worse off". Overall the individuals in the sample appear quite optimistic relative to their financial situation, with most of them (58 percent) reporting their situation to remain the same, and only a small proportion expecting there to be a worsening in the year ahead (9 percent). Looking at the perceived change in their financial situation compared to the previous year, for about half of the sample (45 percent) the situation has remained unchanged; the proportion of those reporting their situation to being better (31 percent) is higher than those who report their situation to got worse (23 percent).

3. Deviations from expectations and subjective well-being

In order to estimate the effect of deviations between expectations and realizations, we construct the variable "Deviation" computed as the difference between perceived change in financial situation and expectations held in the year before. Both expectations and change in financial situations are ordinal variables of three categories (with 1 corresponding to worse off, 2 to same and 3 to better off; the categories have been reversed compared to the original data). Their differences range from -2 to 2: negative values indicate a worsening in respondents' financial situation compared to what they expected (disappointment), and positive values indicate an improvement (elation). A deviation equal to zero indicates that the financial situation has changed as expected.

Table 1 shows the frequencies of the deviation between expectations and change, and the corresponding average life satisfaction and GHQ-12 score. In about half of the cases respondents can correctly predict the change in their financial situation, but the proportion of cases in which people overestimate their changes is larger than the proportion of those who underestimate them: about 29 percent of the sample has experienced a financial situation worse than what they expected (negative values), and about 18 per cent better than what they expected (positive values). According to both life satisfaction and GHQ-12 score, subjective well-being is lower in the case of negative deviations than positive or no deviations.

Table 1 - Distribution of the variable "Deviation" and average subjective well-being.

	%	Life satisfaction		GHQ-12 score	
		mean	std. dev.	mean	std. dev.
Strong negative deviation (-2)	6.29	4.68	1.3209	8.77	3.7764
Negative deviation (-1)	23.03	4.98	1.2521	9.70	3.3365
No deviation (0)	53.07	5.24	1.1541	10.36	2.8273
Positive deviation (1)	16.14	5.29	1.1139	10.38	2.7389
Strong positive deviation (2)	1.47	5.21	1.0838	10.16	2.9271

We empirically investigate the effect of fulfilment of expectations on subjective well-being with a model that incorporates the deviation between expectations and perceived change in financial situation. The categorical nature of the SWB variables suggests an ordered response model as the best specification. However in order to control for fixed effects such as personality traits, we take advantage of the panel nature of the BHPS and estimate the model through a linear model with fixed effects. As the GHQ-12 score has a high concentration of observations at the limit, in order to check the robustness of our results we also create a binary variable aggregating the values from 0 to 11, that divides the sample into approximately two halves ("Binary GHQ-12 score" in the tables). The model using the binary GHQ-12 score is estimated with a logit model with fixed-effects.

We estimate the following model:

$$(1) \quad SWB_{it} = \alpha_{it} + \beta lny_{it} + \sum_{j=1}^{4} \gamma_j Dev_{it} + \delta X_{it} + \eta_t + f_i + \varepsilon_{it}$$

where SWB_{it} is the subjective well-being of individual i in year t and is measured either by life satisfaction or GHQ-12 score; lny_{it} is the annual net household income, equivalized using the modified-OECD equivalence scale, X_{it} are control variables, η_t are time effects and f_i individuals fixed effects. The variable "Dev" is a categorical variable capturing the deviation between expectations and realizations, so we generate five dummies for each value of deviation, from strong negative (-2) to strong positive (+2). In the estimations we take "no deviation" as the default category. The hypotheses

we test are that a negative (positive) deviation has a negative (positive) effect on subjective well-being compared to no deviation, and that the effect increases in the magnitude of the deviation.

Table 2 contains the results. Column 1 and 2 display the estimates of the benchmark models for life satisfaction and GHQ-12 score respectively without the deviation variable. Columns 3 and 4 add the dummy variables for deviation. Column 5 estimates the same model reported in column 4, but using the binary variable for GHQ-12 score. The benchmark models show the standard results found in the literature on SWB: compared to being married or living with a partner, being divorced, widowed or never married has a significant negative effect on subjective well-being; a U-shaped relationship appears for age (see e.g. Blanchflower and Oswald, 2004, 2008); unemployed report much lower levels of satisfaction and psychological well-being than those in paid employment (see e.g. Winkelmann and Winkelmann, 1998, Clark and Oswald, 1994, Gathergood, 2013); self-reported health has a strong positive effect on subjective well-being (see e.g. Diener et al., 1999, Helliwell, 2003). Finally, subjective well-being decreases with the number of adults in the household while it is almost not affected by the number of children (see e.g. Van Praag et al., 2003). The total effect of number of children on subjective well-being is given by the sum of the two coefficients related to number of children and household size. Summing up the two coefficients the total effect is almost zero.

Household income appears significant and positive only for life satisfaction (column 1), while it is insignificant for psychological well-being (column 2). This finding suggests that income affects the cognitive evaluations of own life (such as life satisfaction), but not the components of well-being more related to feeling and emotions (such as the GHQ-12 score). This result is found also by Kahneman and Deaton, 2010, who use the data collected by the Gallup Organization in 2008 and 2009 to analyse the different correlates of satisfaction versus emotional well-being, finding that income significantly influences life satisfaction but not emotional well-being.

In terms of the role of expectations as reference points, the results indicate that a deviation between expectations and change in financial situation has a significant impact on subjective well-being. When including the variable related to deviations from expectations household income becomes insignificant even for life satisfaction. A strong negative effect emerges in the case of negative deviations: compared to a situation where expectations are fulfilled, experiencing a change in financial situation worse than that which previously expected significantly reduces both life satisfaction and psychological well-being, and the effect is stronger the higher the deviation. This result is robust to the type of subjective well-being measure we use. A significant effect is found also in the case of positive deviations compared to no deviation. However, the effect is much bigger in the case of negative rather than positive deviations. A strong negative deviation leads to a reduction in

life satisfaction that is almost three times the increase generated by a strong positive. This result suggests an asymmetry in the effect of expectations as reference points: individuals' subjective well-being is much more strongly affected by disappointment than elation. The evidence that losses matter more than gains is at the basis of the hypothesis that individuals are loss averse. Our results thus fit better with the gain-loss utility function used by Kőszegi and Rabin, 2006, which assumes loss aversion rather than the models on disappointment aversion that assume no asymmetry between negative and positive deviations (see e.g. Loomes and Sugden, 1986).[1]

[1] However loss aversion assumes that an income loss of a certain amount matters more than an equivalent gain of the *same amount*, so that an income drop of x matters more than an equivalent income increase of x. With our data we can only compare deviations between expectations and realizations in a qualitative way. Future research should try to capture information on how much individuals expect their financial situation to change in order to compare the effect of positive and negative deviations of equivalent magnitudes and reach a better understating of the phenomenon of loss aversion.

Table 2 – Effect of deviation from expectations on life satisfaction and GHQ-12 score.

	(1) Life sat. (benchmark)	(2) GHQ-12 score (benchmark)	(3) Life sat.	(4) GHQ-12 score	(5) Binary GHQ-12 score
log hh income	0.036***	0.019	0.019	-0.033	-0.056*
	(0.0123)	(0.0316)	(0.0136)	(0.0334)	(0.0325)
Deviation (Ref.: no deviation)			-	-	-
strong negative deviation			-0.307***	-1.000***	-0.686***
			(0.0211)	(0.0625)	(0.0531)
negative deviation			-0.117***	-0.415***	-0.298***
			(0.0111)	(0.0317)	(0.0305)
positive deviation			0.045***	0.081**	0.015
			(0.0116)	(0.0319)	(0.0342)
strong positive deviation			0.106***	0.186*	0.010
			(0.0329)	(0.0995)	(0.0985)
age	-0.065***	-0.115*	-0.080***	-0.153**	-0.041
	(0.0247)	(0.0631)	(0.0257)	(0.0721)	(0.0585)
age^2	0.001***	0.001***	0.000***	0.001***	0.000*
	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0002)
health	0.231***	0.822***	0.217***	0.800***	0.490***
	(0.0079)	(0.0228)	(0.0085)	(0.0249)	(0.0193)
Job status (Ref.: employed)	-	-	-	-	-
self-employed	0.005	-0.034	0.007	-0.052	-0.101
	(0.0244)	(0.0633)	(0.0267)	(0.0688)	(0.0678)
unemployed	-0.306***	-1.121***	-0.208***	-0.842***	-0.500***
	(0.0362)	(0.0944)	(0.0427)	(0.1081)	(0.0900)
other	-0.063***	-0.417***	-0.028	-0.349***	-0.218***
	(0.0207)	(0.0562)	(0.0223)	(0.0624)	(0.0498)
Marital status (Ref.: married)	-	-	-	-	-
widowed	-0.306***	-1.249***	-0.347***	-1.177***	-0.646***
	(0.0885)	(0.2473)	(0.1005)	(0.2890)	(0.2083)
divorced	-0.320***	-0.655***	-0.314***	-0.608***	-0.472***
	(0.0412)	(0.1089)	(0.0448)	(0.1214)	(0.0885)
never married	-0.207***	-0.191**	-0.211***	-0.174*	-0.007
	(0.0299)	(0.0820)	(0.0338)	(0.0950)	(0.0842)
# children	0.040***	0.085***	0.038***	0.068**	0.034
	(0.0107)	(0.0299)	(0.0116)	(0.0327)	(0.0285)
hh size	-0.045***	-0.045*	-0.053***	-0.058**	-0.072***
	(0.0090)	(0.0245)	(0.0101)	(0.0280)	(0.0256)
constant	5.702***	9.210***	7.111***	11.916***	
	(0.8690)	(2.2245)	(1.1962)	(3.3843)	
Year dummies	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes
Individual fixed-effects	Yes	Yes	Yes	Yes	Yes
N	57278	62606	46508	51345	39311
R-sq overall	0.08	0.12	0.03	0.09	
Log likelihood	-65570.72	-138860.07	-51535.90	-113138.93	-15877.95

*Notes: Dependent variable displayed at the top. Columns 1 to 4 contain the estimates from linear models with fixed-effects. Column 5 contains the estimates of a logistic model with fixed-effects. Time and regional dummies included. ***p<0.001; **p<0.05; *p<0.10. Std. err. in parenthesis.*

One possibility is that the effect of a deviation between an individual's financial situation and expectations varies according to the income level. We thus estimate the same model of column 3,

Table 2, by income quartile. Table 3 reports the results of the linear model with fixed-effects, using life satisfaction as the dependent variable. The first four columns estimate the effect of deviations separately for each quartile, while Columns 5 adds an interaction term between the variable deviation and a dummy for being in the bottom quartiles of the income distribution (quartile 1 or 2). The effect of a deviation between expectations and change in financial situation differs according to the position in the income distribution. The negative effect of negative deviations is much stronger for individuals in the lowest quartile compared to those in the highest quartile. In the case of strong negative deviations the effect on life satisfaction for the individuals in the bottom quartile is about 50 percent larger in absolute terms than that for the individuals in the upper quartile. Interacting the deviation variable with a dummy for being in quartile 1 or 2 (column 5), the interaction term is negative and significant in the case of strong negative deviations. This result confirms that the effect of negative deviations is significantly stronger for the poorest individuals than the richest. Replicating the same analyses using the GHQ-12 score rather than life satisfaction the results are even stronger, with negative deviations reducing emotional well-being of the poorest of an amount that is twice as large as corresponding negative deviations for the richest (see Table A3 in Appendix), and the interaction terms is significant for both negative and strong negative deviations. Along the entire income distribution however the effect of negative deviations is much bigger than that of positive ones, confirming that disappointment affects individuals' SWB more than elation.

Table 3 – Effect of deviation on life satisfaction by income quartiles.

	(1) Q1	(2) Q2	(3) Q3	(4) Q4	(5) Interaction
Deviation (Ref.: no deviation)	-	-	-	-	
strong negative deviation	-0.370***	-0.366***	-0.179***	-0.246***	
	(0.0585)	(0.0474)	(0.0423)	(0.0399)	
negative deviation	-0.151***	-0.104***	-0.074***	-0.119***	
	(0.0320)	(0.0252)	(0.0225)	(0.0207)	
positive deviation	0.090**	0.021	0.083***	-0.007	
	(0.0389)	(0.0286)	(0.0238)	(0.0190)	
strong positive deviation	0.054	0.232***	0.140*	0.046	
	(0.1099)	(0.0853)	(0.0763)	(0.0499)	
Log hh income	0.016	0.024	0.016	0.011	0.012
	(0.0329)	(0.1178)	(0.1069)	(0.0421)	(0.0155)
Deviation (Ref.: no deviation)					-
strong negative deviation					-0.260***
					(0.0269)
negative deviation					-0.106***
					(0.0141)
positive deviation					0.038***
					(0.0138)
strong positive deviation					0.108***
					(0.0389)
Bottom quartiles					-0.003
					(0.0173)
Deviation*Bottom quartiles (Ref.: no deviation)					-
strong negative deviation*bottom quartiles					-0.100**
					(0.0414)
negative deviation*bottom quartiles					-0.024
					(0.0221)
positive deviation*bottom quartiles					0.019
					(0.0245)
strong positive deviation*bottom quartiles					-0.001
					(0.0689)
Additional controls	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes
N	9232	11012	12446	13818	46508
R-sq overall	0.01	0.05	0.01	0.05	0.03

*Notes: Dependent variable: life satisfaction. Linear model with fixed-effects. Additional controls: age, age squared, marital status, job status, health status, # children, hh size. ***p<0.001; **p<0.05; *p<0.10. Std. err. in parenthesis. Bottom quartiles in Column 5 is a dummy taking values 1 if the individual is in quartile 1 or 2.*

3.1. Expectations, perceptions and realizations

One limitation of using the perceived change in financial situation to estimate the effect of deviations from expectations is that when answering this question individuals may already take into account their previous expectations to evaluate their financial situation. Also, the analyses so far showed that compared to situations where expectations are fulfilled (i.e. no deviation) a negative deviation reduces subjective well-being. These results are independent from the fact that the financial situation has changed in a positive or a negative way. Indeed, the variable deviation is equal to zero both in the case of a worsening and an improvement in the financial situation, if previous expectations

were correct. In this section we explore the relationship between expectations, perceived financial situation and actual income change. Moreover, we analyse the different effect of an income drop on SWB according to the expectations held in the previous period.

The mean (median) household annual income change in the UK over the period 1996-2008 has been of about 1.5 percent (1.2 percent). Figure 2A in the Appendix shows the relationship between the median change in actual household income from *t-1* to *t* and the change in financial situation as perceived by the respondent over time.[2] For those reporting an improvement in their financial situation, the median income change is above zero, ranging from about four percent in the first waves and declining to about one percent in the later waves. Those reporting their situation to remain the same experience a median income change that varies around zero, while those reporting a deterioration always experience a negative income change. The perceived change in financial situation seems to match the actual change in household income remarkably well.

Figure 3A in Appendix shows the pattern of income change over time according to the expectations held in the year before. The individuals who expect a deterioration in their financial situation experience on average a negative income change over time. Those expecting an improvement experience on average a positive income change in the first years of the panel, while in 2006 and 2007 their average income change is almost zero and similar to the values of those expecting their financial situation to remain the same. The evidence that the household income of those who were expecting an improvement is increasing at a smaller magnitude in the last waves, from 2003, compared to the first period of the survey is likely to be due to the effect of the economic crisis that has made some people less able to fulfil their expectations.

In order to evaluate the role of expectations as reference points using actual income change, in Table 4 we show the effect of a decrease[3] in income from year *t-1* to *t* on life satisfaction, interacting the income change with the expectations held in *t-1*. We consider three thresholds of income change, namely a decrease equal or higher than 5, 10 and 15 percent and we estimate the following model for each of the three threshold:

$$(2) \quad SWB_{it} = \alpha_{it} + \beta y\_decr_{it} + \sum_{j=1}^{2} \gamma_j EXP_{it-1} + \sum_{j=1}^{2} \delta_j (EXP_{it-1} Xy\_decr_{it}) + \vartheta X_{it} + \eta_t + f_i + \varepsilon_{it}$$

where SWB_{it} is either life satisfaction or GHQ-12 score; y_decr_{it} is a dummy taking value 1 if the individual has experienced a negative income change from *t-1* to *t* of at least 5, 10 or 15 percent;

[2] The graph looks similar to Das and van Soest, 1999, for Netherlands, though we have only three categories of perceived change in financial situation rather than five.

[3] We also considered the effect of an increase in income, but the results were overall not significant. Results available upon request.

EXP_{it-1} is a categorical variable capturing the individuals' expectations in *t-1* and takes three values (better off, about the same, worse off, with expectation of stability taken as the omitted category in the analyses); $EXP_{it-1}Xy\_decr_{it}$ is the interaction term between the negative income change from *t-1* to *t* and expectations held in *t-1* about financial situation in *t*. Table 4 displays the results for life satisfaction.

The coefficient of the interaction between an income decrease and positive expectations in t-1 is significant in most of the specifications: experiencing a decrease in income not previously expected significantly reduces life satisfaction, and the results are robust to the threshold used. In contrast, a decrease in income of a magnitude greater or equal to 10 percent and 15 percent does not have any effect on life satisfaction if it was expected (interaction between decrease in income and negative expectations). Only when using a 5 percent threshold is the effect of a decrease in income significant even when the individuals had negative expectations in the year before compared to expecting stability[4]. Summing up the three coefficients of the interaction term and the two variables for expectations and income change, life satisfaction is reduced by 0.01, 0.03 and 0.02 points in the case of a 5, 10 and 15 percent decrease respectively. Replicating the analyses using the GHQ-12 score instead of life satisfaction, we find that a negative income change of 10 percent, and of both 5 and 10 percent when the binary measure of GHQ-12 score is used, significantly decrease psychological well-being when the individual held positive expectations, while no effect is found when the worsening in financial situation was expected.

In the next section we explore the direct effect of expectations as anticipatory emotions.

[4] Replicating the analyses by income quartile, this result appears only for the first quartile of the income distribution. Results available upon request.

Table 4 – Effect of a decrease in income on subjective well-being controlling for previous expectations

	Life satisfaction			GHQ-12 score			Binary GHQ-12 score		
	5% decrease	10% decrease	15% decrease	5% decrease	10% decrease	15% decrease	5% decrease	10% decrease	15% decrease
Income decrease >=5%	0.022**			-0.038			-0.043		
	(0.0113)			(0.0307)			(0.0331)		
Income decrease >=10%		0.005			-0.049			-0.042	
		(0.0127)			(0.0345)			(0.0362)	
Income decrease >=15%			0.013			-0.080**			-0.074*
			(0.0140)			(0.0381)			(0.0400)
Expectations in t-1 (Ref.: exp. of stability)	-	-	-	-	-	-	-	-	-
Expectations of deterioration in t-1	0.006	-0.019	-0.017	-0.118*	-0.106*	-0.096	-0.138**	-0.133**	-0.129**
	(0.0216)	(0.0204)	(0.0197)	(0.0645)	(0.0603)	(0.0582)	(0.0593)	(0.0558)	(0.0539)
Expectations of improvement in t-1	0.035***	0.027**	0.025**	0.058	0.062*	0.052	0.058	0.057*	0.047
	(0.0124)	(0.0119)	(0.0116)	(0.0361)	(0.0348)	(0.0338)	(0.0355)	(0.0341)	(0.0332)
Income decrease x Exp. in t-1 (Ref.: exp. of stability)	-	-	-	-	-	-	-	-	-
Income decrease x Exp. of deterioration in t-1	-0.089***	-0.029	-0.047	0.013	-0.019	-0.051	-0.046	-0.078	-0.102
	(0.0338)	(0.0346)	(0.0377)	(0.0925)	(0.0965)	(0.1012)	(0.0901)	(0.0960)	(0.1029)
Income decrease x Exp. of improvement in t-1	-0.069***	-0.058***	-0.060**	-0.081	-0.113*	-0.091	-0.097*	-0.115*	-0.094
	(0.0200)	(0.0222)	(0.0242)	(0.0566)	(0.0620)	(0.0677)	(0.0550)	(0.0594)	(0.0645)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	45314	45309	45306	50020	50015	50012	38171	38165	38161
R-sq overall	0.03	0.03	0.03	0.08	0.08	0.08			
Log likelihood	-50183.26	-50183.80	-50182.28	-110228.59	-110210.99	-110203.36	-15471.57	-15468.60	-15465.74

*Notes: Linear model with fixed-effects (columns 1 to 6). Logit model with fixed-effects (columns 7 to 9). Additional controls: age, age squared, marital status, job status, health status, # children, hh size. Time and regional dummies included. ***p<0.001; **p<0.05; *p<0.10. Std. err. in parenthesis.*

4. Expectations as anticipatory emotions

As described in the introduction, theories of anticipatory emotions predict that expectations have an impact not only through their fulfilment but also in the present in the form of savouring or dread for the anticipation of what people expect to happen in the future. We estimate the model:

$$(3) \qquad SWB_{it} = \alpha_{it} + \beta ln_{it} + \sum_{j=1}^{2} \gamma_j EXP_{it} + \delta X_{it} + \eta_t + f_i + \varepsilon_{it}$$

where EXP_{it} is a categorical variable capturing the individuals' expectations and takes three values (better off, about the same, worse off). In the following estimations we take the expectation of stability as the omitted category. The other variables are the same as those used in the previous section. We test the hypothesis that, compared to expecting the financial situation to remain the same, expecting an improvement increases subjective well-being while expecting a worsening decreases it.

The results are displayed in Table 5. Similarly to the results we found in the previous section, the results show a strong asymmetry in the effect of current expectations on SWB. Compared to expecting the situation to remain the same, expecting a worsening in financial situation strongly reduce SWB, and the results are robust to the type of SWB measure we use. The negative effect of expectations as anticipatory emotions when a worsening is expected has also been found in the previous empirical literature (see e.g. Senik, 2008). In contrast, we do not find any positive effect of expecting an improvement compared to expecting the situation to remain the same. Instead, the coefficient for positive expectations is even negative when the binary variable for the GHQ-12 score is used (column 3). This however does not have to be interpreted as a negative effect of positive expectations, but only compared to the default category of expecting the situation to remain the same. Indeed, if we use expectations of a worsening as the reference category, we do find that positive expectations significantly increase subjective well-being compared to having pessimistic expectations, and the result holds for all the measures of subjective well-being. These results are displayed in Appendix A4. Including both current expectations and deviations from previous expectations (column 4) all the results are confirmed.

Table 5 – Effect of current expectations on subjective well-being

	(1) Life sat.	(2) GHQ-12 score	(3) Binary GHQ-12 score	(4) Life sat.
log hh income	0.033***	0.010	-0.064**	0.021
	(0.0124)	(0.0309)	(0.0285)	(0.0137)
Expectations in t (Ref.: exp. of stability)	-	-	-	-
expectations of deterioration	-0.095***	-0.525***	-0.437***	-0.075***
	(0.0157)	(0.0454)	(0.0412)	(0.0167)
expectations of improvement	0.005	-0.031	-0.055**	0.006
	(0.0104)	(0.0295)	(0.0275)	(0.0113)
strong negative deviation				-0.304***
				(0.0214)
negative deviation				-0.109***
				(0.0113)
positive deviation				0.048***
				(0.0118)
strong positive deviation				0.100***
				(0.0334)
Additional controls	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Individual fixed-effects	Yes	Yes	Yes	Yes
N	55240	60408	47042	45133
R-sq overall	0.08	0.12		0.05
Log likelihood	-62622	-133225	-19224	-49559

*Notes: Dependent variable displayed at the top of each column. Additional controls: age, age squared, marital status, job status, health status, # children, hh size. Time and regional dummies included. ***p<0.001; **p<0.05; *p<0.10. Std. err. in parenthesis.*

The evidence that expecting an improvement does not have a larger positive effect than expecting the situation to remain the same is in contrast to what predicted by the theories of anticipatory emotions and to what was found in the previous literature, in particular in Senik, 2008, which to the best of our knowledge is the only work on expectations and life satisfaction that uses a panel dataset as we do.[1] Our finding indicate that the individuals in a developed country such as the UK have a preference for progress compared to decline, but not for progress per se. The finding that in the context of a developed country with a relatively low and stable economic growth people do not show a preference for improvement can be linked to the evidence of a weak relationship between growth and subjective well-being in western countries. The Easterlin's paradox holds predominantly for developed countries, while economic growth seems to have a significant positive effect on subjective well-being in low-income countries (see e.g. Proto and Rustichini, 2013). The different

[1] Ekici and Koydemir, 2014, uses three waves of British data to study the relationship between expectations and SWB, but they use expectations as a quantitative variable assuming a linear relationship between expectations and satisfaction.

effect of expectations as anticipatory emotions at different stages of economic development has still not been explored and it is a potential area for future research.

4.1. Instrumental variable approach

In this last section we address the potential problem of endogeneity. Despite the inclusion of fixed-effects that can control for unobservable characteristics such as personality traits, there could still be a source of endogeneity, for example if individuals more satisfied with their life or with higher psychological well-being tend to be more positive about their future. We therefore check the robustness of the results using an instrumental variable regression. We use two instruments for expectations. First, we use reference income in the next year, constructed regressing individual income on age, gender, level of education, industry, occupation and region; this is also the instrument used by Senik, 2008. The second instrument we use is whether the individual expects to receive work-related training. This can be seen as a measure of the opportunity of advancement an individual has in his job, and it can thus affect an individual's expectations related to future earnings and career. It is thus reasonable to assume that expecting job-relating training is correlated with expectations about future financial situations but not with current life satisfaction. However the use of this instrument limits the sample to the individuals in the job market. The instrumental variable analyses are thus performed on a reduced sample compared to the previous estimates. The results of the reduced model for the sample of working individuals are similar to those we found for the total sample (see Table A5 in Appendix).

Table 6 contains the results of the instrumental variable models. The effect of expectations is estimated separately for negative expectations (columns 1 and 2) and positive ones (columns 3 and 4). The instruments appear valid and not weak for positive expectations, while they are slightly weak for negative ones. Reference income in the next year doesn't affect the probability of holding positive expectations but significantly reduces that of negative expectations. Expecting work-related training has a significant effect on both positive and negative expectations. The results from the instrumental variable model confirm the significant effect of expectations as anticipatory emotions on SWB, and the results are robust to the type of dependent variable we use.[2] Also, analysing separately positive

[2] The fact that the coefficients of the instrumental variable estimations appear bigger in size than the corresponding coefficients of the reduced models could be due to the fact that the endogenous variable (positive and negative expectations) is a binary variable. Using the 2SLS procedures with a binary endogenous regressor leads to consistent estimations but with much larger coefficients (see e.g. Wooldridge, 2010, page 939). A

and negative expectations we now find a significant positive effect of expecting an improvement. However the effect is about the half of that of expecting a worsening, reinforcing the evidence that negative conditions matter more than positive ones.

Table 6 – Effect of expectations instrumented.

	(1)	(2)	(3)	(4)
	Negative expectations		Positive expectations	
	Life sat.	GHQ-12 score	Life sat.	GHQ-12 score
log hh income	0.062***	0.015	0.081***	0.096
	(0.0242)	(0.0591)	(0.0283)	(0.0713)
expectations of deterioration	-1.872***	-6.186***		
	(0.7063)	(2.2760)		
expectations of improvement			0.965***	3.217***
			(0.3637)	(1.0704)
Year dummies	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Individual fixed-effects	Yes	Yes	Yes	Yes
Instruments:				
Reference income in t+1	-.019*	-.021**	.014	.016
Expect work-related training in t+1	-.022***	-.020***	.044***	.043***
N	22811	26061	22811	26061
F-stat	11.87	11.47	15.48	17.97
Hansen J-stat (p-value)	0.99	0.30	0.53	0.87
Endogen. test (p-value)	0.00	0.00	0.00	0.00

*Notes: Instrumental variable regression (II stage displayed). Dependent variable: life satisfaction and GHQ-12 score.. Additional controls: age, age squared, marital status, job status, health status, # children, hh size. Time and regional dummies included. ***p<0.001; **p<0.05; *p<0.10. Std. err. in parenthesis.*

5. Conclusions

This work empirically investigated the effect of expectations on subjective well-being. The theoretical literature predicts that expectations influence utility in two ways: directly, in the present, as anticipatory emotions, and indirectly as deviations between expectations and future achievements. We empirically studied both these effects. The data source we used is the BHPS which contains questions on expectations and perceived change in financial situation. The dataset has the advantage of being a panel survey, allowing us to estimate the effect of expectations and their fulfilment over time, controlling for fixed characteristics such as personality traits.

The results showed a strong asymmetry in the effect of expectations on SWB both as anticipatory emotions and reference levels. Experiencing a financial situation worse than that which

second possible reason is again suggested in Wooldridge, 2010, in the fact that the dependent variable is a count variable, i.e. it takes only nonnegative integer values.

was previously expected leads to a much lower subjective well-being than if expectations were fulfilled, and the greater the negative deviation, the higher the negative effect in absolute terms. The effect is robust to the type of measure we used as proxy for subjective well-being. The effect of positive deviations is instead less strong and sometimes insignificant. Similarly, expecting a worsening in the financial situation has a much larger and significant effect on SWB than expecting an improvement. Also, positive expectations have a positive effect on both life satisfaction and psychological well-being only compared to negative expectations, but not compared to expecting the situation to remain the same. This findings suggests that in a developed country like the UK people have a preference for growth compared to decline rather for growth itself.

Analysing the indirect effect of expectations by income quartile, we do find that the effect of disappointment is about 50 percent larger in absolute terms for the individual in the bottom quartile than those in the upper quartile of the income distribution. The evidence that the poorest in the society suffers more for negative deviations than the richest can help to explain why in a context of economic growth characterized by increasing inequality the average life satisfaction does not increase over time. If economic growth is unequal and some individuals are left behind, their disappointment will counterbalance the positive effect of growth experienced by the rest of the society.

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APPENDIX

A 1 – Descriptive Statistics

Variable	N	Mean	Std. Dev.
Age	69782	41.45	11.73
Annual hh income (ln)	69725	10.07	0.60
Annual ind. income (ln)	68817	8.79	1.05
Annual ind. reference income (ln)	51176	9.03	0.44
No. years of schooling	64950	11.21	1.14
Life satisfaction	63488	5.14	1.21
GHQ-12 score	68863	10.06	3.05
Health status	64034	3.87	0.91
Household size	69782	2.93	1.27
No. children	69782	0.72	1.00
Gender (% males)	69782	48.3	0.50
	N	**Perc.**	**Cum.**
Highest educational qualification			
No qualification	9208	13.38	13.38
Less than GCSE/0 level	5452	7.92	21.3
GCSE/0 level	11923	17.33	38.63
A level	7957	11.56	50.19
Higher vocational degree	22302	32.41	82.6
First or higher degree	11972	17.4	100
Job status			
In paid empoloyment	46898	67.22	67.22
Self-employed	6470	9.27	76.49
Unemployed	2170	3.11	79.6
Other	14232	20.4	100
Marital status			
Married/living as a couple	53097	76.11	76.11
Widowed	1188	1.7	77.81
Separated/divorced	5665	8.12	85.93
Never married	9814	14.07	100
Expectations about fin. situation in t+1			
Worse off	6091	9.05	9.05
About the same	39103	58.08	67.13
Improve	22129	32.87	100
Change in fin. situation from t-1			
Worse off	16165	23.24	23.24
About the same	31637	45.49	68.74
Improve	21740	31.26	100

A 2 – GHQ-12 questionnaire

Here are some questions regarding the way you have been feeling over the last few weeks. For each question please tick the box next to the answer that best describes the way you have felt.
Have you recently....

a) been able to concentrate on whatever you're doing?
with the responses:
1=better than usual; 2=same as usual; 3=worse than usual; 4=much worse than usual

b) lost much sleep over worry?
e) felt constantly under strain ?
f) felt you couldn't overcome your difficulties ?
i) been feeling unhappy or depressed ?
j) been losing confidence in yourself ?
k) been thinking of yourself as a worthless person ?
with the responses:
1=not at all; 2=no more than usual; 3=rather more than usual; 4=much more than usual

c) felt that you were playing a useful part in things?
d) felt capable of making decisions about things?
g) been able to enjoy your normal day-to-day activities ?
h) been able to face up to problems ?
l) been feeling reasonably happy, all things considered ?
with the responses:
1=more so than usual; 2=about same as usual; 3=less so than usual; 4=much less than usual

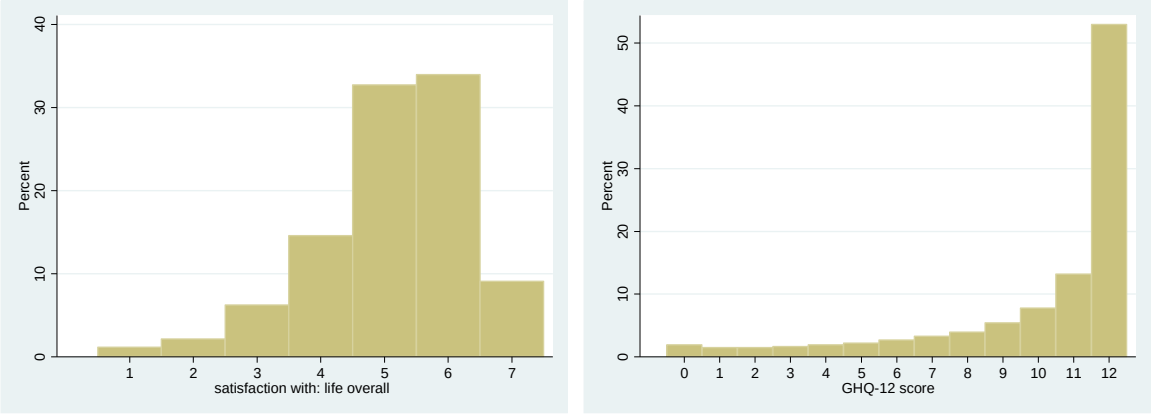

Figure 1 – Distribution of Life satisfaction and GHQ-12 score. Source: BHPS, waves 1996-2008

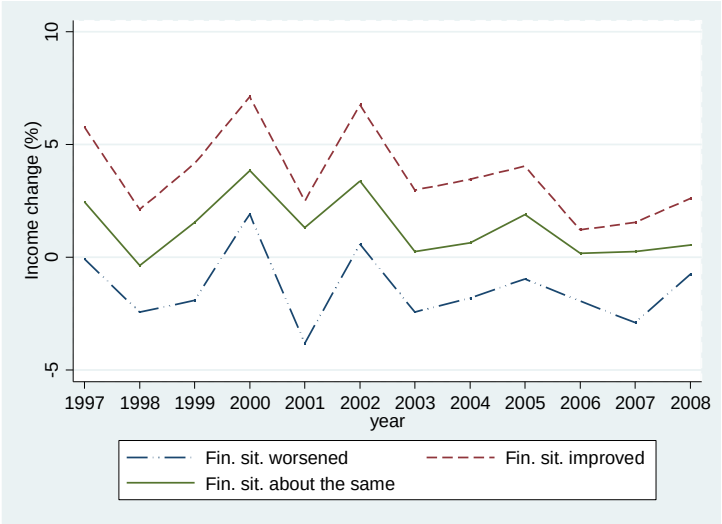

Figure 2 - Median change in household income from t-1 to t and perceived change in financial situation in t.

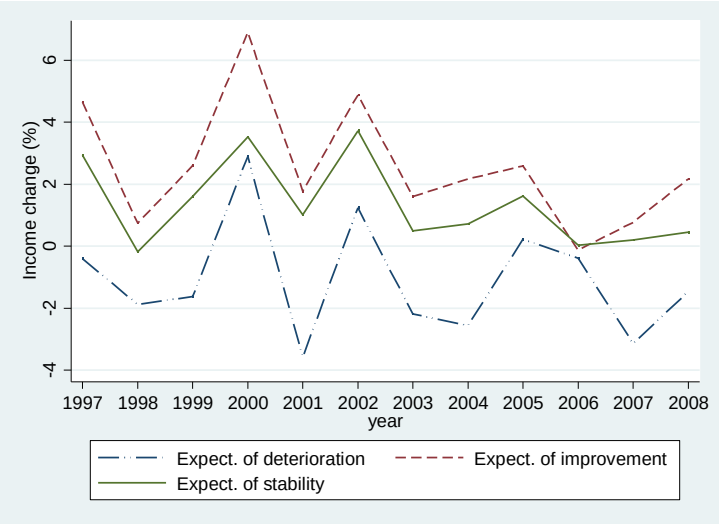

Figure 3 – Median change in household income from t-1 to t and expectations in t-1.

A 3 – Effect of deviation on GHQ-12 score by income quartile

	(1) Q1	(2) Q2	(3) Q3	(4) Q4	(5) Interaction
Deviation (Ref.: no deviation)	-	-	-	-	
strong negative deviation	-1.433***	-1.252***	-0.622***	-0.784***	
	(0.1706)	(0.1557)	(0.1234)	(0.1188)	
negative deviation	-0.672***	-0.467***	-0.214***	-0.337***	
	(0.0833)	(0.0733)	(0.0642)	(0.0619)	
positive deviation	0.064	0.037	0.150**	0.028	
	(0.0936)	(0.0787)	(0.0690)	(0.0578)	
strong positive deviation	0.323	0.271	0.476**	-0.020	
	(0.3194)	(0.2526)	(0.2158)	(0.1735)	
Log hh income	0.169**	-0.845**	0.171	-0.244**	-0.018
	(0.0729)	(0.3306)	(0.3010)	(0.1240)	(0.0381)
Deviation (Ref.: no deviation)					-
strong negative deviation					-0.781***
					(0.0795)
negative deviation					-0.281***
					(0.0412)
positive deviation					0.075*
					(0.0401)
strong positive deviation					0.159
					(0.1274)
Bottom quartiles					0.137***
					(0.0468)
Deviation*Bottom quartiles (Ref.: no deviation)					-
strong negative deviation*bottom quartiles					-0.475***
					(0.1232)
negative deviation*bottom quartiles					-0.299***
					(0.0632)
positive deviation*bottom quartiles					0.027
					(0.0655)
strong positive deviation*bottom quartiles					0.094
					(0.2024)
Additional controls	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes
N	10271	12214	13738	15122	51345
R-sq overall	0.09	0.09	0.02	0.02	0.09

*Notes: Dependent variable: GHQ score. Linear model with fixed-effects. Additional controls: age, age squared, marital status, job status, health status, # children, hh size. Time and regional dummies included. ***p<0.001; **p<0.05; *p<0.10. Std. err. in parenthesis. Bottom quartiles in Column 5 is a dummy taking values 1 if the individual is in quartile 1 or 2.*

A 4 - Effect of current expectations using expectations of worsening as reference category.

	(1) Life sat.	(2) GHQ-12 score	(3) Binary GHQ-12 score	(4) Life sat.
log hh income	0.033***	0.010	-0.064**	0.021
	(0.0124)	(0.0309)	(0.0285)	(0.0137)
Expectations in t (Ref.: exp. of deterioration)	-	-	-	-
expectations of stability	0.095***	0.525***	0.437***	0.075***
	(0.0157)	(0.0454)	(0.0412)	(0.0167)
expectations of improvement	0.099***	0.494***	0.381***	0.081***
	(0.0172)	(0.0500)	(0.0448)	(0.0185)
strong negative deviation				-0.304***
				(0.0214)
negative deviation				-0.109***
				(0.0113)
positive deviation				0.048***
				(0.0118)
strong positive deviation				0.100***
				(0.0334)
Additional controls	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes	Yes
Individual fixed-effects	Yes	Yes	Yes	Yes
N	55240	60408	47042	45133
R-sq overall	0.08	0.12		0.05
Log likelihood	-62622.29	-133225.62	-19224.60	-49559.18

*Notes: Dependent variable displayed at the top of each column. Additional controls: age, age squared, marital status, job status, health status, # children, hh size. Time and regional dummies included. ***p<0.001; **p<0.05; *p<0.10. Std. err. in parenthesis.*

A 5 – Effect of current expectations on the reduced sample of individuals in labour market.

	(1) Life satisfaction	(2) GHQ-12 score
log hh income	0.041***	0.006
	(0.0149)	(0.0369)
Expectations in t (Ref.: exp. of stability)	-	-
expectations of deterioration	-0.067***	-0.460***
	(0.0169)	(0.0520)
expectations of improvement	0.013	-0.014
	(0.0111)	(0.0320)
Year dummies	Yes	Yes
Regional dummies	Yes	Yes
Individual fixed-effects	Yes	Yes
N	42547	46580
R-sq overall	0.08	0.04

*Notes: Dependent variable displayed at the top of each column. Time and regional dummies included. ***p<0.001; **p<0.05; *p<0.10. Std. err. in parenthesis.*