Zukunftsangst! Fear of (and hope for) the future and its impact on life satisfaction.

Piper, Alan T.

Europa-Universität Flensburg

October 2014

Zukunftsangst! Fear of (and hope for) the future and its impact on life satisfaction.

Alan Piper*

Europa-Universität Flensburg

Internationales Institut für Management und ökonomische Bildung

Munketoft 3B, 24937 Flensburg, Deutschland

Abstract: The thoughts that an individual has about the future contribute substantially to their life satisfaction in a positive or negative direction. This is a result found via five different methods, some of which control for personality and disposition and the potential endogeneity of thoughts and life satisfaction. The reduction in life satisfaction experienced by individuals who report being pessimistic is greater than that for well-known objective statuses like unemployment. Including individuals' thoughts about the future substantially increases the explanatory power of standard life satisfaction models. Life satisfaction is made up of objective and subjective factors and methods exist to account for their potential endogeneity to enhance our understanding of well-being. This investigation is an example of such an analysis combining a subjective factor, thoughts about the future (treated as endogenous), with more standard objective factors to aid understanding regarding well-being.

Zukunftsangst! Fear of the future and its impact on life satisfaction.

"The mind that is anxious about the future is miserable" Seneca

"He who fears he will suffer already suffers what he shall fear" Montaigne

1. Introduction

The quotes above provide a succinct summary of this investigation. Using German panel data evidence is presented that people who are pessimistic about the future, compared with people who are quite optimistic, are much less satisfied with life. The size of the effect is substantial, with the impact being approximately a loss of one happiness point on the German Socioeconomic Panel's (SOEP) eleven point scale. This represents a larger impact than that of unemployment or divorce. Conversely, there is a small life satisfaction premium associated with feeling optimistic about the future compared to being merely quite optimistic. Moreover, including a measure of an individual's fear of the future substantially increases the explanatory power of well-being equations.

An inspiration for this research is the finding that the impact on happiness from fearing crime is often greater than actually being a crime victim. In an analysis of the well-being of people who live in capital cities and those who do not, Piper (2014a) shows that individuals from Athens, Berlin and Vienna have a greater fear of being a victim of burglary or violence and, furthermore, it seems that this is the reason for their lower happiness, on average, than that enjoyed by their non-capital city living compatriots.[1]. Conversely, having been a victim of crime has no statistically significant impact on happiness, suggesting that fears play a substantial role for well-being. Within the economics of happiness literature this is largely untested. Thus the contribution of this paper is to examine the role of a fear of the future for life satisfaction, and to demonstrate that inclusion of such fears substantially increases the explanatory powers of the typical equations estimated in well-being research. A further contribution is th use of a model which can incorporate potentially endogenous variables, something that should be more widely considered within the well-being literature.

---

[1] This study employed the European Social Survey (ESS) where the well-being question asked directly about individual happiness ('how happy are you'). Throughout this investigation, I follow much of the economic literature, and use well-being, life satisfaction and happiness interchangeably.

Another inspiration for this research comes from recent work which attempts to understand the effect of an individual's past, including family background and teacher assessments of the individual when a child, on current well-being. Frijters et al. (2014) and Layard et al. (forthcoming) are two examples from within the 'economics of happiness' literature that investigate this and find that any direct effects are minor, though their inclusion increases the R^2 value. Indirect effects are certainly possible, though challenging to isolate. The childhoods of individuals, including parental marital status, may have an influence on their own adult marital status, and hence affect their life satisfaction. This is certainly plausible, but hard to assess given most current data. Rather than investigating the effect of the past, this study takes the different angle of trying to examine the impact of the future on current life satisfaction. One way to do this is to consider what individuals think about the future: are they optimistic or pessimistic about it? And then to ask what that might mean for wellbeing. A dynamic panel assessment of life satisfaction indicates that it is largely contemporaneous (Piper 2014b), which is suggestive that the thoughts of an individual about their future affect their well-being *now*. Becchetti et al. (2012) investigate life satisfaction via eleven sub-components and find that answers to the question "How often do you look forward to another day?" are an important contributor to an understanding of well-being. Similarly, this investigation presents evidence that such perceptions matter for well-being, and considerably so. This means that individuals' fears and hopes should be more widely considered in well-being investigations than they are now - the increase in explanatory power over 'standard' well-being equations can approach 40% - when the data exists.[2] They are important determinants of current well-being and, in terms of size, of larger effect than unemployment which, as many studies show (this one too) is a major negative influence on well-being.

Work within economics has acknowledged the possibility that the future may have an impact on current well-being. Some recent examples follow. Haucap and Heimeshoff (2014) investigate the causal effect of studying economics on well-being and find that perceived good future job prospects

---

[2] This figure was nearer 60% in some alternative specifications.

(which they suggest could also be a proxy for future income) are positively associated with student life satisfaction scores. Similarly Hetschko et al. (2014), using the SOEP, investigate, in part, the possibility that more uncertain future income and employment prospects can impact current well-being. Such issues are also investigated by Grunow (2014), who, also with the SOEP, investigates the impact of future job expectations on current life satisfaction finding that, broadly, unexpected unemployment has a larger impact on life satisfaction than expected unemployment. Using a wave of the SOEP, Grözinger and Matiaske (2004) investigate, in part, the impact of regional unemployment on overall life satisfaction and argue that the higher regional unemployment is the higher the fear about future unemployment is and thus the lower individual life satisfaction.

Two recent papers link the future and the present via climate change, with expectations about climate change demonstrated to have an impact on well-being. Osberghaus and Kühling (2014) investigate this and provide robust evidence that worsening expectations about future climate change negatively affect well-being, though the size of the effect is not large. Similarly, Alem and Kolmer (2014) find, with Ethiopian data spanning two waves, that subjective well-being is negatively affected by climate variability which they argue can be seen as a proxy for future income uncertainty. For Ethiopian farmers, they assert, periods of climate variability is linked with more uncertain future income, and this increased uncertainty about the future lowers current well-being.

Regarding fear itself, it has recently been studied in the context of immigration (Mocan and Raschke 2014) as well as crime (Dustmann and Fasani 2013; Cornaglia et al. 2014). An entertaining, more general, and full of interesting anecdotes, read regarding fear is provided by Bourke (2005). A brief summary of how the rest of the paper is organised follows: the data is described in section 2; the results presented in section 3; a discussion of the results and their consequences is found in section 4; and section 5 concludes.

2. Data description

The main dataset employed here, and the one that all the results (in Section 3) are based on, is the

SOEP, which asks about fears generally.[3] The main question employed asks about the 'future in

general' and individuals can choose whether they are optimistic, more optimistic than pessimistic,

more pessimistic than optimistic, or pessimistic.[4] This question was asked in the following years:

1990-1993; 1995-1997; 1999; 2005; 2008-2009. The responses have been turned into dummy

variables and added to a standard well-being equation. As the SOEP is well-known, and frequently

utilised for well-being work it is not described here; similarly, the other explanatory variables,

employed here as controls are not explained either. Information regarding the dataset can be found

online (http://www.diw.de/en/soep); reviews of economic well-being studies can be found in Clark

et al. (2008), Stutzer and Frey (2012), and Becchetti and Pelloni (2013). The standard correlates here

are used as control variables: hence the investigation is asking if we take into account marital status,

labour force status (etc.) what is the impact of an individual's thoughts about the future on their life

satisfaction. It is well-known that unemployed people are less satisfied with life, for example, and

certainly conceivable that they may feel more pessimistic about the future than the employed. Not

controlling for unemployment may mean that the results reflect the increased pessimism of the

unemployed and not thoughts about the future itself. A differing impact by income is also possible,

and hence income is also used as a control variable. Although many of the variables are well-known,

and somewhat self-explanatory, the labour force status variables need some explanation. The

'conventionally' employed are split into two categories: employed, and government employed. This

is because of the greater security that German government employees possess, for example in terms

of job security and also private health insurance, which is more than most other employees. It is

perhaps likely that these additional benefits will make government employees systematically less

pessimistic about the future than other employees. Unemployed here refers to individuals who are

---

[3] Supplementing this is a brief investigation with the latest round of ESS data. See appendix 1 for an explanation and some results.
[4] In German, the middle two categories are 'eher optimistisch' and 'eher pessimistisch' which can be translated as quite optimistic, or rather optimistic, and quite pessimistic or rather pessimistic.

in the labour market but cannot find work, in contrast to individuals not in the labour market (which might be a house husband, for example).

There are also control variables for age bands. Schwandt (2014), also using the SOEP, demonstrates that young people are more optimistic than older people. He finds this by comparing answers to a question about how an individual sees their life satisfaction in five years' time with its eventual realisation. The descriptive statistics largely confirms Schwandt's finding: the percentage of people who respond to the 'future in general' question with optimistic falls as age increases (though in this study the extremities in terms of age do not fit this pattern). This and other descriptive statistics are presented in appendix 2, and provoke interesting thoughts regarding which groups in the population are more optimistic and more pessimistic. The differences with the means for the different optimism/pessimism categories are quite large (and highly statistically significant). This is unsurprising, but a reminder that people's hopes and fears contribute substantially to their (dis)satisfaction with life. Perhaps as expected, they show that the speculation made above about the unemployed being systematically more pessimistic than members of other labour force categories is supported. As that table shows, overall, the unemployed comprise six percent of the sample, but make up five percent of the optimistic group and thirteen percent of the pessimistic group. Interestingly, single people are more optimistic than married people: perhaps they hold out hope of an excellent marriage whereas married people know already what they have. Individuals aged over 61, and there are quite a few of these in this sample, are pretty pessimistic about the future in general.[5] It is highly likely that their concept of future in general is substantially different from individuals nearer the start of adult life. Given this, the results will be tested for robustness using both the whole sample and a sample restricted to people of (broadly) working age.

The aim of the next section is to investigate whether these differences remain after controlling for different variables where, as appendix 1 shows, they clearly impact pessimism and optimism. Given

---

[5] Though this category itself is likely to be very diverse: the mean age of individuals within this age range is just over 70, with ten percent of individuals being over 80.

all of the correlates that are often studied and regularly demonstrated to have rather consistent associations with well-being, is there still a role for hopes and fears about the future to play a role in determining current life satisfaction? And if so, how much does their inclusion in 'standard' models help improve the explanatory power of such models?

3. Results

The first set of results show the outcome from pooled cross section estimations. These are found in columns 1 and 2 of table 1, with the difference between the two columns being the addition of the optimistic-to-pessimistic dummy variables. This enables us to inspect the increase (if any) that these variables provide in accounting for the variation of well-being.

[table 1 here]

As for the optimistic and two pessimistic dummy variables, the coefficients tell us about the difference in the life satisfaction of people who are optimistic about the future, rather pessimistic and pessimistic compared to the base category of rather optimistic. So, in column 2, our pooled cross-section regression indicates that individuals who are optimistic are, on average, nearly half a point higher (on the 11-point well-being scale) compared to individuals who are rather (or quite) optimistic. Similarly, rather pessimistic and pessimistic individuals are two-thirds of a point, and one-and-one-third of a point less satisfied with life than those who are rather optimistic. These are substantial values: their size demonstrates a comparable or greater association with life satisfaction than most of the control variables. Unlike table A1, the descriptive statistics, here log real income is used though using real income makes no difference to the variables of interest (or other controls). Regarding the variables employed (largely) as control variables, the coefficients in table 1 are, on the whole, unsurprising: they have the expected sign, and are similar to the general findings in the literature. Also, the R^2 value has increased representing a 6.4% increase in explained life satisfaction

variation: also an important result (which represents an increase of 30% of the originally explained variation).

However, pooled cross section results cannot account for individual unobserved heterogeneity, which includes individuals' personalities and dispositions. Thus, such results should be treated cautiously. The next four columns of table 1 exploit the panel nature of the SOEP, and the first two of these, the fixed effects (FE) estimates, can be said to control for an individual's personality and disposition with the important caveat that this requires that an individual's personality and disposition to be fixed or slowly moving. As explained in section 2, the waves where the 'future in general' question was asked are fewer than the whole sample, which is the reason for the quite large reduction in sample size from the odd numbered columns to the even ones. As shown in table 1, the fixed effects results for optimism and pessimism are similar to those obtained by pooled OLS, though the coefficients are smaller. The coefficients are also smaller for other variables like health and unemployment. It is interesting to note that the negative and significant coefficient on widowhood (for the two panel data estimations) disappears when the optimistic and two pessimistic dummy variables are introduced (i.e. when we move from columns 3 and 5 to 4 and 6 respectively). Because fixed effects cannot be generalised out of sample, and variables may not always have enough within variation for accurate coefficient determination, these estimates were also undertaken with random effects (RE) estimation. Again, table 1 shows that these results are supportive of those found via the other methods. Individuals who are optimistic about the future enjoy more life satisfaction than individuals who are pessimistic about it. In all three cases – OLS, FE, and RE – the variation of life satisfaction explained increases when these variables are included in the analysis. This informs us of two things: what people think about the future is important for current well-being, and that an inclusion of hopes and fears helps well-being regressions explain more of what makes up individual well-being.

These results are unchanged when the sample is restricted to individuals aged between 15 and 60. Recall the brief discussion about the pessimism of the over sixties above for the reason for the restriction. The results from table 1 are also qualitatively unchanged when robust standard errors are used.

This result shows that people who are optimistic about the future enjoy more life satisfaction now. Conversely, individuals who are pessimistic about the future report less life satisfaction now. Thus, people's opinions about the 'future in general' matter for life satisfaction now, and when these opinions are modelled the explanatory power of the model is increased. Taken together, these results suggest that Marcus Aurelius and Seneca were right (see opening epigrams). These results are also robust to the accuracy (or otherwise) of people's expectations about their life satisfaction in the future.

As Schwandt (2014) does, I use the individual's estimate of her happiness in five years' time and compare it to its eventual realisation to have an idea about how accurate their predictions are. The idea here is that individuals who make poor (or good) ex-ante statements (in terms of accuracy) about their future well-being may have systematically different ways of thinking about the future than those who make good (or poor) ex ante comments. [6] Controlling for differences in the accuracy of these predictions supports the results obtained in table 1: people who are more optimistic (pessimistic) about the future in general are more (less) satisfied with life now (not shown but available upon request).

A further potential robustness test is presented by General Method of Moments (GMM) estimation. A popular method in many areas of enquiry if not, at present, well-being; some recent examples of its use elsewhere are as a tool to help investigate corporate finance (Flannery and Hankins 2013), economic growth (Lee et al. 2012), foreign aid (Dutta et al. 2013) and school expenditure and school

---

[6] This difference may be caused by an individual's poor ex-ante verdict, but also by the many events that an individual experiences between making the verdict and its realisation. Another way to think about this use of future well-being prediction is as an attempt, however partial, to try to control for people's delusions about the future.

performance (Pugh et al. 2014). With GMM the possibility exists to treat explanatory variables as endogenous or exogenous, and this is potentially an issue of great importance for research investigating well-being. This opens up the possibility of a better accounting for the associations of commonly studied variables with life satisfaction, as well as enabling the examination of more subjective values. Presumably, subjective values are as important an explanation for life satisfaction as objective ones.

With well-being the use of GMM (from a statistical diagnostic viewpoint) is more successful with some datasets and samples others. The SOEP is one of the popular datasets where, frequently, the diagnostic tests do not sufficiently support GMM estimation.[7] Here, however, an attempt to use GMM was a qualified success though the results should be treated with caution.[8] As the estimations are computationally intensive and memory hungry, the sample had to be split by gender and the waves included reduced (the sample used here concentrates on the waves where there is most data for the future in general question, 1990-2000). Furthermore, the equation estimated does not include the wave dummy variables which generate far too many instruments for estimation. For these reasons the results cannot be directly compared with those in table 1.[9] The first two columns of table 2 are from static GMM estimation, male and then female, and the second two are from dynamic estimation, again male and then female. All four estimates treat the various 'future in general' dummies as potentially endogenous. In short, this involves using past values (levels and changes) to instrument for current values (changes and levels), thus being system GMM, and then

---

[7] A discussion of the benefits and challenges of GMM estimation (and particularly dynamic panel estimation) in a well-being context is provided by Piper (2014b).
[8] The GMM estimations employed the twostep robust procedure that utilises the Windmeijer (2005) finite sample correction for the two-step covariance matrix. Without this, standard errors have been demonstrated to be biased downwards (Windmeijer 2005).
[9] This is the case for an additional reason with the dynamic estimates (columns 3 and 4 of table 2) where the coefficients obtained reflect contemporaneous associations, unlike those in table 1.

diagnostically testing for the exogeneity of the instruments.[10] These diagnostic test results are presented at the bottom of the table and discussed immediately below.

[table 2 here]

The diagnostic tests, set out in the supporting table following the results, indicate that the model is statistically appropriate. The figures in the tables are p-values and represent the probability of error when rejecting the null of exogenous instruments. Here a value of around 0.05 is cause for concern because this means that there only a five percent chance of error when ruling out the exogeneity of the instruments; conversely a ninety-five percent chance that the instruments are endogenous. This is often misunderstood, and studies often show low p-values and assert that this means that their instruments are exogenous.[11] The opposite is the case. Because we are trying to rule out correlation between the instruments and the error term rather than deciding on the significance of a coefficient estimate, Roodman (2009) suggests a 'common sense' level of 0.25 is more appropriate though should still be viewed with some concern. Here the p-values for the different Hansen tests are higher than this common sense level and indicate instruments that can be assumed to be exogenous. Researchers can choose which explanatory variables should be considered endogenous and exogenous and test for this decision's statistical appropriateness both overall and for various subsets. Here the choice was made to treat the variables of especial interest (the optimism-pessimism dummies) as endogenous and all others as exogenous: a choice statistically appropriate given the diagnostic tests' outcomes. Many of the rows in the supporting table show which diagnostic tests are undertaken (and their results), reflecting the different tests possible for static and dynamic panel GMM. The low average observations per person means that the AR (2) tests

---

[10] The results and test outcomes are also fully supported when restricting the sample to individuals aged between 15 and 60.

[11] An example from the 'well-being' area being Bottan and Perez-Truglia (2011), where a p-value of <0.001 is presented as a strong indicator of exogenous instruments is instead a strong rejection of this assumption. Other well-being studies do not appear to fully understand the diagnostic tests too, as discussed in Piper (2014b)

cannot be performed, and hence there is no concern with second order correlation of first differences (what AR (2) tests for).[12]

Researchers can also decide how far back lags can be used for the purposes of instrument creation. The last three columns of table 2 are based on estimations which employed 'default' instrumentation, i.e. starting at the first available lag and going backwards without limit (within the dataset). The results and diagnostic test outcomes are robust to this choice. The first column (static GMM, males only) is a little more complicated. The results (and diagnostic test) outcomes are based on the first two available lags only. Introducing more instruments based on deeper lag lengths actually makes the optimistic dummy variable significant (at a 5% level of significance rather than a 10% level).but this is at the cost of less acceptable diagnostic test results. The discussion now turns to the results for the variables of primary interest.

Regarding the results in table 2, it is important to note that the columns cannot be directly compared. The addition of the lagged dependent variable in the dynamic panel estimations means that the coefficients in the final two columns represent contemporaneous coefficients controlling for the past (which is represented by the lagged dependent variable). The coefficients in the static and dynamic columns are similar though because most of the impact of well-being is contemporaneous (itself indicated by the small size of the coefficient on lagged life satisfaction). With the static analysis, being optimistic about the future in general loses its high statistical significance: both are positive and substantial (an increase of very approximately one on the eleven point scale) but the p-values are 0.096 for males and 0.078 for females. Different choices of lag lengths (for instrument creation) can lower these values, though at a cost of lower p-values for some of the diagnostic tests. Similarly, using real income rather than its log also increases the significance of the optimism coefficient. With the dynamic panel analyses, being optimistic about the future is again significant with a confidence level higher than 95% for males and females. Taken together with the static

---

[12] The argument here being if there is not enough data enabling a test of second order autocorrelation in first differences there cannot be second order autocorrelation.

results and the results of table 1 (OLS, FE, and RE) this is reasonably strong evidence that being optimistic about the future (compared with being quite optimistic) is associated with higher well-being now.

The biggest change from table 1 is for the quite pessimistic coefficients; with GMM analysis, and the related treatment of these dummies as endogenous, being quite pessimistic about the future is insignificantly different from being quite optimistic about the future. However, being pessimistic about the future in general is associated with the biggest change in life satisfaction: both the static and dynamic analyses find being pessimistic to be strongly negative (statistically significant and a substantial quantitative effect) for life satisfaction. Interestingly, perceptions about the future in general seem to play a larger role in the life satisfaction of men rather than women, though the life satisfaction of women is still substantially affected by such perceptions. Coupled with table 1, these results, and the increase in explanatory power they offer, indicate that, where possible, perceptions of the future should be modelled in standard well-being estimations. Accounting for endogeneity can be important too: when the likely endogeneity of the optimistic-pessimistic variables is taken into consideration, being quite pessimistic is insignificant for well-being but being optimistic or pessimistic is still important for satisfaction with life.

The coefficients obtained for the other explanatory variables are in line with expectations from previous results in the literature, and those presented in table 1. For example, marriage is positively associated with life satisfaction, and unemployment negatively associated. Interesting to note is that government employees ('*beamte*') are more satisfied with life than other employees (the reference category). The lagged dependent variable deserves comment, and at just under 0.1 is in line with previous results, from different samples and datasets, indicating that the direct influence of the past is small and that much of what makes up well-being is contemporaneous (see Piper 2014b for a more detailed discussion of the lagged dependent variable, its size, and robustness, in well-being equations).

4. Discussion

What individuals think about their future appears to have an impact on their current life satisfaction, even when accounting for unobserved individual heterogeneity and the likely endogeneity of such thoughts with life satisfaction. Thoughts are important, and their direction is as expected: individuals who are optimistic about the future enjoy more life satisfaction *now* whereas individuals who are pessimistic have, on average, lower life satisfaction now. This was demonstrated with descriptive statistics in the appendix as well as 5 different methods for regression analysis in section 3. However, while the two methods that treat the optimism-pessimism dummies as endogenous demonstrate these effects for optimism and pessimism, people who are quite pessimistic are now no longer less satisfied with life on average than people who are quite optimistic. Thus the discussion below refers, mainly, to individuals who are optimistic or pessimistic.

The impact of thoughts may be different for individuals with different personality types. Perhaps introverts are more affected by their thoughts about the future than extroverts, for example. Other 'Big Five' personality traits would also be interesting to investigate. For example, how optimism and pessimism affects life satisfaction for individuals with differing levels of neuroticism, and does being very conscientious have an impact on an individual's thoughts on the future and their impact on well-being? Other interesting questions are easily found.

The impact of pessimism (when measured in terms of life satisfaction, and as estimated by OLS, FE, RE and (static and dynamic GMM) is greater than that of optimism. This is reminiscent of loss aversion, where individuals experience losses to a greater degree than they do gains. A phenomenon that has recently received more support, in a well-being context, by studies that investigate changes in the income of individuals, using the SOEP and the British Household Panel Survey (Boyce et al. 2014) and changes in GDP (De Neue et al. 2014).[13] This latter study employs three different datasets

---

[13] A notable previous attempt to investigate loss aversion, income and life satisfaction was made by Vendrik and Woltjer (2007).

and finds, overall, an asymmetric effect on life satisfaction between recessions and periods of economic growth, consistent with loss aversion.[14] Because of this, the authors argue for policy responses that are concerned not just with growth itself, but how that growth occurs. Smooth business cycles being preferred to more volatile ones. Furthermore, long periods of smooth growth may, somewhat, help lower individuals fear of the future and thus be beneficial to life satisfaction, a possibility returned to in the last paragraph of this section.

Potential policy conclusions stem from this, though they may be difficult to undertake. Here follows some brief speculation. Given the importance of individual's thoughts about the future, policymakers could try to create credible reasons for optimism. Macroeconomic initiatives encouraging more employment and more employment stability (thus reducing pessimism about the future) may help to increase life satisfaction. More stability in terms of economic growth is called for by De Neve et al. (2014), as mentioned above, for promoting life satisfaction and the analysis here supports such a call. This may affect future happiness as De Neve et al. (2014) show, and is also likely to affect current life satisfaction too through its role in changing expectations as the analysis in this investigation shows. Similarly, Boyce et al. (2014) make the suggestion regarding individual and national incomes that lower, though stable, growth is likely to be preferable for well-being than the riskier pursuit of higher incomes. Again, the analysis of this investigation is supportive of such a conclusion. Stable growth and income may well generate less pessimism about the future, and pessimism plays a greater role in current life satisfaction than optimism.

This research, with its demonstration of the importance of an individual's thoughts for life satisfaction, indicates that individuals should 'guard their thoughts' and do their best to not to get trapped into too much negative thinking. This is an aim of cognitive behavioural therapy, and something well-known happiness researcher, Richard Layard, has argued should receive more public

---

[14] De Neve et al. (2014) explicitly include dummies for expectations about the future in one of their robustness tests. Their inclusion confirms their result about the asymmetry of GDP changes for life satisfaction, and the expectation dummies themselves support the results of section 3 above. There is no discussion, however, about the potential endogeneity between life satisfaction and expectations of life in the future.

resources along with greater funding for, and appreciation of, mental health. In section 3 of Layard (2013), he explicitly argues for policymakers to make more use of evidence based methods of psychological therapy, with the most researched being 'cognitive behavioural therapy (or CBT), which helps people to reorder their thoughts and thus manage their feelings and behaviour' (p.6). The results here support such an argument.[15] Thoughts are important for our current life satisfaction, and the analysis above has shown that our thoughts about the future can be responsible for a larger impact on well-being than such well-known causes of reduced life satisfaction like unemployment.

5. Concluding remarks

This investigation has provided strong evidence that peoples' perceptions of the future in general, and particularly their fears of the future, have an impact on their current life satisfaction. This was found via by five separate regression models (OLS, FE, RE, static GMM, and dynamic GMM) to take into account unobserved individual heterogeneity as well as to recognise, and appropriately deal with, the possibility that such perceptions might be endogenous. The result itself is perhaps unsurprising, and more remarkable is the size of the effect. Being pessimistic about the future has a large negative effect on well-being, larger than such well-known and studied factors like being unemployed (and this is after controlling for employment status and other socio-economic considerations). In the results of section 3, the largest negative impact on life satisfaction is pessimism about the future. This result, and particularly its size, is important.

The inclusion of an individual's thoughts about the future in an assessment of well-being is also important because of the substantial increase in explanatory power that such an inclusion offers. Where it can be calculated the R^2 value increases significantly, indicative of a higher level of explained variation in the models. It is difficult to know what to include in multivariate regressions of

---

[15] A supporting economic argument for increased resources for mental health has been recently made by Knapp and Lemmi (2014).

life satisfaction, and data often plays a key role in what can be chosen. Given current datasets it may not always be possible to include thoughts about the future in well-being models. Where possible, the results of this analysis suggest that thoughts about the future should be included. Given the size of the effect, the likely gender difference (such thoughts seemingly affect males more than females), and the role in explaining variation in life satisfaction, thoughts about the future should be considered for inclusion even if they are not of direct interest. They are likely to be important control variables.

Two of the models employed use General Method of Moments to obtain coefficient values, for the explicit purpose of treating optimism and pessimism as potentially endogenous. Such a technique creates instruments that are (hopefully) correlated with the potentially endogenous variable but not with the idiosyncratic error term; diagnostic testing demonstrates that the generated instruments fulfil this criteria. The use of GMM is unusual in the well-being literature though it has much to offer investigators of life satisfaction, including this ability to treat explanatory variables as potentially endogenous. GMM has proved useful in many areas of economic investigation, and should be more widely considered in the economics of happiness literature.

Economics deals largely with objective factors (unemployment, marriage) and assesses their direct association with well-being. The analysis above indicates that subjective factors are also important and should also be considered, whether directly or as a control variable, in future investigations of well-being. With GMM, scholars have more ability to address these potentially important subjective factors. This may mean that future datasets should also try to include more subjective questions too: the inner life of individuals is likely to be as important for a satisfaction with life as objective factors. An enhanced understanding of life satisfaction needs to include both subjective and objective elements of an individual's life. As is very often the case, more research would be useful and informative.

References

Alem, Y. and Colmer, J. (2014) Optimal Expectations and the Welfare Cost of Climate Variability, Discussion Papers dp-14-03-efd, *Resources For the Future*.

Becchetti, L., Corrado, L. and Samà, P. (2013) Inside the Life Satisfaction Blackbox, *CEIS Research Paper* 259, Tor Vergata University, CEIS, revised 09 Jan 2013.

Becchetti, L. & Pelloni, A. (2013) What are we learning from the life satisfaction literature? *International Review of Economics* 60, 2: pp. 113-155.

Bottan, N. L. and Perez-Truglia, R.N. (2011) Deconstructing the Hedonic Treadmill: Is Happiness Autoregressive? *Journal of Socio-Economics* 40, 3: pp. 224-236.

Bourke, R. (2005) *Fear: A Cultural History* London: Virago

Boyce, C., Wood, A., Banks, J., Clark, A. E. and Brown, G. D. A. (2014) Money, Well-being and Loss Aversion: Does an Income Loss Have a Greater Effect on Well-being than an Equivalent Income Gain?, *CEP Occasional Papers 39*, Centre for Economic Performance, LSE.

Clark, A. E., Frijters, P. and Shields, M. A. (2008) Relative Income, Happiness and Utility: An Explanation for the Easterlin Paradox and Other Puzzles, *Journal of Economic Literature* 46, 1: pp.95-144.

Cornaglia, F., Feldman, N. E., and Leigh, A. (2014) Crime and Mental Well-Being, *Journal of Human Resources* 49, 1: pp.110-140.

De Neve, J., Ward, G.W., De Keulenaer, F., Van Landeghem, B., Kavetsos, G. and Norton, M. I. (2014) Individual Experience of Positive and Negative Growth is Asymmetric: Evidence from Subjective Well-being Data, *CEP Discussion Papers* dp1304, Centre for Economic Performance, LSE.

Dustmann, C. and Fasani, F. (2013) The Effect of Local Area Crime on Mental Health, *IZA Discussion Papers* 7711, Institute for the Study of Labor (IZA).

 Dutta, N., Leeson, P. T. and Williamson, C. R. (2013) The Amplification Effect: Foreign Aid's Impact on Political Institutions, *Kyklos* 66: 2, pp. 208-228.

Flannery, M. J., & Hankins, K. W. (2013) Estimating dynamic panel models in corporate finance *Journal of Corporate Finance*, 19, pp.1-19.

Frijters, P., Johnston, D. W. and Shields, M. A. (2014) Does Childhood Predict Adult Life Satisfaction? Evidence from British Cohort Surveys. *The Economic Journal*.
doi: 10.1111/ecoj.12085

Grözinger, G. and Matiaske, W. (2004). Regional unemployment and individual satisfaction. In Grözinger, G. and van Aaken, A. (Eds.), Inequality: New Analytical Approaches. Marburg: Metropolis, pp. 87–104.

Grunow, M. (2014) Reference-Dependent Effects of Unemployment on Mental Well-Being *SOEPpapers on Multidisciplinary Panel Data Research* 638, DIW Berlin, The German Socio-Economic Panel (SOEP).

Haucap, J. and Heimeshoff, U. (2014) The happiness of economists: Estimating the causal effect of studying economics on subjective well-being, *DICE Discussion Papers* 157, Heinrich-Heine-Universität Düsseldorf, Düsseldorf Institute for Competition Economics (DICE).

Hetschko, C., Knabe, A. and Schöb, R. (2014) Looking Back in Anger?: Retirement and Unemployment Scarring, *SOEPpapers on Multidisciplinary Panel Data Research* 652, DIW Berlin, The German Socio-Economic Panel (SOEP).

Knapp, A. and Lemmi, V. (2014) The Economic Case for Better Mental Health. In: Davies, Sally, (ed.) *Annual Report of the Chief Medical Officer 2013, Public Mental Health Priorities: Investing in the Evidence.* Department of Health, London, UK, pp. 147-156.

Layard, R. (2013) Mental health: the new frontier for labour economics, *IZA Journal of Labor Policy* 2, 1: pp. 1-16.

Layard, R. Clark, A. E., Cornaglia, F., Powdthavee, N., and Vernoit, J. (forthcoming) What Predicts a Successful Life? A Life-Course Model of Well-Being, *Economic Journal*.

Lee, S. H., Levendis, J., & Gutierrez, L. (2012) Telecommunications and economic growth: an empirical analysis of sub-Saharan Africa. *Applied Economics*, 44:4, pp.461-469.

Mocan, N. and Raschke, C. (2014) Economic Well-being and Anti-Semitic, Xenophobic, and Racist Attitudes in Germany, *IZA Discussion Papers* 8126, Institute for the Study of Labor (IZA).

Osberghaus, D. and Kühling, J. (2014) Direct and indirect effects of weather experiences on life satisfaction: Which role for climate change expectations?, ZEW Discussion Papers 14-042, ZEW - Zentrum für Europäische Wirtschaftsforschung / Center for European Economic Research.

Piper, A. T. (2014a) Europe's capital cities and the happiness penalty: an investigation using the European Social Survey, Social Indicators Research, DOI 10.1007/s11205-014-0725-4

Piper, A. T. (2014b) An Investigation into Happiness, Dynamics and Adaptation, MPRA Paper 57778, University Library of Munich, Germany.

Pugh, G., Mangan, J., Blackburn, V., & Radicic, D. (2014) School expenditure and school performance: evidence from New South Wales schools using a dynamic panel analysis. *British Educational Research Journal*. doi: 10.1002/berj.3146

Roodman, D, (2009) A note on the theme of too many instruments. Oxford Bulletin of Economics and Statistics 71, 1: pp. 135-158.

Schwandt, H. (2014) Unmet aspirations as an explanation of the age U-shape in human well-being. Working Paper available online
http://www.princeton.edu/~schwandt/papers/LSforecasts.pdf

Stutzer, A. and Frey, B. (2012) Recent Developments in the Economics of Happiness: A Selective Overview, *IZA Discussion Papers* 7078, Institute for the Study of Labor (IZA).

Vendrik, M. C. M., & Woltjer, G. B. (2007) Happiness and loss aversion: Is utility concave or convex in relative income? *Journal of Public Economics, 91*, 1423-1448.

Windmeijer, F. (2005) A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics* 126: 25-51.

Table 1

VARIABLES	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) RE	(6) RE
Optimistic		**0.45*****		**0.24*****		**0.37*****
		(0.015)		**(0.016)**		**(0.014)**
Quite Pessimistic		**-0.66*****		**-0.40*****		**-0.54*****
		(0.013)		**(0.014)**		**(0.012)**
Pessimistic		**-1.36*****		**-0.81*****		**-1.10*****
		(0.026)		**(0.028)**		**(0.025)**
Log Real Income	0.09***	0.08***	0.08***	0.10***	0.08***	0.09***
	(0.003)	(0.006)	(0.005)	(0.009)	(0.004)	(0.006)
Married	0.18***	0.18***	0.11***	0.10***	0.10***	0.14***
	(0.009)	(0.015)	(0.017)	(0.030)	(0.012)	(0.017)
Divorced	-0.15***	-0.10***	0.05*	-0.01	-0.11***	-0.10***
	(0.014)	(0.023)	(0.025)	(0.044)	(0.019)	(0.027)
Separated	-0.43***	-0.47***	-0.26***	-0.33***	-0.37***	-0.44***
	(0.024)	(0.039)	(0.029)	(0.052)	(0.025)	(0.040)
Widowed	-0.03	0.07	-0.17***	-0.13	-0.15***	-0.02
	(0.027)	(0.043)	(0.050)	(0.087)	(0.036)	(0.051)
Self-employed	-0.08***	-0.13***	0.00	-0.05	-0.02*	-0.09***
	(0.011)	(0.019)	(0.018)	(0.033)	(0.015)	(0.022)
Gov employed	0.18***	0.16***	-0.01	0.00	0.14***	0.15***
	(0.014)	(0.024)	(0.033)	(0.058)	(0.022)	(0.030)
Apprentice	0.25***	0.19***	0.08***	0.09**	0.19***	0.20***
	(0.018)	(0.030)	(0.021)	(0.040)	(0.018)	(0.029)
Unemployed	-0.89***	-0.83***	-0.68***	-0.69***	-0.75***	-0.77***
	(0.016)	(0.024)	(0.015)	(0.027)	(0.014)	(0.023)
Retired	0.11***	0.14***	0.01	0.12**	0.03	0.10***
	(0.024)	(0.038)	(0.025)	(0.048)	(0.022)	(0.037)
Health: V good	2.36***	1.99***	1.38***	1.25***	1.70***	1.69***
	(0.014)	(0.023)	(0.015)	(0.029)	(0.014)	(0.023)
Health: Good	1.72***	1.47***	1.05***	0.96***	1.26***	1.26***
	(0.011)	(0.018)	(0.012)	(0.022)	(0.011)	(0.018)
Health: Satisfact	0.93***	0.81***	0.63***	0.58***	0.72***	0.72***
	(0.011)	(0.018)	(0.011)	(0.020)	(0.011)	(0.018)
Educat: High	0.13***	0.05**	0.03	-0.01	0.17***	0.10***
	(0.012)	(0.019)	(0.025)	(0.046)	(0.017)	(0.024)
Educat: Medium	0.04***	0.02	-0.01	-0.08**	0.06***	0.02
	(0.010)	(0.016)	(0.019)	(0.035)	(0.013)	(0.019)
Age 21-30	0.08***	-0.00	-0.05***	-0.01	0.01	0.01
	(0.011)	(0.017)	(0.015)	(0.028)	(0.012)	(0.018)
Age: 31-40	-0.03***	-0.07***	-0.02	-0.02	-0.02*	-0.05***
	(0.009)	(0.014)	(0.011)	(0.020)	(0.009)	(0.014)
Age: 51-60	0.17***	0.20***	0.03***	0.07***	0.05***	0.13***
	(0.010)	(0.016)	(0.013)	(0.025)	(0.010)	(0.016)
Age: 61plus	0.48***	0.54***	0.21***	0.29***	0.28***	0.46***
	(0.017)	(0.028)	(0.025)	(0.048)	(0.019)	(0.029)
Constant	5.27***	5.98***	6.29***	6.59***	5.28***	5.32***
	(0.046)	(0.079)	(0.102)	(0.222)	(0.037)	(0.047)

Supporting information for table 1

	(1)	(2)	(3)	(4)	(5)	(6)
Observations	214, 637	77,911	214, 637	77,911	214,637	77,911
Individuals	-	-	34,208	25,168	34,208	25,168
R^2 (Overall)	0.212	0.276	0.183	0.248	0.206	0.273
R^2 (Between)	-	-	0.217	0.300	0.260	0.339
R^2 (Within)	-	-	0.081	0.110	0.078	0.106

Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$; all columns include region and wave dummy variables. Base categories are as follows: single, employed, poor health, low education, age 15-20, quite optimistic.

Table 2:

VARIABLES	(1) Males (Static GMM)	(2) Females (Static GMM)	(3) Males (Dynamic GMM)	(4) Females (Dynamic GMM)
Lagged Life Satisfaction			0.08***	0.09***
			(0.017)	(0.018)
Optimistic	**1.10***	**0.84***	**1.00****	**0.96****
	(0.661)	**(0.474)**	**(0.441)**	**(0.463)**
Quite Pessimistic	**-0.14**	**-0.30**	**-0.10**	**-0.13**
	(0.637)	**(0.307)**	**(0.261)**	**(0.276)**
Pessimistic	**-2.32****	**-1.08***	**-1.76****	**-1.36****
	(0.717)	**(0.576)**	**(0.534)**	**(0.569)**
Log Real Income	0.16***	0.06***	0.15***	0.04**
	(0.019)	(0.016)	(0.019)	(0.016)
Married	0.14***	0.21***	0.13***	0.20***
	(0.039)	(0.044)	(0.037)	(0.044)
Divorced	-0.14*	-0.09	-0.14**	-0.08
	(0.074)	(0.069)	(0.071)	(0.067)
Separated	-0.58***	-0.21**	-0.53***	-0.21**
	(0.112)	(0.104)	(0.117)	(0.109)
Widowed	0.04	0.15	0.09	0.14
	(0.137)	(0.100)	(0.130)	(0.096)
Self-employed	-0.27***	-0.03	-0.25***	-0.03
	(0.050)	(0.063)	(0.047)	(0.060)
Gov employed	0.22***	0.14*	0.19***	0.15**
	(0.056)	(0.080)	(0.053)	(0.074)
Apprentice	0.12	0.05	0.13*	-0.00
	(0.073)	(0.071)	(0.074)	(0.072)
Unemployed	-0.71***	-0.68***	-0.72***	-0.65***
	(0.071)	(0.065)	(0.069)	(0.064)
Retired	0.17**	-0.07	0.16**	-0.05
	(0.079)	(0.094)	(0.076)	(0.094)
Health: V good	1.51***	1.67***	1.50***	1.58***
	(0.114)	(0.090)	(0.084)	(0.083)
Health: Good	1.17***	1.25***	1.14***	1.20***
	(0.075)	(0.060)	(0.057)	(0.058)
Health: Satisfact	0.65***	0.71***	0.65***	0.69***
	(0.058)	(0.051)	(0.052)	(0.052)
Educat: Medium	0.06	0.04	0.07*	0.04
	(0.040)	(0.043)	(0.038)	(0.041)
Educat: High	0.01	0.07	0.03	0.08
	(0.054)	(0.056)	(0.049)	(0.054)
Age 21-30	-0.29***	-0.16**	-0.25***	-0.13*
	(0.078)	(0.076)	(0.075)	(0.076)
Age: 31-40	-0.41***	-0.28***	-0.35***	-0.22***
	(0.087)	(0.087)	(0.084)	(0.086)
Age: 41-50	-0.39***	-0.27***	-0.33***	-0.21**
	(0.095)	(0.093)	(0.089)	(0.091)
Age: 51-60	-0.14	-0.03	-0.11	0.02
	(0.097)	(0.099)	(0.090)	(0.096)
Age: 61plus	0.25**	0.46***	0.24**	0.47***
	(0.111)	(0.139)	(0.104)	(0.136)

Supporting information for table 2

	(1)	(2)	(3)	(4)
Constant	5.10*** (0.277)	5.39*** (0.150)	4.46*** (0.212)	4.77*** (0.196)
Observations	23,769	17,905	22,464	16,948
Individuals	7,482	6,153	7,158	5,886
Instruments used	44	59	72	72
AR(2)	*	*	*	*
Hansen *C* test	0.568	0.604	0.412	0.850
Exogenous instruments	0.443	0.903	Covered by the other tests	Covered by the other tests
Hansen J test (lag dep var)	N/A	N/A	0.412	0.745
Hansen *J* test (for levels)	N/A	N/A	0.629	0.877
Future dummies exogeneity	Covered by the other tests	Covered by the other tests	0.402	0.847

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1; all columns include region dummy variables. Base categories are as follows: single, employed, poor health, low education, age 15-20, quite optimistic. In each column the variables treated as endogenous are the optimism-pessimism variables; the lag lengths employed for instrument creation are the first two available for the first column and all available for the other columns (a choice made, as described in the text, because of the diagnostic test results).

Appendix 1

<u>The impact of individual perceptions about the future across Europe on happiness and life
satisfaction: raw correlations from the ESS round 6 (2012)</u>

The latest round of the ESS can also provide an illustration of the role of optimism and pessimism for
happiness and life satisfaction (which, in the ESS, are asked about separately). One question in the
ESS asks directly about happiness. The question 'taking all things together, how happy would you say
you are?' is answered with an eleven point scale from 0, extremely unhappy, to 10, extremely
happy. The life satisfaction question is similar and asks individuals how satisfied they are with life as
a whole also with an eleven point scale (0 being extremely dissatisfied and 10 being extremely
satisfied). The explanatory variable used asks people about their confidence regarding the future,
and simple regressions were undertaken to investigate a relationship between this and happiness,
and life satisfaction. However, because of the cross-section nature of the dataset, analysis is
presented here only as an illustration. Countries in the sample are put into a category based on the
statistical significance (or its lack) with respect to the dependent variable (happiness or life
satisfaction). The directions of the associations are as expected.

Significant explanatory variables	Happiness	Life Satisfaction
Future looks positive (+); future looks bleak (-)	Belgium Bulgaria Estonia France Germany Great Britain Hungary Ireland Netherlands Russia Slovenia Spain Sweden	Belgium Bulgaria Estonia France Germany Kosovo Netherlands Norway Portugal Russia Slovenia Sweden
Future looks positive only (+)	Czech Republic Finland Lithuania Norway Slovakia	Albania Finland Lithuania Slovakia
Future looks bleak only (-)	Albania Denmark Iceland Portugal	Cyprus Czech Republic Denmark Hungary Ireland Italy Spain
Neither variable	Cyprus Kosovo Israel Italy Poland Switzerland Ukraine	Great Britain Switzerland Iceland Israel Poland Ukraine

Appendix 2
Descriptive statistics from the SOEP sample

	Range	Optimistic	Rather Optimistic	Rather Pessimistic	Pessimistic	Overall
Variable						
Life satisfaction	0 - 10	7.73	7.20	6.32	5.29	6.89
Real income	0 - 1080	17.55	17.35	13.40	9.63	15.66
Single	0 - 1	0.32	0.26	0.18	0.16	0.23
Married	0 - 1	0.55	0.62	0.66	0.61	0.62
Divorced	0 - 1	0.06	0.06	0.07	0.10	0.06
Separated	0 - 1	0.02	0.02	0.01	0.02	0.02
Widowed	0 - 1	0.05	0.05	0.08	0.11	0.06
Self employed	0 - 1	0.07	0.06	0.05	0.03	0.05
Employed	0 - 1	0.47	0.50	0.45	0.36	0.47
Gov employed	0 - 1	0.04	0.04	0.03	0.01	0.03
Apprentice	0 - 1	0.05	0.03	0.02	0.01	0.03
Unemployed	0 - 1	0.05	0.05	0.08	0.13	0.06
Retired	0 - 1	0.17	0.19	0.29	0.37	0.23
Not in lab mkt	0 - 1	0.08	0.08	0.08	0.08	0.08
Very good health	0 - 1	0.21	0.10	0.05	0.04	0.10
Good health	0 - 1	0.48	0.46	0.32	0.22	0.41
Satisfactory health	0 - 1	0.23	0.32	0.38	0.32	0.33
Poor health	0 - 1	0.08	0.12	0.25	0.41	0.17
Education: high	0 - 1	0.18	0.19	0.14	0.10	0.17
Education: medium	0 - 1	0.60	0.61	0.64	0.63	0.62
Education: low	0 - 1	0.22	0.20	0.22	0.27	0.21
Age: 15-20	0 - 1	0.10	0.06	0.04	0.03	0.06
Age: 21-30	0 - 1	0.24	0.20	0.13	0.10	0.17
Age 31: 40	0 - 1	0.21	0.21	0.17	0.14	0.19
Age: 41-50	0 - 1	0.16	0.19	0.20	0.18	0.18
Age: 51-60	0 - 1	0.13	0.15	0.20	0.22	0.16
Age: 61 plus	0 - 1	0.17	0.19	0.27	0.34	0.22