# Is Well-being U-Shaped over the Life Cycle?

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Abstract

We explore the idea that happiness and psychological well-being are U-shaped in age. The main difficulty with this argument is that there are likely to be omitted cohort effects (earlier generations may have been born in, say, particularly good or bad times). First, using data on 500,000 randomly sampled Americans and West Europeans, the paper designs a test that controls for cohort effects. A robust U-shape is found in separate equations in *seventy four countries* - Albania; Argentina; Australia; Azerbaijan; Belarus; Belgium; Bosnia; Brazil; Brunei; Bulgaria; Cambodia; Canada; Chile; China; Colombia; Costa Rica; Croatia; Czech Republic; Denmark; Dominican Republic; Ecuador; El Salvador; Estonia; Finland; France; France; Germany; Greece; Honduras; Hungary; Iceland; Iraq; Ireland; Israel; Italy; Japan; Kyrgyzstan; Laos; Latvia; Lithuania; Luxembourg; Macedonia; Malta; Mexico; Myanmar; Netherlands; Nicaragua; Nigeria; Norway; Paraguay; Peru; Philippines; Poland; Portugal; Puerto Rico; Romania; Russia; Serbia; Singapore; Slovakia; South Africa; South Korea; Spain; Sweden; Sweden; Switzerland; Tanzania; Turkey; United Kingdom; Ukraine; Uruguay; USA; Uzbekistan and Zimbabwe.

Ceteris paribus, a typical individual's well-being reaches its minimum -- on both sides of the Atlantic and for both males and females -- in middle age. We demonstrate this with a quadratic structure and non-parametric forms. Second, some evidence is presented for a U-shape in developing countries, East European, Latin American and Asian nations. Third, using measures that are closer to psychiatric scores, we document a comparable well-being curve across the life course in two other data sets: (i) in GHQ-N6 mental health levels for a sample of 16,000 Europeans, and (ii) in reported depression and anxiety among approximately 1 million U.K. citizens. Fourth, we document occasional apparent exceptions, particularly in developing nations, to the U-shape. Fifth, we note that American male birth cohorts seem to have become progressively less happy with their lives. Our paper's results are based on regression equations in which other influences, such as demographic variables and income, are held constant.

**Is Well-being U-Shaped over the Life Cycle?**

<u>1. Introduction</u>

A large social-science literature is emerging on the determinants of happiness and mental well-being. As would be expected, this topic has attracted attention from medical statisticians, psychologists, economists, and other investigators (including recently Easterlin 2003, Blanchflower and Oswald 2004, Helliwell and Putnam (2004), Lucas et al 2004, Layard 2005, Smith et al 2005, Ubel et al 2005, Gilbert 2006, and Kahneman et al 2006). However, a fundamental research question remains poorly understood. What is the relationship between age and well-being?

Traditional surveys of the field, such as Myers (1992), Diener et al (1999) and Argyle (2001), argue that happiness is either flat or slightly increasing in age. New work, however, has shown that there is some evidence of a U-shape through the life cycle. In cross-sections, even after correcting for potentially confounding influences, there is now thought to be a well-determined convex link between reported well-being and age. This finding is reported in Clark and Oswald (1994), Gerlach and Stephan (1996), Theodossiou (1998), Winkelmann and Winkelmann (1998), Blanchflower (2001), Di Tella et al (2001, 2003), Frey and Stutzer (2002), Blanchflower and Oswald (2004), Graham (2005), Oswald (1997), Frijters et al (2004, 2005), Senik (2004), Van Praag and Ferrer-I-Carbonell (2004), Shields and Wheatley Price (2005), Oswald and Powdthavee (2005, 2007), Propper et al (2005), Powdthavee (2005), Bell and Blanchflower (2007), and Uppal (2006). Clark et al (1996) makes the argument for job satisfaction equations. Pinquart and Sorensen (2001) develops an equivalent case for a measure of loneliness, and Hayo and Seifert (2003) does so for a measure of economic subjective well-being. Jorm (2000) reviews psychiatric evidence and concludes that there are conflicting results on how

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the probability of depression alters through the life course. Glaeser et al (2002) find that 'social capital' appears to be hill-shaped over the life cycle.

There is an important difficulty with the U-shape conclusion. A variable that measures how old someone is may be standing in for omitted cohort effects (earlier generations may have been born in, say, particularly good or bad times). Hence the U-shape in age, uncovered now by various authors, could be an artifact of the data.

This is more than a theoretical possibility. Suicide levels seem to vary across cohorts (Stockard and O'Brien 2002). Moreover, Blanchflower and Oswald (2000) find some evidence of rising well-being among young people. There is also evidence -- for example, in Sacker and Wiggins (2002) -- that levels of depression and psychiatric distress, measured consistently across cohorts, have risen in a country such as Great Britain. Oswald and Powdthavee (2007) document worsening mental distress GHQ scores in Britain. Nevertheless, these matters are still the subject of debate (Murphy et al 2000, Paykel 2000).

This paper offers some of the first evidence that the curvilinear relationship is robust to cohort effects. We draw upon randomly sampled data on more than 500,000 Americans and Europeans. These data come mainly from the General Social Surveys of the United States and the Eurobarometer Surveys, and, necessarily given the design of our test, cover a period of some decades. After controlling for different birth cohorts, we show that well-being reaches its minimum around the middle of life, and in most data sets in a person's 40s. The regularity in the data is intriguing. The U-shape is fairly similar for males and females, and for each side of the Atlantic Ocean (though its minimum is apparently reached a little later among American men). Moreover, because of the size of our data sets, the turning point in well-being -- the age at which happiness begins to lift back up -- is reasonably precisely determined. In

total we find a statistically significant U-shape in happiness or life satisfaction by age estimated separately for *seventy four countries* - Albania; Argentina; Australia; Azerbaijan; Belarus; Belgium; Bosnia; Brazil; Brunei; Bulgaria; Cambodia; Canada; Chile; China; Colombia; Costa Rica; Croatia; Czech Republic; Denmark; Dominican Republic; Ecuador; El Salvador; Estonia; Finland; France; France; Germany; Greece; Honduras; Hungary; Iceland; Iraq; Ireland; Israel; Italy; Japan; Kyrgyzstan; Laos; Latvia; Lithuania; Luxembourg; Macedonia; Malta; Mexico; Myanmar; Netherlands; Nicaragua; Nigeria; Norway; Paraguay; Peru; Philippines; Poland; Portugal; Puerto Rico; Romania; Russia; Serbia; Singapore; Slovakia; South Africa; South Korea; Spain; Sweden; Sweden; Switzerland; Tanzania; Turkey; United Kingdom; Ukraine; Uruguay; USA; Uzbekistan and Zimbabwe..

One point should be made clear from the outset. It is that the paper will concentrate mostly on so-called single-item measures of well-being, so cannot allow subtle differentiation -- as favoured in some psychology journals -- into what might be thought of as different types of, or sides to, human happiness or mental health. Nevertheless, the patterns that emerge seem of interest.

The paper's concern is with the ceteris paribus correlation between well-being and age, so we later partial out some other factors, such as income and marital-status, that alter over a typical person's lifetime and have an effect upon well-being. This follows one particular tradition of empirical research. We read the effect of a variable's coefficient from a long regression equation in which other influences have been controlled for as effectively as possible.

Despite the commonness of this convention in modern social-science research, such a method is not inevitable. A valid and different approach is that of, for example, Mroczek and Kolanz (1998) and Easterlin (2006), who control for few or no

other influences upon well-being, and instead scrutinize the aggregate uncorrected relationship between happiness and age. These authors focus on a reduced-form issue. They largely ask the descriptive question: how does observed happiness vary over the life cycle? Related work is that of Mroczek and Spiro (2005), who establish in a data set on American veterans, where the youngest person in the data set is 40 years old -- making it hard to do an exact comparison with our later random samples -- that happiness rises into the person's early 60s, and then appears to decline.

As common observation shows, the quality of a person's health and physical abilities can depend sensitively on the point in the life cycle. Most diseases, and the probability of getting them, worsen with age. A 90 year old man cannot in general do the same number of push-ups as a 20 year old man. Hence an important issue is whether in happiness equations it is desirable to control in some way for health and physical vitality. There is here no unambiguously correct answer. But the approach taken in the paper is not to include independent variables that measure physical health. This is partly pragmatic: our data sets have no objective measures and few subjective ones. But the decision is partly substantive: it seems interesting to ask whether people become happier as they age once demographic and economic variables are held constant.

There is relatively little social-science theory upon which to draw (though mention should be made of Carstensen's theory, which, put informally, is that age is associated with increasing motivation to derive emotional meaning from life and decreasing motivation to expand one's horizons: see Carstensen et al 1999 and Charles et al 2001). Conventional economics is in principle capable of making predictions about the life cycle structure of happiness -- if conceptualized as utility in the normal economist's framework. In practice, however, the theory does not appear

to generate a U-shape in any natural way. Instead, perhaps the most natural conclusion is that well-being might be predicted to be independent of age. To see why, let the individual agent be concerned to maximize lifetime utility V by choosing a consumption path c(a) where a is the individual's age. Assume, for simplicity, that lifespan runs deterministically from time point t to time point T, and that there is no discounting. Let income, y, be fixed and given by the agent's talent endowment, and for simplicity normalize this to unity. Then the agent chooses consumption, c, at each age, a, to maximize lifetime happiness

$$V = \int_t^T u(c,a)da \quad (1)$$

subject to an inter-temporal borrowing constraint

$$1 = \int_t^T c(a)da \quad (2)$$

in which the endowment of income to be allocated across all the periods has been set to one. Assume that u, utility, or well-being, is an increasing and concave function of consumption, c. Spending, by assumption, makes people happier, but at a diminishing rate.

This is the simplest kind of isoperimetric problem. The first-order condition for a maximum is the usual one: it requires the marginal utility of consumption to be the same at each level of age, a. Therefore, solving a Lagrangean L constructed from (1) and (2):

$$\frac{\partial L}{\partial c} = \frac{\partial u(c,a)}{\partial c} - \lambda = 0 \quad (3)$$

where, from the underlying mathematical structure, the multiplier lambda is necessarily constant across all the different ages from t to T. Individuals thus allocate their discretionary spending to the points in time when they enjoy it most.

If the utility function u(c, a) is additively separable in consumption c and age a, then equation (3) has a simple implication. It is one that is implicit, though perhaps not always articulated, in much of standard economic theory. Consumption will be flat through time (because under separability u = u(c)) + v(a)) and, therefore, utility will also be flat through the lifespan if the non-consumption part of utility, v(.), is independent of age. In plainer language, happiness will not alter over a person's life course.

It seems reasonable to suggest that to go from the utility function u = u(c, a) to the presumption that u(..) is additively separable in its two arguments is a large, and potentially unwarranted, step. There is no clear reason why the marginal utility of consumption would be independent of a person's age. For example, one might believe that young people wish to signal their status more, and therefore might have a greater return from units of consumption than the old (so the cross-partial derivative of u(c, a) would then be negative). Alternatively, one might argue that older people have more need of health and medical spending, and therefore that the marginal utility of consumption is greatest at high levels of age. Then, of course, the cross-partial of u(c, a) is positive. While it would be possible to assume that early in life the first effect dominates and then in later life the second one dominates, and in this way get eventually to a model where well-being was curved through the lifespan, to do so seems too ad hoc (or perhaps one would say post-hoc) to be persuasive theoretically.

What this means is that textbook economic analysis, at least as based on normal assumptions of lifetime maximization and the concavity of utility, is -- without making assumptions about v(a) that could mechanically lead to any shape --

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not capable of producing clear predictions about the nonlinear pattern of well-being through an individual's life.

2. Empirical Results

To explore this issue empirically, we draw upon a number of data sets -- they combine data on hundreds of thousands of randomly selected individuals -- and implement a test that controls for the possible existence of cohort effects. Our data do not follow the same individuals through time. They provide repeated statistically representative snapshots year after year. Other approaches to the cohort-effects problem have recently been proposed, using British longitudinal data, by Clark (2007) and Clark and Oswald (2007).

The key evidence in the paper is summarized in five tables. These give regression equation results in which the dependent variable is derived from two kinds of survey answers. The principal data sets employed in the paper are the U.S. General Social Surveys (GSS) from 1972-2006 and the Eurobarometers from 1976-2002. The exact wording of the GSS well-being question is: *"Taken all together, how would you say things are these days – would you say that you are very happy, pretty happy, or not too happy?"* In the Eurobarometer survey it is: *"On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?"*

To give a feel for the raw patterns in the data, happiness in the United States can be expressed in a cardinal way by assigning 1 to 3 to the three answers above, where 'very happy' is a 3. In that case, the mean of US happiness in the data is 2.2 with a standard deviation of 0.6. Similarly, European life satisfaction can be cardinalized using the integers 1 to 4, where 'very satisfied' is a 4. In this case, the mean of life satisfaction is 3.0 with a standard deviation of 0.8. Well-being answers

are somewhat skewed, in both data sets, towards the upper end of the possible distribution.

Table 1 takes all the males in the U.S. General Social Survey from 1972-2006. It estimates a happiness regression equation for this sub-sample, and reveals in its early columns that well-being is U-shaped in age.  Then cohort variables are introduced.  These take the form of a set of dummy variables – one dummy for each decade of birth.  Although the introduction of the cohort dummies affects the turning point of the quadratic function in age, it does not do so in a way that changes the thrust of the idea that psychological well-being follows a U-shaped path.  The same statistical procedure is adopted for the analysis of three further sub-samples, namely, the females in the GSS data set, the males in the Eurobarometer survey, and finally the females in the same European sample.  We typically test for a U-shape by examining whether the data take a quadratic form in age.  The coefficients on age-squared variables are usually statistically significant at the 0.0001 level.

In the first column of Table 1 a GSS happiness ordered logit equation is estimated on the pooled sample of 20,316 American males with age entered as an independent variable.  It has, as further independent regressors, a separate dummy variable for each year in the data set, and for each region of the United States.  These are to mop up year-by-year variation in national well-being and unchanging spatial characteristics (such as, say, regions' climatic conditions).

The age regressor in the first column of Table 1 has a positive coefficient of 0.0096 and a t-statistic of approximately 12.  Hence reported happiness is higher among people who are older.  Subsequent columns of Table 1 add a number of additional regressors - years of education of the person; two dummy variables for racial type; 8 dummy variables to capture the working status (employed, unemployed,

…) of the person; a dummy to identify if the respondent has dependent children; a dummy to identify if at age 16 the person was not living with both parents because of divorce; and 4 dummy variables to capture the person's marital-status. Despite what might be conjectured, it seems to make little difference if controls are entered for having young children, or children of various different ages. The well-being U-shape in age is apparently not produced by the influence of children. Subsequent columns of Table 1 check for a turning point in age. It does so, initially, in the simplest parametric way, by fitting a level and a squared term. In column 2 of Table 1, a quadratic form seems to approximate the data well: the equation traces out a happiness function that reaches a minimum at 35.7 years of age. This is effectively the U-shape result in the recent literature.

However, Table 1 then explores the possibility that the U-shape in age is a product merely of omitted cohort effects. Column 3 of Table 1 extends the specification by introducing a separate dummy variable -- termed in the table Born<1910-1919, Born 1920-1929, and so on -- for each decade of birth (to avoid complete collinearity, we cannot enter a full set of individual birth-year dummies). The outcome of this exercise is a U-shape in age, but, interestingly, one where the turning point for Americans males is now noticeably later in the typical individual's life. According to the evidence in column 3 of Table 1, subjective well-being among randomly selected American males, bottoms out at an estimated 52.9 years. This is to be thought of, it should be said, as the minimum-happiness age after controlling for other influences such as income, education and marital-status. Column 4 then adds the logarithm of household income, to allow for the influence of income upon reported happiness (although the causal interpretation here is perhaps open to debate, Gardner and Oswald 2007 document longitudinal evidence that windfalls raise mental

well-being).  Income enters positively with a t-statistic of approximately 12; the age minimum is 52.6, and thus barely alters.

A quadratic might be thought restrictive.  Column 5 now tests for a U-shape without imposing any functional form. To do so, the age and age squared variables are replaced with a series of dummy variables representing five-year age bands. Despite the non-parametric form of the test, something fairly close to a quadratic emerges over most of the life course, although it turns over again slightly in late life. The happiness minimum in column 5 of Table 1 occurs in the age band 50-54 years.

In our other data sets, the change in the minimum of the happiness U shape after the inclusion of cohort dummies is less pronounced.  Table 2, for example, reports the same exercise for the females in the US General Social Survey.  The pooled sample size is a little larger (because women live longer than men) at 25,837 individuals.  Once again, each individual gives a well-being score on a three-point scale from very happy down to not at all happy, and Table 2 estimates an ordered logit equation with the same structure as for the males in Table 1.  Perhaps surprisingly, the analytical structure for American women is almost the same as for the men.  In Table 2, well-being is at first increasing in age.  But once a squared term in age is introduced, in the third column, it is clear that the data favour the quadratic form, and once again happiness is strongly U-shaped in age.  When the same set of cohort dummies are incorporated into the equation, in column 4 of Table 2, the turning point of the happiness function is at age of 38.6 years, which is well below the value for men obtained in column 4 of Table 1 of 52.9 years.

With a few differences, Tables 3 and 4 tell the same broad story, although they use Eurobarometer data pooled from 1976 to 2002.  Here the continent is different and the sample sizes far larger.  A slightly different form of well-being

question (on life satisfaction) has to be employed, but as these estimation methods effectively use only the ordering of well-being answers, the exact wording is perhaps unlikely to matter (and so empirically it seems to prove). In Table 3, an ordered logit is estimated for 293,612 males from France, Belgium, Netherlands, West Germany, Italy, Luxembourg, Denmark, Ireland, Great Britain, Greece, Spain, Portugal, Finland, Norway, Sweden and Austria. To allow comparisons, the aim is to achieve an econometric specification as close as possible, despite some differences in the data sets on topics such as the level of detail in the measure of income, to that for the United States in Tables 1 and 2. Before the cohort dummies are introduced, the turning point in the male well-being equation is at a minimum where age is equal to 44.5 years (see column 2 of Table 3). It is not easy to say why this number might be lower than in the USA (see column 2 of Table 1), but one conjecture is that the Second World War may have exacted a different toll on this generation of European males. Here the age at which well-being reaches a minimum in the full specification is 46.5 years, which is below the American number. Table 4 produces similar figures, and equations, for the female sub-sample of 314,431 randomly sampled European women.

Although, probably unsurprisingly, the birth-cohort coefficients (on Born<1910-1919, etc) are not always individually well-defined, there are strong signs from the tables that the United States and Europe differ in the time structure of the cohort effects upon happiness. In Tables 1 and 2, there is evidence that successive American birth cohorts have become progressively less happy between 1900 and today. This finding is reminiscent of one of Easterlin's (2006), although he uses a different statistical method. In Europe, by contrast, Tables 3 and 4 suggest that well-

being is broadly similar across birth-generations. This seems particularly clear for males.

A full set of interaction terms – where both the age and age squared terms were interacted with the other independent variables -- was also tried, as a robustness check, but these were found to have coefficients that were almost always insignificantly different from zero at the 95% confidence level.

At the suggestion of a referee, Appendix Tables 2 and 3 slowly build up independent variables in well-being equations. These illustrate the case for males only. It can be seen that, especially in the United States, the addition of the marital-status variables has a noticeable effect on the turning point of the U-shape.

Even if statistically significant, is such a U-shape in age large enough to be important empirically? The data suggest that the answer is yes.

One way to explore this is to compare the levels of well-being between, say, age 20 and age 45. This difference -- in the equations that control for other factors -- is approximately 0.1 to 0.2 cardinal well-being points, and this is around one fifth of a standard deviation in well-being scores. At first sight that does not appear particularly large. But, because the standard deviation is dominated by cross-section variation in reported well-being, there is a more useful and evocative way to think about the size of the age and age-squared effect. Going from age 20 to age 45 is approximately equal to one third of the size of the effect of the unemployment coefficient in a well-being equation. That is suggestive of a large effect on well-being.

Although the birth-cohort coefficients (on Born<1900, Born 1900-1910, etc) are not always individually well-defined, there are signs from the Tables that the United States and Europe differ quite strongly in the time structure of the cohort

effects upon happiness. In Tables 1 and 2, there is evidence that successive American generations became progressively less happy from 1900 to today. This conclusion is reminiscent of one of Easterlin's (2006), although he uses a different statistical method.

In Europe, by contrast, Tables 3 and 4 suggest that cohort well-being falls initially from the beginning of the century but, after bottoming out in the 1950s (which is the omitted base category), has actually been rising slightly throughout the most recent generations.

As with the effect of moving along the quadratic function in age, cohort dummy variables are here large in magnitude; they are not merely different from zero on a formal significance test. Put loosely, cohort effects are two or three times as large as the effect from the U-shape in age. The single greatest effect is visible in the equations for US males in Table 1. Here, comparing the happiest cohort of Americans to the least happy, the cardinalized well-being difference through the generations exceeds half of one standard-deviation of the happiness measure. In all the tables, whilst the details differ, estimated cohort effects are quantitatively significant and not merely statistically significant.

On a cautious note, it might be argued that the use of language itself could have altered over the century (perhaps modern generations of highly educated TV-watchers have become linguistically more or less expressive), and hence that in the US and Europe the paper's estimated happiness-cohort effects are partly or wholly an illusion caused by this changing nature of words. It is not easy to guard against such possibilities in a definitive way. Nevertheless, one piece of evidence against such a view comes out of the clear difference between the two continents' results. The estimated pattern of the cohort effects is very different between the US and Europe.

As -- no doubt because of common trends in technology -- both continents' ways of living have changed in broadly similar ways since 1900, it is not easy to see how the coefficients on the cohort dummies could be explained solely by some form of changed use of language in the modern world. Thus these cohort effects seem unlikely to be simply a mirage caused by alterations in the way that different generations use, and perceive the meaning of, words.

Table 5 tentatively explores whether the U-shape in age holds in developing countries. Clearly mean life-spans are different, so it would be a surprise if exactly the same pattern emerged. No long time series is available to allow a test for cohort effects, but data are available, from four sweeps of the World Values Survey, on eighty countries covering the years 1981-1984; 1989-1993; 1994-1999; and 1999-2004. These data are drawn from twenty five Western countries such as the USA, Canada and the UK; fourteen East European countries (e.g. the Czech Republic, Hungary and Poland); and thirty seven developing countries (e.g. China, Uganda, Uruguay and Vietnam). Table 5 reports estimates of a series of life satisfaction equations with well-being scored from 1 at the dissatisfied end to 10 at the completely satisfied end; we report them separately for each of the three groups of countries. Controls here include workforce-status, marital-status, schooling, country and year dummies, and the person's income (grouped into appropriate deciles for his or her country). A U-shape in age is found in all five columns of Table 5. It occurs in approximately the mid to late forties. When separate equations are estimated by country, but not by gender, the U-shape seems to occur in the majority of nations (Appendix 1 reports the results). The group with a U-shape includes a large number of developing countries including, with numbers in parentheses being the age minima from Appendix Table 1 - Azerbaijan (45.8); Brazil (36.5); China (46.5); Iraq (51.7);

Mexico (41.4); Nigeria (42.4); Peru (39.5); Tanzania (46.2) and Zimbabwe (46.2). It would be unwise, nevertheless, to overstate this finding. A group that did not have a U-shape in age, where either or both of the age terms were insignificant, often included countries where sample sizes were small, but were mostly developing countries (Armenia; Bangladesh; Chile; Colombia; Dominican Republic; Egypt; India; Indonesia; Iran; Jordan; Moldova; Morocco; Pakistan; Saudi Arabia; Singapore; Slovenia; Taiwan; Uganda; Venezuela and Vietnam).

When separate results are run by country, using the Eurobarometer trend data 1976-2002, with both sexes pooled, the results are as follows -- where controls are log of income, year-of-birth dummies, gender, income, schooling, year, country, year, marital-status and labour force status as in column 4 in Tables 3 and 4. Neither age term was significant for Austria (n=6,594) or Norway (n=5,465).

|  | Age at minimum | Sample size |
|---|---|---|
| Belgium | 46.4 | 33,035 |
| Denmark | 50.1 | 39,010 |
| Finland | 49.9 | 8,978 |
| France | 49.5 | 38,843 |
| Germany | 42.9 | 54,946 |
| Greece | 53.4 | 30,469 |
| Ireland | 38.4 | 25,191 |
| Italy | 64.2 | 35,327 |
| Luxembourg | 41.3 | 9,761 |
| Netherlands | 46.9 | 39,239 |
| Portugal | 66.1 | 25,529 |
| Spain | 50.1 | 20,854 |
| Sweden | 49.6 | 8,566 |
| UK | 35.8 | 40,668 |
| Total | 47.0 | 422,475 |
|  |  |  |
| USA (GSS) | 44.5 | 41,193 |

For the USA, a similar equation was run with controls for log of income, year and year-of-birth dummies, gender, region, family, marital and labour force status dummies (as in column 5 of Tables 1 and 2).

Columns 1-4 of Table 6 makes use of data for eighteen Latin American countries (Argentina; Bolivia; Brazil; Colombia; Costa Rica; Chile; Ecuador; El Salvador; Guatemala; Honduras; Mexico; Nicaragua; Panama; Paraguay; Peru; Uruguay; Venezuela and the Dominican Republic) over the years 1997, 2000-2001 and 2003-2005 using data from the Latinobarometers. The life satisfaction question used in the Latinobarometers is identical to the one used in the Eurobarometers. Columns 1 and 3 include schooling dummies which were unavailable in 2000 hence the smaller sample size; the results are similar when the schooling variables are omitted and the additional year of data are added. There are age minima for both men and women. As was found above using the World Values Survey there were age minima for a majority, but not all, countries when separate equations were estimated. The countries where age minima were found, with the estimated minima in parentheses, excluding schooling dummies to ensure maximum sample sizes, were Argentina (52.3); Brazil (46.7); Colombia (49.7); Costa Rica (44.2); Chile (44.0); Ecuador (61.9); Honduras (58.3); Nicaragua (48.9); Paraguay (52.0); Uruguay (40.3) and Dominican Republic (48.7).

Columns 5 and 6 of Table 6 include data from the Asiabarometers for 2003 and 2004 pooled for fifteen Asian countries -- Brunei; Cambodia; China; India; Indonesia; Laos; Malaysia; Myanmar; Philippines; Singapore; South Korea; Sri Lanka; Thailand; Uzbekistan and Vietnam. These data relate to happiness, with the exact question being *"All things considered, would you say that you are happy these days? 1=very unhappy; 2=not too happy 3=neither happy or unhappy; 4=pretty happy and 5=very happy"*. Controls are 5 schooling dummies; 3 marital status dummies; one year dummy and 18 labour force status dummies. In column 5 an age minimum for men is found at 46.9 and at age 39.1 for women in column 6. Separate

minima in individual country equations were found seven out of the fifteen countries - for Cambodia (72.9); Myanmar (61.9); Singapore (43.9); South Korea (47.9); Laos (37.7); Brunei (37.3) and Uzbekistan (47.7)

So far, our focus has been on happiness and life satisfaction.  It seems useful to ask whether a life course U-shape also emerges when the well-being variable is closer to a measure of mental health.  Figure 1 plots the incidence of self-reported depression in the UK Labour Force Survey.  Here the data are pooled for men and women across the period 2004Q2-2007Q1.  The sample is for those aged 16-70. There are approximately one million observations (n=972,464), and the estimates are weighted using the person weights so are nationally representative.  Respondents in the LFS are asked to report on any health problems they have had, and then to identify the most important of these and that is what is examined here.

What is graphed in Figure 1 is the mean incidence by age.  The figure has an average of 17,068 observations per cell (i.e. per dot).  The outcome is a hill-shaped relationship between the incidence of depression-and-anxiety and age, which maximises around age 46 in these raw data.  Hence this seems consistent with the paper's earlier, and qualitatively different, life-satisfaction evidence.

Using the dprobit procedure in STATA, Table 7 estimates the probability an individual in the LFS will report being depressed.  In column 1, without any controls, *probability of depression = 0.0021416Age - 0.000024Age$^2$* where n=972,464.  The quadratic maximises at age 44.6.  Adding additional controls has fairly little impact. The maximum is finally estimated at 44.0 in column 3 with a full set of controls for month, year, region, race, education, marital and labour force status.  March is the month in which the highest depression rates are reported.

Table 8 performs a similar exercise on a measure of mental health. The table draws upon data from Eurobarometer #56.1: *Social Exclusion and Modernization of Pension Systems* (ICPSR #3475). Between September and October 2001, this survey collected identical survey information from approximately 15,500 individuals living in Austria, Belgium Denmark, East Germany, Finland, France, Greece, Italy, Ireland, Luxembourg, the Netherlands, Portugal, Spain, the United Kingdom, Sweden and West Germany. This data file, possibly uniquely, has data for the same individuals on mental strain and on life satisfaction. It was included within one of our Eurobarometers used in Tables 3 and 4.

In the first two columns of Table 8, our dependent variable is a measure of psychological distress constructed (in the spirit of the well-known General Health Questionnaire score) by amalgamating answers to the questions:

*Have you recently:*

1. *Lost much sleep over worry?*

2. *Felt constantly under strain?*

3. *Felt you could not overcome your difficulties?*

4. *Been feeling unhappy and depressed?*

5. *Been losing confidence in yourself?*

6. *Been thinking of yourself as a worthless person?*

To the answers to each of these six, we assigned the integers 0, 1, 2, 3 -- depending whether each was answered *not at all, no more than usual, rather more than usual, much more than usual*. Following Blanchflower and Oswald (2007), the numerical answers were summed, and we term the result a 'GHQ-N6' measure, where N stands for 'negative'. The mental distress score denoted GHQ-N6, must for a person therefore lie between 0 and 18. Across Europe, the mean of the variable is 3.6

(standard deviation 3.7). These six are the 6 negative questions from the fuller General Health Questionnaire GHQ-12 measure of psychological distress. The data set does not provide data on the other six 'positive' questions. Thus our focus is upon negative affect. Clark and Oswald (1994, 2002) show in British data that GHQ is quadratic in age.

Although much remains to be understood, there is a precedent for exploring separately the negative and positive questions within the GHQ (see Huppert and Whittington, 2003). Column 1 of Table 7 just contains age and its square as controls, and the function reaches a maximum at age 47.8. Adding additional controls for workforce-status, marital-status, and schooling, reduces the maximum marginally to 46.8. In both cases, Ordinary Least Squares (OLS) is the method of estimation. Columns 3 and 4 of Table 8 use the same sample of individuals and same controls as in columns 1 and 2; but now ordered logit is the method of estimation, and life satisfaction is the dependent variable. In column 3, without controls, life satisfaction minimises at age 49.5 (and 49.3 in column 4).

Overall, the two kinds of results in the paper seem approximately mirror-images of one another. Happiness and life satisfaction are U-shaped in age; distress and depression follow an inverted U-shape.

3. Conclusions

This paper offers evidence that well-being depends in a curvilinear way upon age: happiness is approximately U-shaped through the life course. Psychological well-being appears to reach a minimum in middle age. This conclusion is meant as a broad characterization of the data, and should be kept in perspective. There is, for example, a little evidence from our non-parametric work for a further flattening, and turn down, towards the end of life. The paper's results, which draw upon regression

equations, and use data sets long enough to distinguish age effects from cohort effects, seem of interest. They suggest that the convex structure of the curve is fairly similar across different parts of the world. To the best of our knowledge, the U-shape finding in United States data comes originally from results reported in Blanchflower et al (1993), which became Blanchflower and Oswald (2004). Because the paper's equations control for many other influences upon happiness and life satisfaction -- including income, education and marriage -- the findings should be read as describing an age U-shape *in ceteris-paribus well-being.*

Our correction for birth-cohort influences makes some difference to the results claimed by the earlier literature, especially in American well-being equations, but the spirit of a U-shape is unaffected by cohort effects. On these estimates, happiness among American males and females reaches a minimum in, respectively, approximately their early 50s and late 30s. Reported life satisfaction levels among European men and women minimize around the mid 40s.

It might reasonably be objected that our method has had to rely on decadal proxies for cohorts of Americans and Europeans. How to do better than this, nevertheless, is not clear -- as one aim is to maintain also age and year effects within the equations. Moreover, if subtler cohort effects were of major importance, we might expect to see more evidence of equation instability when they are imperfectly introduced in the form of the decade-long dummy variables.

By definition, this paper has one limitation. It is that these international data sets do not follow the same individuals over the years. As far as we know, there is no internationally comparable panel data set on multiple nations in which general happiness or well-being questions are asked (a European Household Panel is currently being constructed but asks only questions such as income-satisfaction and housing-

satisfaction). It is perhaps also worth pointing out that panel data have their own disadvantages, particularly that of sometimes high levels of measurement error. What causes the apparently U-shaped curve in human well-being, and the rough regularity of its mathematical shape in different parts of the developed and developing world, is unknown. Tentatively:

- One possibility is that individuals learn to adapt to their strengths and weaknesses, and in mid-life quell their infeasible aspirations.

- Another -- though it could presumably only be a small part of the explanation -- is that cheerful people live systematically longer than the miserable, for reasons not currently understood, and that the well-being U-shape in age thus traces out in part a selection effect.

- A third is that a kind of comparison process is at work: I have seen school-friends die and come eventually to value my blessings during my remaining years.

Whatever its ultimate causes, understanding the roots of the pattern seems an important task.

## References

Argyle, M. (2001). The psychology of happiness. London: Routledge, Second edition.

Bell, D., & Blanchflower, D.G. (2007). The Scots may be brave but they are neither healthy nor happy. *Scottish Journal of Political Economy*, 54, 166-194.

Blanchflower, D.G. (2001). Unemployment, well-being and wage curves in Eastern and Central Europe. *Journal of Japanese and International Economies*, 15, 364-402.

Blanchflower, D.G., & Oswald, A.J. (2000). The rising well-being of the young. In Youth employment and joblessness in advanced countries, eds. D.G. Blanchflower and R. Freeman, Chicago: NBER and University of Chicago Press.

Blanchflower, D.G., & Oswald, A.J. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics*, 88, 1359-1386.

Blanchflower, D.G., & Oswald, A.J. (2007). Hypertension and happiness across nations. *Journal of Health Economics*, forthcoming.

Blanchflower, D.G., Oswald, A.J., & Warr, P. (1993). Well-being over time in Britain and the USA. Unpublished paper presented at a Happiness conference at the London School of Economics.

Carstensen, L.L., Isaacowitz, D.M., & Turk-Charles, S. (1999). Taking time seriously: A theory of socioeconomic selectivity. *American Psychologist*, 54, 165-181.

Charles, S.T., Reynolds, C.A., & Gatz, M. (2001). Age-related differences and change in positive and negative affect over 23 years. *Journal of Personality and Social Psychology*, 80, 136-151.

Clark, A.E. (2007). Born to be mild. Working paper, PSE, Paris.

Clark, A.E., & Oswald, A.J. (1994). Unhappiness and unemployment. *Economic Journal*, 104, 648-659.

Clark, A.E., Oswald, A., & Warr, P. (1996). Is job satisfaction U-shaped in age? *Journal of Occupational and Organizational Psychology*, 69, 57-81.

Clark, A.E., & Oswald, A.J. (2002) A simple statistical method for measuring how life events affect happiness, *International Journal of Epidemiology*, 31, 1139-1144.

Clark, A.E., & Oswald, A.J. (2007). The curved relationship between age and subjective well-being. Working paper, PSE, Paris.

Diener, E., Suh, E.M., Lucas, R.E., & Smith, H.L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276-302.

Di Tella, R., MacCulloch, R.J., & Oswald, A.J. (2001). Preferences over inflation and unemployment: Evidence from surveys of happiness. *American Economic Review*, 91, 335-341.

Di Tella, R., MacCulloch, R.J., & Oswald, A.J. (2003). The macroeconomics of happiness. *Review of Economics and Statistics*, 85, 809-827.

Easterlin, R.A. (2003). Explaining happiness. *Proceedings of the National Academy of Sciences*, 100, 11176-11183.

Easterlin, R.A. (2006). Life cycle happiness and its sources: Intersections of psychology, economics and demography. *Journal of Economic Psychology*, 27, 463-482.

Frey, B.S., & Stutzer, A. (2002). Happiness and economics. Princeton: Princeton University Press.

Frijters, P., Haisken-DeNew, J.P., & Shields, M.A. (2004). Money does matter! Evidence from increasing real income and life satisfaction in East Germany following reunification. *American Economic Review*, 94, 730-740.

Frijters, P., Haisken-DeNew, J.P., & Shields, M.A. (2005). The causal effect of income on health: Evidence from German reunification. *Journal of Health Economics*, 24, 997-1017.

Gardner, J., & Oswald, A.J. (2007). Money and mental well-being: A longitudinal study of medium-sized lottery wins. *Journal of Health Economics*; 26; 49-60.

Gerlach, K., & Stephan, G. (1996). A paper on unhappiness and unemployment in Germany. *Economics Letters*, 52, 325-330.

Gilbert, D. (2006). Stumbling on happiness. New York: Alfred A Knopf.

Glaeser, E.L., Laibson, D., & Sacerdote, B. (2002). An economic approach to social capital. *Economic Journal*, 112, F437-458.

Graham, C. (2005). Insights on development from the economics of happiness. *World Bank Research Observer*, 20, 201-231.

Hayo, B., & Seifert, W. (2003). Subjective economic well-being in Eastern Europe. *Journal of Economic Psychology,* 24, 329-348.

Helliwell, J., & Putnam, R.D. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society*, 359, 1435-1446.

Huppert, F.A., & Whittington, J.E. (2003). Evidence for the independence of positive and negative well-being: Implications for quality of life assessment. *British Journal of Health Psychology*, 8, 107-122.

Jorm, A.F. (2000). Does old age reduce the risk of anxiety and depression? A review of epidemiological studies across the adult life span. *Psychological Medicine*, 30, 11-22.

Kahneman, D., Krueger, A.B., Schkade, D., Schwarz, N., & Stone, A.A. (2006). Would you be happier if you were richer? A focusing illusion. *Science*, 312, 1908-1910.

Layard, R. (2005). Happiness: Lessons from a new science. London: Allen Lane.

Lucas, R.E., Clark, A.E., Georgellis, Y., & Diener, E. (2004). Unemployment alters the set point for life satisfaction. *Psychological Science*, 15 (1), 8-13.

Mroczek, D.K., & Kolanz, C.M. (1998). The effect of age on positive and negative affect: A developmental perspective on happiness. *Journal of Personality and Social Psychology*, 75, 1333-1349.

Mroczek, D.K., & Spiro, A. (2005). Change in life satisfaction during adulthood: Findings from the Veterans Affairs Normative Aging study. *Journal of Personality and Social Psychology*, 88, 189-202.

Murphy, J.M., Laird, N.M., Monson, R.R., Sobol, A.M., & Leighton, A.H. (2000). A 40-year perspective on the prevalence of depression – The Stirling County study. *Archives of General Psychiatry*, 57, 209-215.

Myers, D.M. (1992). The pursuit of happiness. New York: Morrow.

Oswald, A.J. (1997). Happiness and economic performance. *Economic Journal*, 107, 1815-1831.

Oswald, A.J., & Powdthavee, N. (2005). Does happiness adapt? A longitudinal study of disability with implications for economists and judges. University of Warwick: working paper.

Oswald, A.J., & Powdthavee, N. (2007). Obesity, unhappiness and the challenge of affluence: Theory and evidence. *Economic Journal*, 117(521), 441-454.

Paykel, E.S. (2000). Not an age of depression after all? Incidence rates may be stable over time. *Psychological Medicine*, 30, 489-490.

Pinquart, M., & Sorensen, S. (2001). Influences on loneliness in older adults: A meta-analysis. *Basic and Applied Social Psychology*, 23, 245-266.

Powdthavee, N. (2005). Unhappiness and crime: Evidence from South Africa. *Economica*, 72, 531-547.

Propper, C., Jones, K., Bolster, A., Burgess, S., Johnston, R., & Sarker, R. (2005). Local neighbourhood and mental health: Evidence from the UK. *Social Science and Medicine*, 61, 2065-2083.

Sacker, A., & Wiggins, R.D. (2002). Age-period-cohort effects on inequalities in psychological distress, 1981-2000. *Psychological Medicine*, 32, 977-990.

Senik, C. (2004). When information dominates comparison – Learning from Russian subjective panel data. *Journal of Public Economics*, 88, 2099-2123.

Shields, M.A., & Wheatley Price, S. (2005). Exploring the economic and social determinants of psychological well-being and perceived social support in England. *Journal of the Royal Statistical Society (Series A)*, 168, 513-537.

Smith, D.M., Langa, M., Kabeto, M.U., & Ubel, P.A. (2005). Health, wealth and happiness. *Psychological Science*, 16, 663-666.

Stockard, J., & O'Brien, R.M. (2002). Cohort variations and changes in age-specific suicide rates over time: Explaining variations in youth suicide. *Social Forces*, 81, 605-642.

Theodossiou, I. (1998). The effects of low-pay and unemployment on psychological well-being: A logistic regression approach. *Journal of Health Economics*, 17, 85-104.

Ubel, P.A., Loewenstein, G., & Jepson, C. (2005). Disability and sunshine: Can hedonic predictions be improved by drawing attention to focusing illusions or emotional adaptation? *Journal of Experimental Psychology: Appl*, 11, 111-123.

Uppal, S. (2006). Impact of the timing and severity of disability on the subjective well-being of individuals with disabilities. *Social Science and Medicine*, 63, 525-539.

Van Praag, B., & Ferrer-I-Carbonell, A. (2004). Happiness quantified: A satisfaction calculus approach. Oxford: Oxford University Press.

Winkelmann, L., & Winkelmann, R. (1998). Why are the unemployed so unhappy? Evidence from panel data. *Economica*, 65, 1-15.

**Table 1. Happiness Equations for Men in the USA: Pooled Data 1972-2006**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Age | .0096 (11.78) | -.0236 (4.25) | -.0272 (3.34) | -.0313 (3.81) | |
| Age$^2$ | | .0003 (5.61) | .0003 (3.75) | .0003 (3.99) | |
| Born <1900 | | | .1420 (0.91) | .0606 (0.37) | -.0783 (0.47) |
| Born 1900-1909 | | | -.1261 (0.73) | -.2669 (1.46) | -.4325 (2.38) |
| Born 1910-1919 | | | -.2405 (1.18) | -.3801 (1.76) | -.5086 (2.44) |
| Born 1920-1929 | | | -.3872 (1.59) | -.5096 (1.99) | -.6115 (2.52) |
| Born 1930-1939 | | | -.5686 (1.99) | -.6824 (2.28) | -.7519 (2.70) |
| Born 1940-1949 | | | -.6219 (1.91) | -.7173 (2.11) | -.7843 (2.50) |
| Born 1960-1969 | | | -.6045 (1.64) | -.6857 (1.78) | -.7575 (2.15) |
| Born 1970-1979 | | | -.6858 (1.66) | -.7838 (1.82) | -.8581 92.17) |
| Born 1980 + | | | -.8168 (1.75) | -.8813 (1.81) | -.9630 (2.16) |
| Log income | | | | .2545 (12.42) | .2549 (2.33) |
| Age 20-24 | | | | | -.1220 (0.99) |
| Age 25-29 | | | | | -.2508 (1.92) |
| Age 30-34 | | | | | -.2837 (2.03) |
| Age 35-39 | | | | | -.3598 (2.37) |
| Age 40-44 | | | | | -.4415 (2.67) |
| Age 45-49 | | | | | -.4562 (2.49) |
| Age 50-54 | | | | | -.4741 (2.39) |
| Age 55-59 | | | | | -.3964 (1.81) |
| Age 60-64 | | | | | -.2209 (0.93) |
| Age 65-69 | | | | | -.0827 (0.32) |
| Age 70-74 | | | | | -.1807 (0.64) |
| Age 75-79 | | | | | -.1769 (0.57) |
| Age 80-84 | | | | | -.1961 (0.58) |
| Age >-85 | | | | | -.2530 (0.68) |
| | | | | | |
| Personal controls | No | Yes | Yes | Yes | Yes |
| | | | | | |
| Cut1 | -1.4891 | -1.3541 | -1.9419 | -.0440 | .2732 |
| Cut2 | 1.3247 | 1.6520 | 1.0671 | 2.9875 | 3.3073 |
| | | | | | |
| Sample size | 20,316 | 19,996 | 19.996 | 18,494 | 18,494 |
| Pseudo R$^2$ | .0065 | .0481 | .0488 | .0524 | .0530 |
| Log likelihood ratio | -18936 | -17853 | -17841 | -15890 | -16416 |
| | | | | | |
| *Age at the happiness minimum* | | *35.7* | *52.9* | *52.6* | |

Notes The dependent variable, here and in later tables, is a measure of subjective well-being. The numbers in parentheses are t-statistics; they test the null hypothesis of a coefficient of zero. The six regression equations are to be read vertically. They are ordered logits and include 25 year-dummies and 9 region-dummies. 'Personal controls' are the number of years of education, two race-dummies, 8 workforce-status dummies, 4 marital-status dummies, 1 dummy to identify if the respondent has zero dependent children, and a further dummy to identify if at age 16 the children was not living with both parents as they were divorced.. The 'base' cohort is that for people born pre-1900. The data set excludes 1972 when income is excluded; surveys were not conducted in 1979, 1981, 1992, 1995, 1997, 1999, 2001, 2003 and 2005. The exact wording of the well-being question is: "Taken all together, how would you say things are these days – would you say that you are very happy, pretty happy, or not too happy?".
Source: General Social Survey, 1972-2006
T-statistics in parentheses.

**Table 2.  Happiness Equations for Women in the USA: Pooled Data 1972-2006**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Age | .0007 (1.04) | -.0187 (4.53) | -.0110 (1.88) | -.0256 (3.39) | |
| Age$^2$ | | .0003 (6.24) | .0002 (3.69) | .0003 (5.29) | |
| Born <1900 | | | .0165 (0.13) | -.0857 (0.60) | -.2204 (1.53) |
| Born 1900-1909 | | | -.0020 (0.01) | -.0502 (0.31) | -.2155 (1.37) |
| Born 1910-1919 | | | -.1317 (0.76) | -.2126 (1.12) | -.3950 (2.16) |
| Born 1920-1929 | | | -.0730 (0.35) | -.1484 (0.65) | -.3289 (1.54) |
| Born 1930-1939 | | | -.1115 (0.45) | -.2185 (0.82) | -.4201 (1.71) |
| Born 1940-1949 | | | -.1923 (0.68) | -.2842 (0.94) | -.5123 (1.84) |
| Born 1960-1969 | | | .0079 (0.02) | -.0587 (0.17) | -.3188 (1.01) |
| Born 1970-1979 | | | .0460 (0.13) | -.0389 (0.10) | -.3348 (0.95) |
| Born 1980 + | | | .0320 (0.08) | -.0082 (0.02) | -.3103 (0.78) |
| Log  income | | | | .2392 (13.75) | .2429 (13.88) |
| Age 20-24 | | | | | -.0398 (0.32) |
| Age 25-29 | | | | | -.0611 (0.47) |
| Age 30-34 | | | | | -.1213 (0.88) |
| Age 35-39 | | | | | -.1872 (1.26) |
| Age 40-44 | | | | | -.2322 (1.46) |
| Age 45-49 | | | | | -.1815 (1.04) |
| Age 50-54 | | | | | -.1322 (0.70) |
| Age 55-59 | | | | | -.1800 (0.88) |
| Age 60-64 | | | | | .0301 (0.14) |
| Age 65-69 | | | | | .0880 (0.37) |
| Age 70-74 | | | | | .3180 (1.24) |
| Age 75-79 | | | | | .2312 (0.83) |
| Age 80-84 | | | | | .2929 (0.97) |
| Age >-85 | | | | | .2646 (0.80) |
| | | | | | |
| Personal controls | No | Yes | Yes | Yes | Yes |
| | | | | | |
| Cut1 | -1.9086 | -1.0203 | -.9075 | .5340 | .6996 |
| Cut2 | .7971 | 1.8765 | 1.9921 | 3.4937 | 3.6607 |
| | | | | | |
| Sample size | 25,837 | 25,478 | 25,478 | 22,699 | 22,699 |
| Pseudo R$^2$ | .0030 | .0466 | .0473 | .0528 | .0532 |
| Log likelihood ratio | -24507 | -23378 | -23086 | -20351 | -20342 |
| | | | | | |
| *Age at the happiness minimum* | | *34.9* | *29.8* | *38.6* | |

<u>Notes</u> as for Table 1.

**Table 3. Life Satisfaction Equations for Men in Europe: Pooled Data 1976-2002**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Age | .0002 (1.16) | -.0509 (33.77) | -.0446 (19.71) | -.0407 (15.18) | |
| $Age^2$ | | .0006 (35.66) | .0005 (23.02) | .0004 (18.21) | |
| Born 1900-1909 | | | .0906 (1.32) | .0977 (1.24) | -.0446 (0.56) |
| Born 1910-1919 | | | .0427 (0.61) | .0150 (0.18) | -.1855 (2.24) |
| Born 1920-1929 | | | -.0212 (0.28) | -.0939 (1.06) | -.2879 (3.25) |
| Born 1930-1939 | | | -.0945 (1.12) | -.1944 (1.98) | -.3259 (3.41) |
| Born 1940-1949 | | | -.1649 (1.77) | -.2588 (2.38) | -.3245 (3.14) |
| Born 1950-1959 | | | -.2610 (2.56) | -.3288 (2.76) | -.3675 (3.28) |
| Born 1960-1969 | | | -.1734 (1.56) | -.2177 (1.68) | -.2366 (1.95) |
| Born 1970-1979 | | | -.0805 (0.67) | -.1060 (0.75) | -.1051 (0.80) |
| Born 1980 + | | | -.0787 (0.60) | -.1391 (0.89) | -.1200 (0.83) |
| Log of income | | | | .3539 (49.65) | .3539 (49.39) |
| Age 20-24 | | | | | -.1058 (4.14) |
| Age 25-29 | | | | | -.2226 (7.58) |
| Age 30-34 | | | | | -.2860 (8.27) |
| Age 35-39 | | | | | -.3207 (8.30) |
| Age 40-44 | | | | | -.3211 (7.19) |
| Age 45-49 | | | | | -.3555 (7.20) |
| Age 50-54 | | | | | -.2936 (5.27) |
| Age 55-59 | | | | | -.2456 (4.03) |
| Age 60-64 | | | | | .0125 (0.18) |
| Age 65-69 | | | | | .0914 (1.24) |
| Age 70-74 | | | | | .1418 (1.74) |
| Age 75-79 | | | | | .1853 (2.09) |
| Age 80-84 | | | | | .2271 (2.25) |
| Age >=85 | | | | | .2230 (1.85) |
| | | | | | |
| Personal controls | No | Yes | Yes | Yes | Yes |
| | | | | | |
| Cut1 | -3.4653 | -4.0423 | -4.0536 | -2.0447 | 1.5284 |
| Cut2 | -1.8445 | -2.3787 | -2.3890 | -.3495 | .1672 |
| Cut3 | .9849 | .5462 | .5380 | 2.6201 | 3.1381 |
| | | | | | |
| Sample size | 293,612 | 284,577 | 284,577 | 206,917 | 206,917 |
| Pseudo $R^2$ | .0588 | .0785 | .0790 | .0913 | .0916 |
| Log likelihood ratio | -29852 | -283240 | -283112 | -203951 | -203892 |

*Age at the life satisfaction minimum* **44.5** **48.5** **46.5**

<u>Notes</u> The numbers in parentheses are t-statistics. All equations are ordered logits and include 16 country-dummies and 23 year dummies. 'Personal controls' are 9 educational-qualification dummies, 6 workforce-status dummies, and 5 marital-status dummies. The 'base' cohort is that for people born pre-1900. The data set excludes 1981, and columns 2-4 also exclude 1979 and 1981, 1995 and 1996 because there are no income variables for those years. The exact wording of the well-being question is: "On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?" The countries are Austria., Belgium, Denmark, Finland, Great Britain, Greece, East Germany, France, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden and West Germany,.
<u>Source</u>: Eurotrends file (Eurobarometer ICPSR #3384)
T-statistics in parentheses.

**Table 4. Life Satisfaction Equations for Women in Europe: Pooled Data 1976-2002**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Age | -.0053 (27.23) | -.0398 (28.86) | -.0359 (16.81) | -.0389 (15.24) | |
| Age$^2$ | | .00044 (30.14) | .0003 (20.08) | .0004 (18.78) | |
| Born 1900-1909 | | | .0184 (0.30) | .1175 (1.61) | .0256 (0.35) |
| Born 1910-1919 | | | -.0016 (0.03) | .0982 (1.30) | -.0294 (0.38) |
| Born 1920-1929 | | | -.0408 (0.58) | .0240 (0.29) | -.1026 (1.24) |
| Born 1930-1939 | | | -.1063 (1.36) | -.0609 (0.66) | -.1527 (1.70) |
| Born 1940-1949 | | | -.1163 (1.33) | -.0820 (0.79) | -.1514 (1.55) |
| Born 1950-1959 | | | -.1876 (1.95) | -.1162 (1.02) | -.1876 (1.76) |
| Born 1960-1969 | | | -.1517 (1.44) | -.0686 (0.55) | -.1358 (1.17) |
| Born 1970-1979 | | | -.0552 (0.48) | .0408 (0.30) | -.0155 (0.12) |
| Born 1980 + | | | -.0219 (0.17) | .0539 (0.36) | .0071 (0.05) |
| Log of income | | | | .3405 (49.35) | .3425 (49.42) |
| Age 20-24 | | | | | -.0889 (3.46) |
| Age 25-29 | | | | | -.2005 (6.82) |
| Age 30-34 | | | | | -.2334 (6.85) |
| Age 35-39 | | | | | -.3100 (8.17) |
| Age 40-44 | | | | | -.3323 (7.57) |
| Age 45-49 | | | | | -.3516 (7.24) |
| Age 50-54 | | | | | -.3490 (6.35) |
| Age 55-59 | | | | | -.2999 (5.01) |
| Age 60-64 | | | | | -.1458 (2.18) |
| Age 65-69 | | | | | -.0620 (0.86) |
| Age 70-74 | | | | | .0176 (0.22) |
| Age 75-79 | | | | | .0882 (1.02) |
| Age 80-84 | | | | | .1200 (1.24) |
| Age >=85 | | | | | .2498 (2.21) |
| | | | | | |
| Personal controls | No | Yes | Yes | Yes | Yes |
| | | | | | |
| Cut1 | -3.8589 | -3.8022 | -3.8240 | -1.8868 | -1.3905 |
| Cut2 | -2.1632 | -2.0759 | -2.0973 | -.1382 | .3582 |
| Cut3 | .6640 | .8260 | .8057 | 2.7974 | 3.2942 |
| | | | | | |
| Sample size | 314,431 | 304,869 | 304,869 | 215,558 | 215,558 |
| Pseudo R$^2$ | .0724 | .0880 | .0882 | .0991 | .0992 |
| Log likelihood ratio | -317507 | -302628 | -302561 | -213239 | -213219 |
| | | | | | |
| *Age at the life satisfaction minimum* | | *45.5* | *48.2* | *46.8* | |

Notes: see Table 3.

**Table 5.  Life Satisfaction Equations: World Values Survey Data 1981-2004**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Men | Women | Men | Women | Men | Women |
| | *Western Europe* | | *Eastern Europe* | | *Developing Countries* | |
| Age | -.0570 (13.74) | -.0371 (9.70) | -.0772 (10.68) | -.0593 (9.20) | -.0414 (8.95) | -.0360 (8.12) |
| $Age^2$ | .0006 (14.24) | .0004 (9.72) | .0008 (10.67) | .0006 (8.83) | .0005 (9.29) | .0004 (7.86) |
| | | | | | | |
| Cut1 | -4.9134 | -4.4746 | -4.0432 | -3.7387 | -2.5244 | -2.1663 |
| Cut2 | -4.2999 | -3.8588 | -3.4915 | -3.1577 | -1.9276 | -1.5718 |
| Cut3 | -3.4685 | -3.0849 | -2.7613 | -2.4412 | -1.3525 | -1.0131 |
| Cut4 | -2.8399 | -2.4890 | -2.2223 | -1.9426 | -.9067 | -.5640 |
| Cut5 | -1.9622 | -1.5927 | -1.3586 | -1.0357 | -.0194 | .3228 |
| Cut6 | -1.3187 | -.9949 | -.8194 | -.4997 | .4750 | .8155 |
| Cut7 | -.4274 | -.2169 | -.1014 | .0982 | 1.0796 | 1.3702 |
| Cut8 | .8268 | .9366 | .9300 | 1.0265 | 1.8427 | 2.1340 |
| Cut9 | 1.7985 | 1.9007 | 1.6424 | 1.7271 | 2.5311 | 2.7979 |
| | | | | | | |
| Sample size | 33,470 | 35,448 | 12,806 | 14,419 | 33,631 | 33,072 |
| Pseudo $R^2$ | .0324 | .0279 | .0284 | .0274 | .0488 | .0464 |
| Log likelihood ratio | -62681 | -67801 | -27268 | -30959 | -70942 | -69561 |
| | | | | | | |
| *Life satisfaction minima* | *45.2* | *47.0* | *46.5* | *48.2* | *42.6* | *44.3* |

<u>Notes</u> The source is: World Values Surveys, 1981-1984; 1989-1993; 1994-1999 and 1999-2004.  Controls are 9 income deciles, 5 marital-status dummies, 9 schooling dummies, 3 year-dummies and 7 workforce-status dummies.  *Western countries* are Australia; Austria; Belgium; Canada; Denmark; Finland; France; Germany; Greece; Iceland; Ireland; Italy; Japan; Luxembourg; Malta; Netherlands; Norway; Northern Ireland; Portugal; Spain; Sweden; Switzerland; Great Britain; United States; West Germany. *Eastern Europe* countries are Bosnia and Herzegovina; Bulgaria; Croatia; Czech Republic; Estonia; Hungary; Latvia; Lithuania; Poland; Romania; Slovakia; Slovenia; Macedonia; Serbia and Montenegro. *Developing countries* are Albania; Algeria; Argentina; Bangladesh; Belarus; Brazil; Chile; China; Colombia; Dominican Republic; Egypt; India; Indonesia; Iran; Iraq; Jordan; Kyrgyzstan; Mexico; Moldova; Morocco; Nigeria; Peru; Philippines; Puerto Rico; Russia; Saudi Arabia; Singapore; South Africa; Taiwan; Tanzania; Turkey; Uganda; Ukraine; Uruguay; Venezuela; Vietnam and Zimbabwe. *Question is All things considered, how satisfied are you with your life as a whole these days? A. 1 'Dissatisfied' to 10 'Satisfied'.*  T-statistics in parentheses.

**Table 6. Life Satisfaction Equations: Latinobarometers and Asianbarometers, 1997-2005.**

|  | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
|  | Latin America | | | | Asia | |
|  | Men | Men | Women | Women | Men | Women |
| Age | -.0260 (7.60) | -.0237 (7.60) | -.0292 (9.09) | -.0247 (8.42) | -.0553 (3.40) | -.06645 (3.20) |
| Age$^2$ | .00026 (6.87) | .00022 (6.42) | .00034 (9.49) | .00026 (8.10) | .00059 (2.88) | .00085 (3.22) |
|  |  |  |  |  |  |  |
| Personal controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | 4 | 5 | 4 | 5 | 1 | 1 |
| Schooling dummies | 16 | No | 16 | No | 5 | 5 |
|  |  |  |  |  |  |  |
| Cut1 | --3.2229 | -2.0000 | --3.0918 | -1.7773 | -4.7416 | -5.3722 |
| Cut2 | -1.2003 | -.0890 | --1.0320 | .1576 | -2.6887 | -3.0610 |
| Cut3 | .5909 | 1.6096 | .7004 | 1.8005 | -1.0108 | -1.1904 |
| Cut4 |  |  |  |  | 1.2675 | 1.1391 |
|  |  |  |  |  |  |  |
| Sample size | 45,177 | 54,128 | 46,951 | 56,450 | 8,592 | 5,025 |
| Pseudo R$^2$ | .0587 | .0626 | .0601 | .0636 | .0487 | .0822 |
| Log likelihood ratio | -54111 | -66304 | -56504 | -69459 | -10529 | -5878 |
|  |  |  |  |  |  |  |
| *Life satisfaction minima* | *50.0* | *53.9* | *42.9* | *47.5* | *46.9* | *39.1* |

Source: Columns 1-4 Latino Barometers 1997, 2000, 2001 and 2003-2005. Dependent variable derived from the following question "In general, would you say that you are satisfied with your life? Would you say that you are very satisfied, fairly satisfied, not very satisfied or not satisfied at all?" Notes: countries are Argentina; Bolivia; Brazil; Colombia; Costa Rica; Chile; Ecuador; El Salvador; Guatemala; Honduras; Mexico; Nicaragua; Panama; Paraguay; Peru; Uruguay; Venezuela and the Dominican Republic. Controls are 6 labour market status dummies, 2 marital status dummies, 16 schooling dummies and 17 country dummies. Schooling variables are unavailable for 2000. When separate country equations were estimated for males and females pooled using the specifications in columns and there were no age minima for Bolivia; El Salvador; Guatemala; Mexico: Panama; Peru and Venezuela. There were age minima for eleven countries - Argentina 52.3 (7,037); Brazil 46.7 (6,548); Colombia 49.7 (7,133); Costa Rica 44.2 (5,856); Chile 44.0 (7,104); Ecuador 61.9 (7,136); Honduras 58.3 (5,939); Nicaragua 48.9 (5,896); Paraguay 52.0 (4,152); Uruguay 40.3 (7,111); Dominican Republic 48.7 (1,989).
Source: columns 5 and 6 Asianbarometers. Countries are Brunei; Cambodia; China; India; Indonesia; Laos; Malaysia; Myanmar; Philippines; Singapore; South Korea; Sri Lanka; Thailand; Uzbekistan and Vietnam. Controls are 5 schooling dummies; 3 marital status dummies; one year dummy and 18 labour force status dummies.
Separate minima in individual country equations were found for Cambodia 72.9 (n=812); Myanamar 61.9 (n=1597); Singapore 43.9 (n=798); South Korea 47.9 (n=1614); Laos 37.7 (n=799); Brunei 37.3 (n=802); Uzbekistan 47.7 (n=792)
 T-statistics in parentheses.

**Table 7. Depression-and-Anxiety Equations, UK 2004Q2-2007Q1 (dprobits)**

|  | (1) | (2) | (3) |
|---|---|---|---|
| Age | .00214 (39.11) | .00210 (38.34) | .00273 (53.89) |
| Age$^2$ | -.00002 (38.33) | -.00002 (37.91) | -.00003 (51.26) |
| Male |  | -.0059 (24.38) | -.0014 (7.66) |
| Mixed race |  | .0045 (2.71) | .0005 (0.50) |
| Asian |  | -.0017 (2.27) | -.0033 (6.50) |
| Black |  | -.0034 (3.55) | -.0046 (7.22) |
| Chinese |  | -.0077 (3.75) | -.0061 (4.50) |
| Other races |  | .0034 (2.66) | -.0008 (0.94) |
| Immigrant |  | -.0037 (7.58) | -.0030 (8.33) |
| January |  | -.0009 (1.72) | -.0008 (2.06) |
| February |  | -.0011 (2.07) | -.0010 (2.36) |
| April |  | -.0001 (0.16) | -.0002 (0.45) |
| May |  | -.0014 (2.23) | -.0011 (2.48) |
| June |  | -.0005 (0.85) | -.0003 (0.79) |
| July |  | -.0005 (0.96) | -.0004 (0.95) |
| August |  | -.0015 (2.65) | -.0012 (2.78) |
| September |  | -.0010 (1.66) | -.0006 (1.47) |
| October |  | -.0008 (1.43) | -.0006 (1.53) |
| November |  | -.0016 (2.65) | -.0012 (2.69) |
| December |  | -.0004 (0.82) | -.0002 (0.61) |
|  |  |  |  |
| Region of residence dummies | 19 | 19 | 19 |
| Year dummies | 3 | 3 | 3 |
| Marital-status dummies | 0 | 0 | 5 |
| Labour force status dummies | 0 | 0 | 5 |
| Schooling dummies | 0 | 0 | 8 |
|  |  |  |  |
| Age at depression maximum | *44.6* | *51.5* | *44.0* |
|  |  |  |  |
| N | 972,464 | 939,039 | 938,337 |
| Pseudo R$^2$ | .0110 | .0217 | .1181 |
| Log likelihood | -765455 | -75172 | -67720 |

Source: UK Labour Force Surveys.  Base categories are 'white' and March.  T-statistics in parentheses.

**Table 8. Equations for GHQ-N6 Mental Distress and Life Satisfaction in European Data, 2001-2002**

|  | (1)<br>GHQ-N6<br>OLS | (2)<br>GHQ-N6<br>OLS | (3)<br>Life satisfaction<br>Ordered logit | (4)<br><br>Ordered logit |
|---|---|---|---|---|
| Age | .0953 (11.42) | .0896 (8.03) | -.0347 (7.69) | -.0584 (9.23) |
| Age$^2$ | -.0010 (11.58) | -.0010 (8.43) | .0004 (7.54) | .0006 (9.19) |
| Male | -.6562 (11.31) | -.5052 (8.12) | .0084 (0.27) | -.1214 (3.46) |
|  |  |  |  |  |
| Country dummies | 14 | 14 | 14 | 14 |
| Marital-status dummies | 0 | 9 | 0 | 9 |
| Labour force status dummies | 0 | 17 | 0 | 17 |
| Schooling dummies | 0 | 8 | 0 | 8 |
|  |  |  |  |  |
| Cut1/Constant | 1.7063 | 1.4328 | -4.9954 | -6.0031 |
| Cut2 |  |  | -3.0086 | -3.9030 |
| Cut3 |  |  | -.1599 | -.8289 |
|  |  |  |  |  |
| Age at depression *maximum* | **47.8** | **46.8** |  |  |
| Age at satisfaction *minimum* |  |  | **49.5** | **49.3** |
|  |  |  |  |  |
| N | 15,441 | 15,438 | 15,885 | 15,882 |
| Adjusted/Pseudo R$^2$ | .0438 | .0984 | .0489 | .0941 |
| F statistic/Log likelihood ratio | 42.63 | 33.42 | -15278 | -14549 |

Source: Eurobarometer #56.1: *Social Exclusion and Modernization of Pension Systems* (ICPSR #3475), September and October 2001. Labour force status dummies also include a control for whether the respondent had been unemployed at any time in the last five years. T-statistics in parentheses.

**Appendix Table 1. Life Satisfaction U-Shape-in-Age Minima: World Values Surveys**

A) Countries with age & age$^2$ significant (55)

| Country | Minimum | N | | Country | Minimum | N |
|---|---|---|---|---|---|---|
| All countries | 46.1 | 151298 | | Romania | 51.2 | 2119 |
| Albania | 40.0 | 1834 | | Russia | 55.3 | 7356 |
| Argentina | 49.3 | 2143 | | South Africa | 41.8 | 826 |
| Australia | 40.2 | 1772 | | Serbia | 49.0 | 2519 |
| Azerbaijan | 45.8 | 1710 | | Slovakia | 46.0 | 1906 |
| Belarus | 52.6 | 2895 | | Spain | 50.2 | 2029 |
| Belgium | 52.2 | 1462 | | Sweden | 49.0 | 6885 |
| Bosnia | 55.6 | 2251 | | Switzerland | 35.2 | 3303 |
| Brazil | 36.6 | 2748 | | Tanzania | 46.2 | 1640 |
| Bulgaria | 53.4 | 1802 | | Turkey | 45.0 | 1303 |
| Canada | 54.0 | 1676 | | Ukraine | 62.1 | 1001 |
| China | 46.5 | 2385 | | Uruguay | 53.1 | 2452 |
| Croatia | 48.1 | 892 | | USA | 40.1 | 927 |
| Czech Republic | 47.2 | 2612 | | Zimbabwe | 42.9 | 3172 |
| Denmark | 46.1 | 847 | | | | |
| El Salvador | 47.8 | 1024 | | b) Countries with no age minimum (25) | | |
| Estonia | 45.1 | 1851 | | Country | | N |
| Finland | 44.9 | 1759 | | Algeria | | 1012 |
| France | 61.9 | 1250 | | Armenia | | 1863 |
| Great Britain | 48.1 | 3168 | | Austria | | 1207 |
| Germany | 47.5 | 939 | | Bangladesh | | 2630 |
| Hungary | 52.3 | 879 | | Chile | | 2069 |
| Iceland | 49.3 | 2226 | | Colombia | | 2985 |
| Iraq | 51.7 | 827 | | Dominican Republic | | 309 |
| Ireland | 50.3 | 943 | | Egypt | | 2676 |
| Israel | 58.3 | 1500 | | Greece | | 917 |
| Italy | 50.7 | 1071 | | India | | 5786 |
| Japan | 49.8 | 1173 | | Indonesia | | 878 |
| Korea | 40.0 | 917 | | Iran | | 1910 |
| Kyrgyzstan | 47.7 | 205 | | Jordan | | 1126 |
| Latvia | 51.0 | 1716 | | Luxembourg | | 592 |
| Lithuania | 50.4 | 716 | | Moldova | | 1850 |
| Macedonia | 49.8 | 3182 | | Morocco | | 1382 |
| Malta | 49.9 | 927 | | New Zealand | | 1002 |
| Mexico | 41.4 | 4433 | | Pakistan | | 1594 |
| Netherlands | 54.6 | 1036 | | Saudi Arabia | | 1356 |
| Nigeria | 42.4 | 2484 | | Singapore | | 1427 |
| Norway | 43.9 | 1191 | | Slovenia | | 639 |
| Peru | 39.5 | 1057 | | Taiwan | | 719 |
| Philippines | 40.4 | 1710 | | Uganda | | 544 |
| Poland | 50.2 | 2242 | | Venezuela | | 2131 |
| Puerto Rico | 35.6 | 4221 | | Vietnam | | 963 |

<u>Notes</u> Controls are age; age squared; male; 6 marital-status dummies; 7 schooling dummies; 6 labour force status dummies; 3 year dummies and income decile dummies. Minima obtained from the coefficients on the age and age squared variables by differentiating with respect to age and setting to zero and solving. Some countries only have single years of data.

**Appendix Table 2.  Happiness Equations for Men in the USA: Pooled Data 1972-2006**

|  | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Age | -.0009 (0.20) | .01135 (1.55) | -.02178 (2.83) | -.02541 (3.29) | -.02718 (3.34) | -.03133 (3.66)) |
| Age$^2$ |  | -.00013 (2.25) | .00018 (2.95) | .00022 (3.55) | .00026 (3.75) | .00030 (4.07) |
| Years of schooling |  |  |  | .0514 (11.29) | .0394 (8.46) | .0215 (4.22) |
| Log household income |  |  |  |  |  | .2546 (12.42) |
|  |  |  |  |  |  |  |
| Race dummies | 2 | 2 | 2 | 2 | 2 | 2 |
| Year dummies | 25 | 25 | 25 | 25 | 25 | 25 |
| Region dummies | 8 | 8 | 8 | 8 | 8 | 8 |
| Cohort dummies | 9 | 9 | 9 | 9 | 9 | 9 |
| Marital status dummies | 0 | 0 | 4 | 4 | 4 | 4 |
| Family dummies | 0 | 0 | 0 | 0 | 2 | 2 |
| Labour market dummies | 0 | 0 | 0 | 0 | 7 | 7 |
|  |  |  |  |  |  |  |
| Cut1 | -2.1733 | -2.0280 | -2.2790 | -1.8536 | -1.9419 | -.0440 |
| Cut2 | .6619 | .8079 | .6802 | 1.1189 | 1.0671 | 2.9875 |
|  |  |  |  |  |  |  |
| Sample size | 20,316 | 20,316 | 20,315 | 20,036 | 19,996 | 18,494 |
| Pseudo R$^2$ | .0113 | .0114 | .0388 | .0395 | .0488 | .0524 |
| Log likelihood ratio | -18846 | -18844 | -18321 | -18050 | -17841 | -16423 |
|  |  |  |  |  |  |  |
| *Age at the happiness minimum* |  | *43.6* | *60.1* | *58.1* | *52.9* | *52.6* |

Notes; The dependent variable is a measure of subjective wellbeing and estimated as ordered logits.  The numbers in parentheses are t-statistics; they test the null hypothesis of a coefficient of zero.  All six regression equations here are to be read vertically.   The surveys were not conducted in 1979, 1981, 1992, 1995, 1997, 1999, 2001, 2003 and 2005.  The exact wording of the wellbeing question is: "Taken all together, how would you say things are these days – would you say that you are very happy, pretty happy, or not too happy?".
Source: General Social Survey, 1972-2006

**Appendix Table 3. Life Satisfaction Equations for Men in Europe: Pooled Data 1976-2002**

|  | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Age | .0002 (1.16) | -.0040 (3.10) | -.0318 (16.06) | -.0409 (18.61) | -.0446 (19.71) | -.0407 (15.18) |
| Age$^2$ |  |  | .0003 (18.45) | .0004 (22.84) | .0004 (23.02)) | .0004 (18.21) |
| Log of income |  |  |  |  |  | .3539 (49.65) |
|  |  |  |  |  |  |  |
| Year dummies | 22 | 22 | 22 | 22 | 22 | 22 |
| Country dummies | 16 | 16 | 16 | 16 | 16 | 16 |
| Cohort dummies | 0 | 9 | 9 | 9 | 9 | 9 |
| Schooling dummies | 0 | 0 | 0 | 9 | 9 | 9 |
| Marital status dummies | 0 | 0 | 0 | 4 | 4 | 4 |
| Labour market dummies | 0 | 0 | 0 | 0 | 6 | 6 |
|  |  |  |  |  |  |  |
| Cut1 | -3.4653 | -4.0581 | -4.2260 | -4.0957 | -4.3578 | -2.2726 |
| Cut2 | -1.8446 | -2.4347 | -2.6020 | -2.4606 | -2.6932 | -.5774 |
| Cut3 | .9850 | .4038 | .2390 | .4211 | .2339 | 2.3923 |
|  |  |  |  |  |  |  |
| Sample size | 293,612 | 293,612 | 293,612 | 285,436 | 284,577 | 206,917 |
| Pseudo R$^2$ | .0588 | .0607 | .0612 | .0696 | .0790 | .0913 |
| Log likelihood ratio | -298512 | -297933 | -297762 | -286817 | -283112 | -203950 |
|  |  |  |  |  |  |  |
| *Age at the life satisfaction minimum* |  |  | *50.9* | *47.7* | *47.7* |  |

The numbers in parentheses are t-statistics. All equations are ordered logits and include 16 country-dummies and 23 year dummies. 'Personal controls' are 9 educational-qualification dummies, 6 workforce-status dummies, and 5 marital-status dummies. The 'base' excluded cohort is that for people born pre-1900. The data set excludes 1981, and columns 2-4 also exclude 1979 and 1981, 1995 and 1996 because there are no income variables for those years. The exact wording of the wellbeing question is: "On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?" The countries are France, Belgium, Netherlands, West Germany, Italy, Luxembourg, Denmark, Ireland, Great Britain, Greece, Spain, Portugal, Finland, Norway, Sweden and Austria..
<u>Source</u>: Eurotrends file ( Eurobarometer ICPSR #3384)

**Figure 1. Depression probability, LFS 2004Q2-2007Q1**