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Sliding down the U-shape?

An investigation of the age-well-being relationship, with a focus on young adults.

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May 2014

Much of the work within economics attempting to understand the relationship between age and well-being has focused on the U-shape, whether it exists and, more recently, potential reasons for its existence. This paper focuses on one part of the lifecycle rather than the whole: young people. This offers a better understanding of the age-well-being relationship for young people, and helps with increasing general understanding regarding the U-shape itself. The empirical estimations employ both static and dynamic panel estimations, with the latter providing an illustration of the importance of decisions concerning the endogeneity or exogeneity of the regressors. The empirical results are in line with the U-shape, and the results from the dynamic analysis both lend support to reasons put forward for the changing nature of the age-well-being relationship over the whole lifecycle and also suggest a further avenue for research.

JEL Codes: C23, I31, J13,

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Sliding down the U-shape? An investigation of the age-well-being relationship, with a focus on young adults.

“Despite all the recent research regarding happiness and subjective well-being a fundamental research question remains poorly understood. What is the relationship between well-being and age?”

Blanchflower and Oswald (2008 p.1733)

1. Introduction

A near uniform finding from the ‘economics of happiness’ research is that life satisfaction appears to follow a U-shape over the lifecycle, starting relatively high at the outset of adulthood, falling to a nadir in (approximately) the mid-forties, before rising again. This U-shape has been found using many different datasets covering (in total) millions of individuals from around 100 countries (Clark and Oswald 1994; Frey and Stutzer 2002; Blanchflower and Oswald 2008; Booth and van Ours 2008; Stone et al. 2010, Cheng et al. 2014) though there is (increasingly) contrasting evidence put forward too (Frijters & Beaton, 2012; Kassenboehmer & Haisken-DeNew, 2012; Sutin et al. 2013). This U-shape result is mainly an underlying (or ‘ceteris paribus’) finding, found after many confounding factors are controlled for. Thus the U-shape remains after having accounted for income, job status, marital status, health, and many of the other controls commonly employed in this literature. Much of the economic analysis in attempting to investigate and understand the age and happiness relationship has focused on this U-shape. Recent debates within the economic literature include whether the U-shape exists or is a result of model specification (Blanchflower and Oswald 2009; Glenn 2009; de Ree and Alessie (2011); Frijters & Beaton 2012), whether it reflects cohort or lifecycle effects (Clark 2007; Sutin et al. 2013), and more recently about what its potential causes might be (Stone et al. 2010; Schwandt 2014). An alternative, yet complementary, way of investigating the happiness and age relationship is by

having a focus on a smaller part of the lifecycle. Such a focus can potentially provide insights for the whole lifecycle, including the U-shape itself, as well as leading to a more thorough understanding of age and happiness for the age range under investigation. As well as these potential insights, there are also sound methodological reasons to consider small age ranges.

This study investigates the age-happiness relationship by looking at a particular part of the lifecycle: the young (defined as individuals aged between 16 and 30). Perhaps, for different age groups, there are systematic differences regarding well-being and happiness, differences that may be missed by whole lifecycle investigations. There is evidence that happiness means different things to different age ranges (Kamvar et al. 2009, Mogliner et al. 2011), whilst life for young people, in contrast to older people, has been argued to consist of “years of profound change and importance” (Arnett 2000). Such potential important differences may be missed by whole lifecycle studies.

The empirical analysis of British panel data presented below, starts by following the tradition of the majority of the economic studies that find an underlying U-shape after controlling for likely confounding factors (Clark and Oswald 1994; Frey and Stutzer 2002; Clark 2007; Blanchflower and Oswald 2008);. Initially assessed by standard fixed effects (FE) estimation, the empirical analysis then employs dynamic panel analysis. This is because static fixed effects models (the preferred static panel model) often contain dynamics in the residual. Here, panel data tests of serial correlation demonstrate autocorrelation in the idiosyncratic part of the error term, indicating omitted dynamics. This information should be modelled rather than ignored. Indeed, omitting dynamics is likely to cause biased and inconsistent estimates. As Bond (2002) argues, even if the underlying dynamic process is not of direct interest, allowing for dynamics is important for consistent estimates of the other parameters. Furthermore, the dynamic analysis provides an example of the need for careful diagnostic testing and (related) the importance of the choice (available to researchers who use GMM estimation, but not the

more usual FE estimation) of which repressors should be treated as potentially endogenous or exogenous when employing dynamic panel analysis.

The paper is organised as follows. Section 2 discusses in more detail the age-happiness relationship. Initially the focus is briefly on the U-shape and related debates, before presenting reasons for a focus on a part of the lifecycle. Section 2 also introduces specific reasons for the focus on young people in addition to reviewing the literature that investigates the well-being of the young. Section 3 discusses the data and undertakes fixed effects estimations, highlighting the problem of serial correlation in the residual. Section 4 remedies this problem with a dynamic panel analysis making use of General Method of Moments (GMM) techniques. Finally, section 5 offers some concluding remarks.

2. Age and Well-Being discussion: the U-shape

This section is split into two subsections, after a brief introductory discussion regarding the attempts to better understand the U-shape. The first subsection offers general reasons why it is valuable to investigate different age groups separately, and the second discusses the well-being of the young specifically. The empirical analysis of the next two sections leads on from the discussion of the well-being of the young, and together this paper can provide evidence in line (or not in line) with the U-shape. If the age coefficients follow a declining pattern from age 16 to age 30 (the ages which bookend the sample used below), then the results can be considered in line with the U-shape. Also, the smaller focus offers insights for the age-well-being relationship for everybody as well as young people. The main current debate about the U-shape centres on whether it results solely from methodological considerations or not, and is not discussed further. Schwandt (2014) and Cheng et al. (2014) are good recent guides to this discussion.

Though seemingly well-established (though, as we have seen, still debated), it is not well understood why this U-shape relationship occurs. A few studies have tried to investigate whether the shape is largely a cohort result or a lifecycle result, and on balance they suggest that there may be a cohort influence but that the U-shape also seems to be something that everyone (on average) experiences too, i.e. being a lifecycle effect (Clark 2007; Blanchflower and Oswald 2008; Cheng et al. 2014). In pursuit of an explanation, Schwandt (2014) compares answers to the question in the German Socio-Economic Panel (SOEP) which asks ‘and how do you think you will feel in five years’ with the same individual’s answer to that survey’s main life satisfaction question (‘how satisfied are you with your life, all things considered’) five years later. On average, he finds, young people overestimate their future well-being compared to its eventual realisation, whereas older people tend to underestimate (slightly) their future life satisfaction.¹ Thus, in (approximately) the first half of adult life, people may be experiencing, to some extent, disappointment whereas, on average, individuals in the second half of adult life may be pleasantly surprised which may inform the U-shape. This, Schwandt (2014) argues, supports theories that the U-shape reflects unmet expectations, which are painful for a while and then given up beneficially, with individuals experiencing less and less regret.² However, there is an alternative explanation for declining well-being responses of younger people. As well as being due to unmet aspirations, it could also be that their aspirations were successfully achieved but not as satisfying or as happiness-inducing as they might have assumed. Such individuals, for example, may have worked hard for the career they thought would bring them much satisfaction and have subsequently discovered that it is not the expected boon for happiness. It is quite likely that for some people declining life satisfaction reflects unmet aspirations, and for others aspirations met but found less

¹These average figures include many individuals who underestimate their future life satisfaction when young, and overestimate when older.

²Similar ideas were raised by Blanchflower and Oswald (2004) who offer the following as a possible reason for the upturn, after the lowest point, in reported happiness: “perhaps, by the middle of their lives, people relinquish some of their aspirations and thereby come to enjoy life more” (p.1375).

satisfying than expected, or both (when we consider aspirations from different domains of life). These are complementary explanations for why, as young people age, happiness falls.

Establishing the U-shape to widespread satisfaction is a difficult task (see de Ree and Alessie 2011), and understanding its causes at least as challenging. The remainder of this section offers reasons why splitting up the lifecycle may provide insights into the age-well-being relationship generally, and is a worthwhile alternative approach to the large majority of studies which focus on the whole of life. The second subsection focuses on the well-being of the young and the issues that are specific to this age range.

2.1 Age and Well-Being discussion: reasons for a focus on specific parts of the lifecycle

A central argument of this paper is that investigations into different age ranges or parts of the lifecycle lead to new insights regarding the age-happiness relationship. Within economics, little focus has been given to smaller parts of the lifecycle (e.g. young people, and older people) whereas studies from psychology have inspected the well-being of different age ranges separately. An acknowledged potential problem with the whole lifecycle multivariate regressions that find a U-shape (by controlling for many other factors) is that the controls assume the same definitions and standards for everyone, aged twenty, fifty, or eighty. Good health, for example, is assumed to have the same meaning for everyone regardless of age; yet an 80 year old may have a different conception of good health than a twenty year old. The multivariate regressions will not pick this up, and this is the specific reason for Blanchflower and Oswald (2008) not including physical health as a control. Clark (2007) explains similarly: “in the context of well-being and age... it is contentious to include health as a right hand side variable, although this practice is widespread in the literature. Including health does

imply that we are comparing individuals of different (working) ages, but with the same level of health.” (p. 11). If differences in health matter for well-being, and a stylised result of the happiness literature is that health matters greatly, how should we account for it in an investigation of the underlying relationship between age and well-being? One solution would be to look at smaller age ranges where health can be considered more homogenous than over the whole lifecycle. Another solution would be to use interaction terms to capture any differing effect of health over the lifecycle. Young people, the focus of this study here, are obviously more homogenous than the whole adult lifespan, and the health conditionality placed on the age and well-being relationship is therefore perhaps less contentious.³

The discussion regarding the independent variable for health highlights one reason to consider smaller age ranges. Another comes from the meaning of the dependent variable itself. Thinking about the left hand-side of the standard equations (i.e. happiness or life satisfaction) also provides a rationale for a focus on a particular part of the lifecycle. Perhaps there is a systematic way that happiness differs between ages, meaning that it is useful to study isolated parts of the lifecycle? There is some evidence that this is so. For example, Kamvar et al. (2009), in an analysis of twelve million blogs, find that younger people (the paper is not precise about what this means) refer to happiness as excitement whereas older people refer to it as feeling peaceful. In the blogs being happy was associated with high arousal words for young people, whereas the association was with low arousal words for older people (again, there is no clear definition of older people). They offer support for this finding in subsequent experiments which demonstrate the same thing (or similar) in different ways, finding a statistically significant difference between the two age groups. They argue

³A complementary argument could be made regarding income. Perhaps income has a systematically different impact for the young when compared to older people, though the likely direction of this is much less clear than for health. Arguments could just as easily be put forward for income both having a greater or lesser impact on the life satisfaction of the young when compared to other individuals.

that this change in how happiness is viewed is driven by an increasing sense of connectedness (to others and the present moment). This difference in what happiness (and therefore self-reported happiness) means to different age groups is potentially very important.

An update of the analysis in Kamvar et al. (2009) demonstrates the relative importance of excitement and peacefulness with respect to what individuals regard as happiness in different age ranges (Mogliner et al. 2011). For the twenties age range the ratio of excited happiness to peaceful happiness is about 1.5 to 1, and, as seen on the table below, the change throughout the lifecycle is striking. Note well that the first line of the table and figures are as presented in the original study, whereas the second line is a slight rebasing of the figures for easier comparison.

Table 1 Ratio of happiness as excitement to happiness as peacefulness across the lifecycle

	Teens	20s	30s	40s	50s
Excited happiness/peaceful happiness	1.85:1	1.48:1	1:1.19	1:3.42	1:8.00
	1: 0.54	1: 0.68	1:1.19	1:3.42	1:8.00

(Source: Mogliner et al. 2011, table 3)

Thus individuals are almost twice as likely to describe happiness as excitement than peacefulness when teenagers, and approximately fifty percent more likely in their twenties. At the other end of the scale, individuals are eight times more likely to relate happiness to peacefulness than happiness, a figure that falls to 3 and a half for individuals in the forties age range. This raises the possibility that, whilst studies of the whole lifecycle are valuable and can suggest important patterns of happiness over the lifespan, what is being examined, i.e. the dependent variable, is different at different ages. Carstensen et al.'s theory (1999), from psychology, that we desire more emotionally satisfying experiences than new experiences as we age is a similar argument. What happiness means to individuals is different at different

ages; what causes or contributes to happiness is also different at different ages. A narrower focus can therefore shed light on the different correlates of happiness at different ages. A focus on a more narrow part of the lifecycle rather than the whole age range (as is commonly undertaken) may yield insights of relevance to individuals at different times of life, which may be missed when assessing all ages.

Furthermore, this change in the meaning of happiness itself across the lifecycle might inform the U-shape finding somewhat. The upturn in happiness corresponds with an increase in perceiving happiness as peacefulness. Perhaps feeling peaceful is a more common experience (or more commonly available) than excitement and, perhaps, peacefulness is more commonly achieved resulting in higher life satisfaction scores. This is something that Adam Smith understood. Here is Smith discussing ‘a poor man’s son [who] admires the condition of the rich’ and believes that happiness is a matter of the ‘pursuit of wealth and greatness’:

He studies to distinguish himself in some laborious profession. With the most unrelenting industry he labours night and day to acquire talents superior to all his competitors. He endeavours next to bring those talents into public view, and with equal assiduity solicits every opportunity of employment. For this purpose he makes his court to all mankind; he serves those whom he hates, and is obsequious to those whom he despises. Through the whole of his life he pursues the idea of a certain artificial and elegant repose which he may never arrive at, for which he sacrifices a real tranquillity that is at all times in his power, and which, if in the extremity of old age he should at last attain to it, he will find to be in no respect preferable to that humble security and contentment which he had abandoned for it. It is then, in the last dregs of life, his body wasted with toil and diseases, his mind galled and ruffled by the memory of a thousand injuries and disappointments which he imagines he has met with from the injustice of his enemies, or from the perfidy and ingratitude of his friends, that he begins at last to find that wealth and greatness are mere trinkets of frivolous utility... (1759 p.181)

This could, in part, be a comment on the U-shape, complementing the potential reasons put forward just above, and is returned to in the concluding remarks, after an explicit discussion regarding the well-being of the young and the empirical results below.

2.2 Age and Well-Being discussion: young people

The discussion now turns to the literature, again from within economics and psychology, which investigates the happiness of young people specifically. In the discussion below, and the empirical analysis of sections 3 and 4, young people refers to individuals aged between 16 and 30 years old. Psychologists, particularly, have studied this particular age range in some detail, and have argued that fundamental changes occur as young people age. Bee (1997), for example, recognises that in this age range personality changes towards more autonomy, and more striving for achievement as well as increased self-confidence and personal assertiveness. She also notes that individuals in this age range become not only physically independent of their family, but more psychologically independent too.⁴ Similarly, according to Loevinger (1976, 1984), who set out a framework in psychology for measuring non-observables like the quality of life in 1957, the underlying change in early adulthood is a shift from an external to an internal definition of oneself. Demographer Ronald Rindfuss (1991) refers to the years between 20 and 30 as ‘demographically dense’, because of the many events that take place in this period. Furthermore, there is a focus in psychology on the ‘transition to adulthood’ is in line with a ‘lifecycle’ approach: i.e. the changes are due to getting older. This transition argument suggests that over this age range – “years of profound change and importance” (Arnett, 2000) – the factors that are important for subjective well-being may change.

One of the initial inspirations for this investigation, and its explicit focus on the well-being of the young people, was discussion of a so-called ‘quarter-life crisis’. The first claims for the ‘quarter-life crisis’, largely a cohort concern, came from the U.S. (Robins and Wilner 2001)

⁴ This personality change is clearly not one that is limited to a particular cohort, and lends itself to a lifecycle interpretation of changes in happiness over this age range.

and were then taken up in Britain (e.g. Barr 2005). Related to this, a more recent book, *The Jilted Generation*, argues that life has become worse for young British people, and bases its arguments on politics, jobs and the housing market (Howker and Malik 2010). The current (at the time of writing) Universities Minister in the UK has also written a book describing how societal changes (politics and demographics, especially) have combined to make life harder for young people (Willetts 2010). Willetts negatively contrasts the situation for young people with that for their parents, so-called ‘boomers’, and is thus making an explicit cohort argument. These ‘quarter-life crisis’ analyses suggest that life has been getting harder for young people, and that there is less satisfaction with life in this age-range than at previous times. Overall, the quarter-life crisis literature posits two main reasons for declining well-being: objective factors have changed to make life harder; and individuals in this age range have, over time, more unrealistic aspirations and expectations of what their life should be like. Bosanquet and Gibbs (2005) with their focus on “the impact of tax, public expenditure and higher education policies on young people under 35” (p.4) investigate the objective factors and Barr (2005) and Robins and Wilner (2001) emphasise the subjective feelings that are summarised by individuals claiming that life is not as good as they expected.⁵ The result of Schwandt (2013) could be viewed as evidence for this. These two books (Barr 2005; Robins and Wilner 2001) mention the impact of television and magazines in raising expectations and aspirations, offering individuals an unrealistic expectation of what their life could be like. Twenge (2007) investigates this further. This book’s subtitle – ‘why today’s young Americans are more confident, assertive, entitled – and more miserable than ever before’ – is telling, and informs that the argument she is making is a cohort one. Twenge mentions the following unrealistic expectation: “in 1999, teens predicted that they would be earning, on average, \$75,000 a year by the time they were 30. The average income of a 30-

⁵ Such inflated expectations would be a cohort effect, if not shared with previous generations, or a lifecycle effect if common to young people in different generations. Generally, these arguments, as presented, are cohort arguments.

year old that year? \$27,000.” (p.79) as indicative of the problem, and her overall thesis is that young people are more narcissistic than in the past and that this behaviour reflects a self-promoting (and self-regarding) egotism masking insecurity rather than any genuine self-esteem. Many of these arguments and books have their critics, and the main counter argument for the reasonably recent so-called ‘quarter-life’ concerns is that it has always been a difficult age range with financial worries, and early career concerns, and this is not specific to the current cohort of young people.⁶ Thus these issues could often reflect both lifecycle and cohort interpretations, however given current datasets choosing between them is very difficult. What can be undertaken, at present, is an empirical assessment of the life satisfaction of young people in a similar fashion to that for the whole (adult) life-cycle.

In summary, the above discussion demonstrates why happiness or life satisfaction may be quite different in different age ranges (with potential reasons), and emphasises again that young people are worth assessing separately from other age ranges. The brief review of research from psychology, demonstrates the beliefs of psychologists that different periods of the lifecycle (and different cohorts) require separate studies to understand the causes and correlates of happiness in these different age ranges. This is similar to the argument made by Buss, the evolutionary psychologist, who argued that the sources of happiness differ profoundly for individuals of different ages (Buss, 2000). Carstensen’s theory, (cited in Blanchflower and Oswald, 2008), argues that ageing is associated with increasing motivation to derive emotional meaning from life and decreasing motivation to expand one's horizons. In short, as one ages one feels more connection to the present moment.⁷ These differences by age are emphasised by a survey from gerontology that argues, “it is not appropriate to measure

⁶Financial worries are perhaps not just an exclusive concern of young people, affecting people of all ages.

⁷A recent book (Simmons, 2014) links a connection to the present moment to increased happiness. If this is the case, and older people do feel more connection to the present moment, then this could be a reason for the uptick in ‘underlying’ happiness in later life.

well-being in old age by the same standards that apply to middle age, namely, standards based upon activity or social involvement” (Neugarten et al., 1964, p.134). Stone et al.’s (2010) snapshot of well-being over the whole adult lifecycle indicates that younger people (those under 30) report more stress and anger than older individuals. This snapshot was from 2008, near the start of the banking and financial crisis which may have had an influence on the outcome. It is certainly conceivable that younger people, at the formative stage of their careers may have felt angrier and stressed than in the pre-crisis years.

Recent work within economics has started to explore this notion that, for different age groups, happiness might mean, and be derived from, different things. Lelkes (2008) uses evidence of the U-shape as a start, via European Social Survey (cross-section data), to argue that changes for older people are explained, partly, by changing preferences and, partly, by changing circumstances. Consistent with the argument that different age groups may have different well-being concerns, using the SOEP Fitzroy et al. (2013) find that, in West Germany, life satisfaction for people under 45 is positively related to the income of reference group (a signalling effect), but for people over 45 the life satisfaction effect of reference group income is negative (a comparison effect). This signal effect has also been found for young people by Godechot and Senik (2013), who also find a gender difference, the signal effect is more prevalent for females than males, which underscores the point about the potential value in considering smaller groups than everyone combined over the lifecycle.⁸

Within economics, until recently, only one study (to my knowledge) had specifically investigated the well-being of younger individuals. Blanchflower and Oswald (2000) assess the well-being of the young (meaning individuals under 30) in the United States, and in many

⁸In the estimates below, the results are often split by gender, though largely for practical reasons. Dynamic Panel analysis requires much computing power, and splitting the sample by gender for analysis makes the empirical assessment possible.

European countries, via data from the U.S. General Social Surveys and the Eurobarometer for approximately twenty years from the early 1970s. Using ordered logit analysis, they find that the probability of reporting a high happiness score is lowest at the end of one's twenties, which may be initially taken as suggestive of a 'lifecycle' result. However, since both the U.S. General Social Surveys and the Eurobarometer are cross-section data, the result could just as easily be a cohort result. This apparent declining happiness over their young people age range (16-29 years old) period is consistent with the U-shape, a result examined here with more recent British panel data in sections 3 and 4. They also find a statistically significant, positive time trend, suggesting that 'young Americans become steadily happier since the 1970s' (p.7). In comparison, a time trend effect for the over 30s was found to be small and negative. For Europe, Blanchflower and Oswald (2000) find a slightly upward trend in young people reporting happiness over roughly the same period. Though the abstract acknowledges that "many commentators believe that life in the industrial nations is getting tougher for the young... [and that] the evidence in this paper paints a different picture. The paper documents a rising level of happiness among young people in western countries" (p.289), these results are not necessarily in contrast to the claims made regarding a 'quarter-life crisis'. This is in part because the years of the data used (1972-93) do not reflect the main period of concern for the advocates of this phenomenon. Also as noted above the data sets used are not panels, so the same individuals are not being followed over time and therefore the results could be due to different people being interviewed each year. This also restricts the econometric methods available to investigate the data. In Europe the statistically significant upward time trend they find is for 13 out of the 15 countries investigated. The two countries where it is not found are Great Britain and Ireland, and Blanchflower and Oswald comment that "why the British Isles misses out on this recent growth of well-being amongst the young is a puzzle" (2000, p.302). Thus they cannot reject the belief that life 'is getting tougher for the young' in

the UK, home of the individuals investigated here. An update of this analysis is provided in Blanchflower (2010), which finds that the time trend disappears with a longer stretch of data. Other recent studies that investigate the well-being of the young often focus on a specific issue, for example migration (Switek 2012; Lemos et al 2013), overeducation (Piper 2014), and temporary contracts (Bruno et al. 2013)

The next two sections make use of panel data to examine empirically the happiness of young individuals in Britain via multivariate regressions. As noted earlier this shorter life span removes some of the methodological concerns discussed above (for example the inability to control for health), and perhaps enables a better picture of the happiness of young people to emerge, when compared to studies of the whole life span, where happiness often has different meanings for the individuals investigated.

3 Data description and static panel analysis investigating the well-being of the young

To empirically analyse the life satisfaction of young British individuals, this investigation makes use of the most well-known and employed British Panel data set, the BHPS. Regarding the British individuals under investigation here, we have some clues about what might matter for their life satisfaction as young people. In wave 11 (2002) of the BHPS individuals were asked about the advantages and disadvantages of being their particular age and their responses may give us an idea of what influences their subjective well-being. As an overview, two thirds of young people claimed that being their age was mostly an advantage, with approximately one quarter saying that it was a bit of both (contained advantages and disadvantages), with the rest (about 7%) stating that it was mostly a disadvantage. The notable reasons given, in order of number of responses, were good physical health, being

mature/experienced, having greater freedom, looking forward to the future, feeling positive regarding fitness, happy with work, more job opportunities, more respect shown, secure financially, mention of children, leisure time reasons, and being generally happy with life. Caution should be exercised with these general findings because it is unclear just whom these individuals are comparing themselves to: from some of the responses it appears that they are comparing themselves now to their younger selves, and for some responses comparing themselves now to how they imagine their experience of life might be in the future, when they are older. Recent 'economics of happiness' literature investigates the important issue of with what and whom we compare ourselves to.

For the empirical estimations, the dependent variable is life satisfaction, measured on an ordinal scale from 1 to 7, 'not at all satisfied' to 'completely satisfied', and is treated as a cardinal variable, as is common in the literature. The independent variables, also common in the literature, are income, job status, marital status, education, and health with wave and regional dummies also included. The other variables in the regression account for small age bands (20-23, 24-26, 27-30 with 16-19 being the omitted base category). Combined these are the variables that make up the happiness functions that are estimated in this section and the next. The specification adopted here is typical of much of the estimations in the empirical economic literature referred to above. The main change from the more common standard methods is an age restriction: only individuals aged between 16 and 30 are in the sample. Descriptive statistics for this sample are presented in the appendix.

Initial diagnostic tests (not reported here) establish that the workhorse model, FE, is the preferred static model, being more appropriate than random effects (RE) and ordinary least squares (OLS). Results for these regressions are presented in table 2: the sample for the three

different FE estimations whose results are in the table contain, from left to right, everyone, males only and females only. A discussion of these results follows the table.

Table 2 Fixed effects life satisfaction regression coefficients for young British individuals

VARIABLES	(1)	(2)	(3)
	FE All Life Satisfaction	FE Males Life Satisfaction	FE Females Life Satisfaction
Income (£000s)	0.00 (0.001)	0.00* (0.001)	0.00 (0.001)
Self-employed	-0.05 (0.047)	-0.05 (0.056)	-0.02 (0.085)
Unemployed	-0.33*** (0.030)	-0.38*** (0.041)	-0.27*** (0.045)
Retired	-0.30 (1.033)		-0.25 (1.051)
Other Labour Force Status	-0.03 (0.020)	-0.06 (0.034)	-0.01 (0.025)
Married	0.09*** (0.031)	0.07 (0.047)	0.12*** (0.042)
Separated	-0.14* (0.083)	-0.29** (0.144)	-0.08 (0.103)
Divorced	0.11 (0.094)	0.11 (0.193)	0.14 (0.111)
Widowed	-0.12 (0.486)	-0.71 (1.074)	0.05 (0.551)
Education: High	0.03 (0.052)	0.07 (0.013)	0.02 (0.076)
Education: Medium	0.06 (0.050)	0.09 (0.069)	0.02 (0.072)
Health: Excellent	0.48*** (0.023)	0.46*** (0.034)	0.48*** (0.032)
Health: Good	0.32*** (0.019)	0.33*** (0.028)	0.07** (0.029)
Age: 20-23	-0.15*** (0.021)	-0.26*** (0.031)	-0.13*** (0.038)
Age: 24-27	-0.19*** (0.028)	-0.28*** (0.042)	-0.16*** (0.063)
Age: 28-30	-0.22*** (0.033)	-0.31*** (0.050)	-0.16*** (0.045)
Wave Dummies	No	No	No
Region Dummies	Yes	Yes	Yes
Constant	5.05*** (0.079)	5.11*** (0.110)	4.99*** (0.114)
Observations	30,942	14,398	16,544
Number of pid	9,821	4,648	5,173
R-squared	0.031	0.039	0.028

Standard errors in parentheses

*** p<0.01; ** p<0.05; * p<0.1

Many of the results above are similar to those obtained by analyses of the whole adult lifecycle. Perhaps the largest difference to the full adult age-range (or at least adult working age range) estimations is found with marital status, with being divorced and widowed having no statistical association with life satisfaction. For young people, the majority of observations belong to the base category of never married, whereas only about 1.5% of the observations in the sample have a marital status of divorced and widowed has only 46 observations (with just 3 of these belonging to males). The results above are in line with the U-shape. The base category is 16-19 and as the categories contain higher ages the coefficient becomes increasingly negative. Interestingly, these significant negative coefficients are substantially larger for males than females. This seems to support the U-shape as being more than a statistical artefact, created by using age and age-squared over the lifecycle. Here, the common quadratic formulation for age is not used, and other potentially necessary data used for previous results (i.e. responses from those over 30) are not included. Well-being seems to fall as young people age. A caveat to this is that such a result is not obtained when dummy variables for the waves of the BHPS are included. In this case, most of the age category dummy variables coefficient estimations are insignificantly different from zero. An analysis that employs random effects, which is rarely supported in a well-being context, rather than fixed effects, is consistent with the U-shape with and without the inclusion of wave dummies.

A methodological concern relates to serial correlation, which can be easily tested for in a panel context.⁹Here Wooldridge's (2002) test for serial correlation, implemented in Stata by the user-written *xtserial* command (Drukker 2003), rejects the null of no first order autocorrelation with a p-value of 0.0000. Essentially, there is no practical chance of error when rejecting the null hypothesis of no serial correlation. This is potentially useful

⁹This is not yet current practice in the well-being literature.

information. One possibility is to recognise the clusters involved in the panel regression and to correct the standard errors accordingly. However, this treats the omitted dynamics detected by the diagnostic test as a problem, rather than as an invitation to respecify the model to include the omitted dynamics in the estimated part of the model.¹⁰ Doing so enables researchers to exploit this additional information in estimation. This argument has recently been strongly supported by King and Roberts (2012) in a study of robust standard errors:

Robust standard errors now seem to be viewed as a way to inoculate oneself from criticism. We show, to the contrary, that their presence is a bright red flag, meaning “my model is misspecified”... it appears to be the case that a very large fraction of the articles published across fields is based on misspecified models. For every one of these articles, at least some quantity that could be estimated is biased (p. 2).¹¹

Accordingly, a potentially more appropriate and more interesting solution is to estimate a dynamic panel model, undertaken in section 4 just below.

4 The well-being of the young: dynamic panel analysis

This section is informed by the presence of first order serial correlation in the idiosyncratic error term in the static estimations of section 3. Such a result can mean that the estimates generated by static panel analysis are inefficient and potentially misspecified. Adding dynamics to the model is usually undertaken by including a lag of the dependent variable as a right hand side variable. Hence, we are estimating the following standard equation (with the independent variables excluded for clarity):

$$y_{it} = \beta y_{i,t-1} + (\alpha_i + \varepsilon_{it}) \quad (1).$$

As this is a panel model each observation is indexed over i ($= 1 \dots N$) cross-section groups (here individuals) and t ($= 1 \dots T$) time periods (here, annual observations). Equation 1 is a

¹⁰ Piper (2013a) discusses in some detail two main options for modelling normally omitted dynamics in happiness estimates.

¹¹ “We strongly echo what the best data analysts have been saying for decades: use all the standard diagnostic tests; be sure that your model actually fits the data; seek out as many observable implications as you can observe from your model. And use all these diagnostic evaluation procedures to respecify your model” King and Roberts (2012, p.8).

first-order dynamic panel model, because the explanatory variables on the right-hand side include the first lag of the dependent variable ($y_{i, t-1}$). The composed error term in parentheses combines a group-specific random effect to control for all unobservable effects on the dependent variable that are unique to the individual and do not vary over time (α_i), which captures specific ignorance about individual i , and an error that varies over both individuals and time (ε_{it}), which captures our general ignorance of the determinates of y_{it} . Such an equation cannot be estimated accurately by OLS or by fixed effects estimation because of upwards and downwards biases respectively. Our solution is to use system GMM, discussed in detail elsewhere generally (Roodman 2009a; Roodman 2009b) and in a well-being context (Piper 2013b). For brevity, here we note that researchers need to decide which regressors are potentially endogenous or strictly exogenous, and how many instruments should be used.¹² Fortunately there are diagnostics available, built-in with the widely used *xtabond2* Stata user command to help with these choices.

After diagnostic testing the variety of possibilities, a decision was taken to treat health and marital status as endogenous and everything else as exogenous. This informs the instrument set created and used. This important decision is returned to below after a discussion of the results in table 3, which present the results from system GMM estimation with the minimum number of instruments (column 1 for males, 3 for females), and the maximum default instrumentation (column 2 for males, 4 for females), and this is the only difference between the estimations generating the results in the two columns for each gender.

¹²As the references listed just above explain (particularly Roodman 2009a), the instruments are most often internal instruments using lagged levels and lagged changes of the independent variables. As we shall see, the choice of potential endogeneity or exogeneity of the regressors can have a substantial impact on the results subsequently obtained.

Table 3 Life satisfaction of young British people, assessed via GMM dynamic panel analysis,

(health and marital status treated as endogenous).

	Males	Males	Females	Females
Number of observations	8662	8662	10187	10187
Number of instruments	109	271	119	309
Lagged Life Satisfaction	0.11*** (0.028)	0.10*** (0.028)	0.09*** (0.025)	0.07*** (0.026)
Real Income (£'000s)	0.00* (0.001)	0.00** (0.001)	0.00 (0.001)	0.00 (0.001)
Self-employed	-0.06 (0.056)	-0.03 (0.57)	-0.04 (0.088)	0.02 (0.084)
Unemployed	-0.37*** (0.064)	-0.40*** (0.065)	-0.25*** (0.073)	0.27*** (0.073)
Other Labour Force Status	-0.04 (0.046)	-0.06 (0.042)	-0.05 (0.032)	-0.030 (0.031)
Married	0.31*** (0.098)	0.29*** (0.091)	0.48*** (0.090)	0.52*** (0.076)
Separated	-0.03 (0.461)	-0.67 (0.566)	0.43 (0.353)	0.58 (0.383)
Divorced	-0.13 (0.364)	-0.02 (0.254)	0.17 (0.218)	0.22 (0.181)
Widowed	-2.61 (32.255)	-11.04 (30.872)	-0.64 (2.025)	-1.11 (1.073)
Education: High	-0.08 (0.070)	-0.08 (0.067)	0.12* (0.065)	0.19*** (0.065)
Education: Medium	-0.03 (0.065)	-0.03 (0.063)	0.09 (0.062)	0.15** (0.065)
Health: Excellent	0.88*** (0.383)	0.58** (0.234)	1.37*** (0.309)	0.98*** (0.207)
Health: Good	0.41 (0.368)	0.33 (0.210)	0.50* (0.284)	0.71*** (0.169)
Age: 20 – 23 years old	-0.12*** (0.030)	-0.12*** (0.031)	-0.01 (0.030)	-0.02 (0.029)
Age: 24 – 27 years old	-0.20*** (0.043)	-0.021*** (0.041)	-0.13*** (0.044)	-0.13*** (0.039)
Age: 28 – 30 years old	-0.30*** (0.062)	-0.28*** (0.056)	-0.25*** (0.060)	-0.26*** (0.052)
Wave Dummies	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes
Constant	4.30*** (0.276)	4.48*** (0.216)	4.14*** (0.240)	4.16*** (0.186)
AR (2)	0.314	0.363	0.833	0.972
Hansen's <i>J</i> test	0.314	0.864	0.848	0.906
Diff-in-Hansen for Levels	0.213	0.225	0.728	0.372
Diff-in-Hansen (lag depvar)	0.704	0.733	0.338	0.182

Note: data from individuals in the BHPS, 1996-2007, aged 16 to 30. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. Missing categories: employed, single, low education, fair to very poor health, 16 – 20 years old.

It is important to note that the results should not be directly compared with those obtained by static panel analysis. With static panel analysis the coefficients obtained for the independent variables reflect the full information available whereas with dynamic panel analysis they reflect new information conditional on the history of the model (which is contained in the lagged dependent variable) (Greene 2008. p.468). Here though, the coefficients are qualitatively similar to those obtained via static fixed effects analysis (table 2) with one large exception. For males, it appears that self-reporting health as being good has no statistically significant difference from self-reporting it as less than good. This is an unusual result when compared to much of the well-being literature for the whole of the lifecycle, and may indicate that young males takes their health for granted somewhat. However treating health as exogenous restores statistical significance to the coefficient for good health: table 4 below shows this treating, for both genders, only marital status as endogenous for the purpose of subsequent instrumentation.

Table 4 Life satisfaction of young British people, assessed via GMM dynamic panel analysis, (only marital status treated as endogenous).

	Males	Males	Females	Females
Number of observations	8662	8662	10187	10187
Number of instruments	85	163	95	202
Lagged Life Satisfaction	0.10*** (0.027)	0.10*** (0.029)	0.09*** (0.024)	0.07*** (0.025)
Real Income	0.00** (0.001)	0.00** (0.001)	0.00 (0.001)	0.00 (0.001)
Self-employed	-0.07 (0.057)	-0.06 (0.058)	0.00 (0.080)	0.01 (0.081)
Unemployed	-0.37*** (0.060)	-0.38*** (0.061)	-0.28*** (0.071)	-0.29*** (0.073)
Other Labour Force Status	-0.04 (0.041)	-0.04 (0.040)	-0.06* (0.029)	-0.05 (0.030)
Married	0.34*** (0.095)	0.30*** (0.091)	0.51*** (0.085)	0.53*** (0.080)
Separated	-0.10 (0.410)	-0.68 (0.551)	0.60 (0.386)	0.71* (0.367)
Divorced	-0.06 (0.315)	0.09 (0.286)	0.34* (0.194)	0.23 (0.175)
Widowed	-10.46 (33.589)	-13.44 (33.383)	-1.50** (0.662)	-1.37 (0.948)
Education: High	-0.07 (0.063)	-0.09 (0.063)	0.17*** (0.060)	0.20*** (0.062)
Education: Medium	-0.02 (0.059)	-0.03 (0.059)	0.14** (0.059)	0.17*** (0.061)
Health: Excellent	0.71*** (0.043)	0.71*** (0.044)	0.79*** (0.039)	0.77*** (0.040)
Health: Good	0.45*** (0.038)	0.46*** (0.038)	0.52*** (0.033)	0.51*** (0.035)
Age: 20 – 23 years old	-0.12*** (0.030)	-0.12*** (0.031)	-0.02 (0.029)	-0.02 (0.029)
Age: 24 – 27 years old	-0.21*** (0.040)	-0.20*** (0.040)	-0.13*** (0.040)	-0.13*** (0.039)
Age: 28 – 30 years old	-0.31*** (0.058)	-0.28*** (0.056)	-0.27*** (0.056)	-0.26*** (0.053)
Wave Dummies	Yes	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes	Yes
Constant	4.35*** (0.155)	4.35*** (0.164)	4.20*** (0.140)	4.28*** (0.145)
AR (2)	0.336	0.360	0.759	0.920
Hansen's J test	0.441	0.935	0.878	0.831
Diff-in-Hansen for Levels	0.178	0.578	0.838	0.979
Diff-in-Hansen (lag depvar)	0.289	0.882	0.137	0.069

Note: data from individuals in the BHPS, 1996-2007, aged 16 to 30. Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1. Missing categories: employed, single, low education, fair to very poor health, 16 – 20 years old.

Now, for male individuals self-reporting their health as good, on average, is positively associated with life satisfaction, as shown in table 4. The coefficient for reporting health as good rather than less than good is around 0.5, on a life satisfaction scale of 1-7. This is quite a sizeable effect, and was not obtained when treating health as endogenous. This provides a reminder that the choice of endogeneity or exogeneity is important and can have a substantial impact on the results subsequently obtained. Care must be taken regarding this choice, and here the decision to treat it as endogenous was (for males) diagnostically rather marginal. The decision rests on the diagnostic tests, and here the diagnostic test of the exogeneity of the instruments for levels (diff-in-Hansen for levels in tables 3 and 4). A potential minimum put forward is a p-value of about 0.25, which should still be treated with concern because it "means that if the specification is valid, the odds are less than 1 in 4 that one would observe a J statistic so large" (Roodman 2009a, p.142).¹³ For males, with minimum instrumentation (i.e. column 1), in table 3 this statistic is approximately 0.21 and in table 4, 0.18. The test marginally favours treating health as endogenous, though a case can be made for viewing these results as diagnostically equivalent. This is not so for females where, as tables 3 and 4 show, health needs to be treated as endogenous. Without doing so (table 4), difference-in-Hansen tests of the exogeneity of the instruments created by the lagged dependent variable can be comfortably rejected. With p-values of 0.137 and 0.069, the necessary assumption of the exogeneity of instruments is rejected. It is interesting to note that these estimates for females would appear acceptable estimations based outcomes for AR(2) and the *J*-statistic (often the only diagnostics reported with GMM life satisfaction results), an example of Roodman's worry that many dynamic panel results are presented that appear valid when they are invalid. As a result researchers should report the difference-in-Hansen tests for levels and

¹³Though Roodman states that a p-value as high as 0.25 should be viewed with concern, he does not reject his later results (Roodman 2009b, p.118) when he obtains, in the same estimation, values of 0.193 and 0.218.

lagged dependent variable in addition to the AR (2) test result and *J*-statistic (Roodman 2009a, p.156).

These coefficients (from both table 3 and 4) reflect a contemporaneous (or short-run) association of the independent variables with current life satisfaction, conditional on the history of the model (which is captured by the lagged dependent variable). That these coefficients are not so different from those obtained by the more common FE estimations is not surprising. The coefficient obtained for the lagged dependent variable indicates that the influence of the past (both the past values of the independent variables and of life satisfaction) is quite small and significant. This is in line with previous results and as expected (see Piper 2013b for a detailed discussion). This result indicates that there is a small, but significant, ‘carry-over’ of happiness from the past, perhaps reflecting the notion of individuals being able, via experience, to build up ‘hedonic capital’ (Graham and Oswald 2006, Graham and Oswald 2010). This finding and notion may also support the speculation made earlier regarding the U-shape: perhaps individuals, as they age, learn what makes them happy and make better choices for their happiness as well as being better able to predict their future happiness? This possibility is supported by Schwandt (2014) which, as discussed above, demonstrated that younger people, when compared to older people, substantially mispredict their future life satisfaction.

A claim was made in the discussion of section 2 above (reflecting literature from psychology) that as one ages one feels more connection to the present moment. The dynamic panel analysis results offer suggestive support for this claim. The coefficient on lagged life satisfaction is quite small and significant, indicating that the vast majority of what influences current life satisfaction is contemporaneous. This may mean that individuals who are more

present focused have more life satisfaction. Since this is argued to be related to age, on average, more connection to the present moment may well link to higher happiness scores, which could be reflected in the upward tick of the U-shape for older adults. Further research is necessary for this to be anything more than a possibility though. Finally, as for the U-shape itself, the age coefficients, in every case, are supportive of its existence (though there is no statistically significant difference found for the 16-19 and 20-23 age range for females). Overall, this empirical assessment suggests that life satisfaction for the young is quite similar to life satisfaction for everybody. Future work could test differences between age groups or generations and explore the surrounding issues.

5 Concluding remarks

This investigation is novel in two main respects: firstly, the focus on young people, and secondly, the use of dynamic panel estimation to capture usually omitted dynamics. In the first respect, the vast majority of studies investigating the age-well-being relationship investigate the whole of adult life, whereas this study employs a smaller focus investigating the well-being of young people. Through this focus, insights are gained for the whole adult lifecycle as well as results regarding the life satisfaction of the young. There is evidence that what happiness means to individuals changes in different age ranges, thus each age range may have potentially different causes and correlates for well-being. Here, however, the empirical results suggest that the well-being of the young is not so different from the well-being of all adults, when assessed by standard multivariate regression. This is despite the literature review highlighting that there might be different influences and associations when compared with happiness for everybody (or at least an older age range).

Secondly, the vast majority of studies in this area (and wider ‘economics of happiness’ literature) employ static fixed effects analysis. This study did so too, but also employed dynamic panel analysis via GMM estimation. The motivating reason for this was the finding of serial correlation in the idiosyncratic error term of the static fixed effects estimation which indicates that static estimates are omitting dynamics. Thus, the dynamic analysis is the preferred specification for estimation. This involves more complexity than standard fixed effects analysis, but there is (now) much guidance in the literature regarding these methods and their important diagnostic tests. This investigation has demonstrated clearly that applied researchers, when using GMM dynamic panel methods need to decide (with help from diagnostic tests) whether to estimate variables as potentially endogenous or exogenous. The results above suggest that this choice is important, modelling health as endogenous results in an influence on happiness that is not significantly different from zero, which is quite a different result from that obtained when health is treated as exogenous.

The underlying U-shape relationship between well-being and age is supported by the analysis here: happiness declines over the 16-30 age range, a result found by comparing the coefficients of the age dummies. A small caveat is that with the static estimations, including wave (i.e. time) dummy variables removed the significance of the age dummies, and with the dynamic estimation there was no significant difference for females aged 20-23 compared with females aged 16-19. Generally, these reports are in line with the U-shape finding.

A key finding from the dynamic panel analysis is a statistically significant positive coefficient for lagged happiness. Thus, there is a clear, if small (approximately 0.1), positive impact of past happiness on this year’s happiness (i.e. current happiness). One interpretation of this positive relationship is found in the notion of hedonic capital, that individuals learn

what makes them happy (Graham and Oswald 2006; Graham and Oswald 2010). This learning is itself supported by the finding by Schwandt (2014) using German panel data that younger people mispredict their future life satisfaction more than older people do. The literature discussion suggests also that older people relate happiness to peacefulness whereas younger people associate it with excitement. This, coupled with the possibility that people learn what happiness is for them (and how to achieve it) suggests perhaps that older people learn that happiness is a choice that is, in the words of Adam Smith, “a real tranquillity that is at all times in his [/their] power” (Smith 1759 p.181). Something not yet realised by Smith’s young man who mispredicts his happiness because “through the whole of his life he pursues the idea of a certain artificial and elegant repose” tries to do so by seeking “to distinguish himself in some laborious profession...with the most unrelenting industry.” The different conceptions of happiness that belong (on average) to the young, like excitement and novelty, and belong to older individuals, like peace and contentment, are likely to have an impact on the age-well-being relationship over the adult lifecycle.

In addition to the sign of the coefficient for lagged life satisfaction, the size may similarly explain changes in the U-shape. The size is small (and significant) indicating that much of what influences happiness (or life satisfaction) is contemporaneous. This is supportive of theories from psychology which argue that as individuals age they feel more connection to the present moment and are not so future-oriented. If happiness is largely a contemporaneous phenomenon, this can provide a reason, after midlife, for (average) happiness to increase as people age. Further research is needed to assess this possibility, and similar ideas.

Studies regarding the whole of life and the U-shape are no doubt interesting and informative. Studies that focus on a particular part of the age are complementary ways of understanding the relationship between age and happiness: they can perhaps better explore the specific part

investigated and, by doing so, find insights that can inform the whole lifecycle relationship too. In addition to whole (adult) lifecycle investigations, future studies should also focus on particular parts of the lifecycle, and make comparisons between, and contrasts regarding, the well-being of different between age ranges and generations. This is likely to lead to greater understanding overall.

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Appendix

Table A1a. The distribution of life satisfaction in the analysis sample of the BHPS

Life Satisfaction	Males		Females	
	Count	%	Count	%
1	171	0.10	203	0.11
2	305	1.81	374	1.94
3	920	5.46	1,073	5.57
4	2,271	13.47	2,809	14.57
5	5,424	32.16	5,929	30.76
6	5,898	34.97	6,746	35.00
7	1,876	11.12	2,140	11.10
Total	16,865	100.00	19,274	100.00

Note: These numbers refer to the sample aged 16-29

Table A1b Independent variables and base categories, summary statistics, BHPS waves 6-10 and 12-17 (the waves where life satisfaction is included in the survey).

variable	mean	N	max	min
Real Annual Income (£'000s)	9.745	33130	1231.75	0
Employed	0.583	36962	1	0
Self-employed	0.033	36962	1	0
Unemployed	0.065	36962	1	0
Retired	0.000	36962	1	0
Other labour force Status	0.319	36062	1	0
Married (mar1)	0.177	36864	1	0
Separated (mar2)	0.009	36864	1	0
Divorced(mar3)	0.012	36864	1	0
Widowed (mar4)	0.000	36864	1	0
Never Married (mar5)	0.799	36864	1	0
Education: other (ed1)	0.145	35855	1	0
Education: High (ed2)	0.356	35855	1	0
Education: Medium (ed3)	0.499	35855	1	0
Health: Excellent (gh1)	0.279	36974	1	0
Health: Good (gh2)	0.513	36974	1	0
Health: Fair/Poor/Very poor	0.208	36974	1	0
Age: 16-19	0.270	36989	1	0
Age: 20-23	0.258	36989	1	0
Age: 24-27	0.264	36989	1	0
Age: 28-30	0.209	36989	1	0

