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## ABSTRACT

Previous literature has found that both unemployment and inflation lower happiness. This paper extends the literature by looking at more countries over a longer time period. It also considers the impacts on happiness of GDP per capita and interest rates. I find, conventionally, that both higher unemployment and higher inflation lower happiness. Interest rates are also found to enter happiness equations negatively. Changes in GDP per capita have little impact on more economically developed countries, but do have a positive impact in the poorest countries -- consistent with the Easterlin hypothesis. I find that unemployment depresses well-being more than inflation. The least educated and the old are more concerned about unemployment than inflation. Conversely, the young and the most educated are more concerned about inflation. An individual's experience of high inflation over their adult lifetime lowers their current happiness over and above the effects from inflation and unemployment. Unemployment appears to be more costly than inflation in terms of its impact on wellbeing.

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"…I should say, like some we have heard of, no, a dreary, desolate, and indeed, quite abject and distressing one, what we might call, by way of eminence, the *dismal science"* Thomas Carlyle, 1849

U.S. Declaration of Independence, July 4, 1776.

"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable rights that among these are life, liberty and the pursuit of happiness."

Despite what Thomas Carlyle said when he was arguing that slavery was morally superior to allowing the market to work, economics is no longer the *dismal science*. A growing body of literature in the economics of happiness has recently emerged. According to Krueger and Schkade (2006), since 2000, 157 papers and books have been published using data on life satisfaction and subjective well-being. There have also recently been two summary articles on the relevance of happiness research for economists in the <u>Journal of Economic Perspectives</u> (Di Tella and MacCulloch, 2006) and the <u>Journal of Economic Literature</u> (Frey and Stutzer, 2002). It is now fashionable to try to understand the pursuit of happiness.

I investigate the determinants of happiness and its micro-economic and macro-economic correlates. I make use of aggregate data from twenty-five OECD countries, and micro-data from twenty. I also model individual's reports on what they expect will happen to their life a year ahead. I find a role for inflation rates, interest rates and unemployment rates, elevated levels of which all lower happiness. Higher per capita GDP levels only have an impact on the happiness levels of poorer countries.

Section 1 provides background to the micro-economic research conducted on happiness. Section 2 examines previous research on the macroeconomics of happiness. Section 3 reports econometric evidence using macroeconomic data from an unbalanced country panel. Section 4 uses microeconomic data on life satisfaction. Section 5 provides conclusions and estimates of the size of the marginal rate of substitution between unemployment and inflation – the slope of the indifference curve. Is unemployment more costly than inflation? **My estimates imply that, across EU countries, a one percentage point increase in the unemployment rate lowers well being by at least one and a half times as much as a one percentage point increase in the inflation rate.**

## 1. Introduction
It is now in vogue to try to understand the pursuit of happiness.[1] The topic has attracted the attention of medical statisticians, psychologists, economists, and other investigators including

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[1] Happiness research continues to be controversial. For example, Ambrose Evans-Pritchard writing in the Daily Telegraph on 25th April 2007, asserted that, without attribution, that this is "an area of research viewed as frivolous by monetarists". This stands in direct contrast to the views of Bernard van Praag writing in a recent paper who suggested that "It is our prediction that in the next decade the measuring of cardinal utility or satisfaction by means of satisfaction questions will become a matter of routine....This implies that the methodology of what is now called 'happiness economics' probably will become one of the major instruments of socio-economic policy. At the moment we stand just at the beginning" (2007, p.65). See also the discussion in letters to the Financial Times in early June 2007 in response to Martin Wolf's June 6th article in the FT entitled 'Why progressive taxation is not the route to happiness'.

Easterlin (2003), Frey and Stutzer (2002), Lucas et al (2004), Layard (2005), Smith et al (2005), Ubel et al (2005), Gilbert (2006).

In general economists have focused on modelling two fairly simple questions, one on life satisfaction and one on happiness. These are typically asked as follows.

Q1. Happiness – (e.g. from the US General Social Survey)

*"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?"*

Q2. Life satisfaction – from the Eurobarometer Surveys

*"On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?"*

Economists have had longstanding reservations about the reliability of interpersonal comparisons of well-being. However, Krueger and Schkade (2006) have examined the persistence of individual's responses to well-being questions over a two week period and conclude that the test-retest correlations were reasonably high and "are probably sufficiently high to support much of the research that is currently being undertaken on subjective well-being, particularly where group means are being compared."

One definition of happiness is the degree to which an individual judges the overall quality of his or her life as favourable. Psychologists view it as natural that a concept such as happiness should be studied in part by asking people how they feel. As a validation of the answers to recorded happiness levels, it turns out that answers to happiness and life satisfaction questions are correlated with:

1. Objective characteristics such as unemployment.

2. Assessments of the person's happiness by friends and family members.

3. Assessments of the person's happiness by his or her spouse.

4. Heart rate and blood-pressure measures of response to stress.

5. The risk of coronary heart disease.

6. Duration of authentic or so-called Duchenne smiles. A Duchenne smile occurs when both the zygomatic major and obicularus orus facial muscles fire, and human beings identify these as 'genuine' smiles (Ekman, Friesen and O'Sullivan (1988); Ekman, Davidson and Friesen (1990)).

7. Skin-resistance measures of response to stress.

8. Electroencephelogram measures of prefrontal brain activity (Davidson and Fox, 1982).

By now the standard econometric approach is to estimate an OLS or ordered logit using micro-data, with the coding such that the higher the number the more satisfied an individual is. Generally, it makes little or no difference if you use an OLS or an ordered logit, although the size of the coefficients will be different. The datasets used in such studies range from an individual cross-section in one country (Luttmer, 2005) sometimes with a number of years pooled (Blanchflower and Oswald, 2004) and sometimes even for multiple years across many countries (Di Tella and MacCullough, 2006).

It is apparent that there is a great deal of stability in happiness and life satisfaction equations, no matter what country is looked at, what dataset or time period used, whether the question relates to life satisfaction or happiness, or how the responses are coded (whether in three, four, five or even as many as ten categories). The main findings from happiness and life satisfaction equations estimated on individual level micro data are as follows (Blanchflower and Oswald, 2004).

**Happiness across countries is higher among:**
Women
Married people
The highly educated
The healthy
Those with high income
The young and the old – U-shaped in age (Blanchflower and Oswald, 2006b)
The self-employed (Blanchflower, 2004),

**Happiness is low among:**
Newly divorced and separated people
Adults in their mid to late 40s
The unemployed and the disabled
Immigrants and minorities
Those in poor health
Commuters (Kahneman et al, 2004)

Wellbeing is correlated with life events such as being unemployed or being married. There is also evidence that well-being is U-shaped over the life cycle in the USA and Europe, minimizing in the late forties for both men and women, even after controlling for cohort effects (for males the minimum is 49.5 and 45.1 for women in the USA, and 44.1 and 42.6 for Europe respectively). Why is happiness U-shaped over the life cycle? The answer is probably a combination of a number of factors.

a) Individuals learning to adapt to their weaknesses and in mid-life quelling their infeasible aspirations.

b) Inherently cheerful people living longer, maybe?

c) A comparison process may be at work – I have seen my school friends die and I count my blessings (Blanchflower and Oswald, 2006b)

There is also evidence that current levels of happiness are impacted by what happened to you as a child. That is true even for older people. There is also evidence that parental divorce, death and parental quarrelling lower happiness many years later (Blanchflower and Oswald, 2006c). Blanchflower and Oswald (2006c) also find some evidence that parents who divorce but didn't quarrel have the biggest negative impact on their children's happiness, presumably because divorce in such circumstances comes as a surprise to the children.

*What about money?* The data shows that richer people are happier and healthier. Gardner and Oswald (2007) have found that Britons who receive lottery wins of between £1,000 and £120,000 go on to exhibit better psychological health. But individuals in the USA were found to be less happy if their incomes are far above those of the poorest people (Blanchflower and Oswald, 2004). People, however, do appear to compare themselves more with well-off families, so that perhaps they get happier the closer their income comes to that of rich people around them. Relative income certainly appears to matter. Luttmer (2005), for the USA, finds that higher earnings of neighbours are associated with lower levels of self-reported happiness, controlling for an individual's own income. Alesina et al (2004), find, using a sample of individuals across the USA (1981-1996) and Europe (1975-1992) that individuals have a lower tendency to report themselves as happy when inequality is high, even controlling for individual income. The effect is stronger in Europe than in the USA.

Blanchflower and Oswald (2004) tried to evaluate the value in money terms of various non-economic outcomes such as marriage and found that it would take a lot of money to compensate for a lasting marriage. The money value of events like unemployment and divorce are large. But the relation between measures of well-being and income is actually quite weak. Kahneman et al (2006) have argued that subjective well-being is connected to how people spend their time. People with higher income tend to devote relatively more of their time to work. "On balance the activities that high income individuals spend relatively more of their time engaged in are associated with no greater happiness, on average, but with slightly higher tension and stress".

## 2. Macroeconomics and happiness

In the USA in 2006, only 13% of people in the General Social Survey said they were not very happy, 56% were pretty happy and 31% very happy (see below for further details). In the *Eurobarometers* for the EU in 2006, 2% said they were not at all satisfied, while 10% were not very satisfied, 53% fairly satisfied and 34% very satisfied (also see below). Mean happiness and life satisfaction scores for European countries are presented in Table 1. The data are taken from the European Quality of Life Survey, 2003, where the results are based on scores from 1-10. Denmark is highest and Bulgaria is lowest on both measures. The rankings are similar no matter if happiness or life satisfaction are used.

There is a consistent structure to happiness and life satisfaction scores across countries and across various datasets broadly replicating the results reported in Table 1. The northern European countries – especially the Danes, but not the Scots – have generally higher happiness and life satisfaction scores than residents of Southern Europe, especially Portugal, Italy, Greece and Turkey (Blanchflower and Bell, 2007). Residents of former Eastern bloc countries have low happiness

scores (Blanchflower, 2001), but are they less happy?  This begs the question, whether such comparisons are meaningful given language and cultural differences?

One way to overcome this in a simple way is to compare countries where the same language is spoken - Australia, Canada, New Zealand, UK, USA (as done in Blanchflower and Oswald, 2005, 2006a).  In those papers it was argued that Australia's high ranking on the HDI measure was a paradox given its much lower ranking on happiness and job satisfaction scores.  Wolfers and Leigh (2006) disagreed.

Another way is to look for some other objective criteria.  A recent paper by Banks, Marmot, Oldfield and Smith (2006) argued that Americans are less healthy than Europeans; differences in blood pressure form part of the author's evidence.  Blanchflower and Oswald (2006d) found that happier nations report systematically lower levels of hypertension.  Happiness and blood pressure are negatively correlated across countries (r=-.6).  This seems to represent a first step toward the validation of cross-country estimates. Denmark has the lowest reported levels of high blood pressure in our data. Denmark also has the highest happiness levels.  Portugal has the highest reported blood pressure levels and the lowest levels of life satisfaction and happiness.  It appears there is a case to take more seriously the subjective 'happiness' measurements made across countries and seems meaningful to do cross-country comparisons.

There is evidence that for poorer countries both happiness and life satisfaction have trended up over time.  An examination of data from the World Database of Happiness (**http://www1.eur.nl/fsw/happiness/hap_nat/nat_fp.htm**) suggests that this is especially true in South America between 1997 and 2004[2] and in Eastern Europe since 2001.[3]  Hungary is the main exception.

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[2]  Average life satisfaction on a 4 point scale is

|           | 1997 | 2004 |
|-----------|------|------|
| Argentina | 2.14 | 2.92 |
| Bolivia   | 1.97 | 2.40 |
| Brazil    | 2.38 | 2.67 |
| Chile     | 2.32 | 2.80 |
| Columbia  | 2.50 | 3.14 |
| Mexico    | 2.61 | 2.96 |
| Uruguay   | 2.40 | 2.73 |
| Venezuela | 2.45 | 3.26 |

[3]  Average life satisfaction on a 4 point scale is

|                | 2001 | 2004 |
|----------------|------|------|
| Czech Republic | 2.14 | 2.92 |
| Hungary        | 2.54 | 2.52 |
| Latvia         | 2.54 | 2.64 |
| Lithuania      | 2.29 | 2.52 |
| Poland         | 2.65 | 2.78 |
| Romania        | 2.12 | 2.38 |
| Slovakia       | 2.48 | 2.65 |
| Slovenia       | 3.04 | 3.10 |

For the major countries, however, there seems to be little evidence that happiness or life satisfaction have trended up over time. That is true in the raw happiness data for the USA, as shown in Blanchflower and Oswald (2004). The most recent data, released in the 2006 General Social Survey presented in Table 2, confirms that; part A of Table 2 presents the responses to question Q1 above (%) for the USA. The life satisfaction distributions (%), which are answers to Q2 above for the UK are presented in part B of Table 2. The data for 1973-2002 are from the *Eurobarometer Trend file* (ICPSR #4357) and for 2003-2006 from six subsequent *Eurobarometers*.[4] Two facts stand out from these two time series distributions of life satisfaction and happiness in the UK and the USA. First how little has changed over time – the distributions in the early 1970s are virtually identical to those observed in 2006. Second, only a very small proportion of respondents report that they were 'not at all satisfied' with their lives, or in the case of the USA, that they were 'not at all happy'. Most people report that they are happy.

As can be seen from Figure 1, average happiness levels for the USA are flat, while real GDP per capita has risen. Wellbeing is flat through time in the other rich countries too, as can be seen from Figure 2a for France, Germany, the Netherlands and the UK and in Figure 2b for Italy, Belgium, Ireland and Denmark. Note that happiness levels are high in Denmark and low in Italy and France. There is some sign of an upward trend in Italy and to a lesser extent in Denmark and for a number of countries including France, Belgium and the UK since 2000. Concerns have been expressed that this is in part due to the fact that the happiness data are bounded from above (Johns and Ormerod, 2007).

There is some consistent evidence though that the wellbeing of the young (<30) has risen over time in both the USA and Europe (Blanchflower and Oswald, 2000). The rise is mostly among the unmarried. Blanchflower and Oswald (2000) also found that this upward trend is not explained by changing education or work, falling discrimination or rise of youth-oriented consumer goods.

So why doesn't happiness increase when a wealthy country gets richer? I am not certain, but possible explanations include:

a) Social comparisons (you compare your 3 BMWs to people with 3 BMWs)

b) Habituation: people adapt to money

c) Mistaken choices (long commutes and working hours).

## 3. Econometric analysis - Aggregate Data

In the raw data, happiness (and life satisfaction) is negatively correlated with unemployment (Figure 3) and inflation (Figure 4). DiTella, McCullough and Oswald (2001) show that people are happier when both inflation and unemployment are low. They find that unemployment depresses well-being more than does inflation. Wolfers (2003) has shown that greater macro volatility undermines wellbeing. Wolfers has found that eliminating unemployment volatility would raise wellbeing by an amount roughly equal to that from lowering the average level of unemployment by a quarter of a percent. Interestingly the effects of inflation volatility on well-being are smaller.

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[4] Eurobarometers #65.2 (2006); 64.2 (2005); 63.4 (2005); 62.0 (2004); 61.0 (2004); 60.1 (2003).

It also appears that happiness is positively correlated with higher GDP per capita (Figure 5 – taken from Wolfers and Leigh (2006)).  When a nation is poor it appears that extra riches raise happiness. However, income growth in richer countries is not correlated with growth in happiness.  This is the Easterlin hypothesis (Easterlin, 1974) and is illustrated in Figure 6, which uses data from the 1995/2000 World Values Survey; the slope of the function for western countries is approximately horizontal.  Recently, Deaton (2007) has questioned this view based on data collected by the Gallup Organization from national samples of adults from 132 countries.  He finds that average happiness is strongly related to per capita national income, but unlike previous studies, finds that the effect holds across the range of international incomes, and if anything, is slightly stronger in rich countries.  Interestingly, the question used in that survey is different from those used by most other happiness researchers. Respondents are asked to imagine an eleven rung scale where the bottom (0) represents "the worst possible life for you" and the top (10) represents "the best possible life for you."  Respondents are then asked to report "on which step of the ladder do you feel you personally stand at the present time?"  It is unclear whether such a question is eliciting an evaluation of the respondent's complete life or how he feels today.  Only one year of data are available and the main analysis is based on only 111 macro observations.  I examine this issue in more detail below and find that GDP per capita impacts the life satisfaction levels of the poorer European countries (Czech Republic; Greece; Hungary; Poland; Portugal: Spain and Slovakia) but not the richer countries. Although, of course, data are unavailable from very poor developing countries.

In this section I examine the impact of macro-economic variables on life satisfaction levels with the unit of observation the country*year cell, extending the work of Di Tella, McCullough and Oswald (2001, 2003)  and  Wolfers (2003) to a larger set of countries and a longer time series.  I also examine the impact of the interest rate itself on happiness.  Di Tella, McCullough and Oswald (2001), for example, restricted their analysis to twelve European countries (Belgium; France; Denmark; Greece; Germany; Great Britain; Ireland; Italy; Luxembourg; Netherlands; Portugal and Spain) from 1975-1991, while Wolfers (2003) examined sixteen European countries from 1973-1998, including the same twelve countries, but adding Austria; Finland; Norway and Sweden.

I extend the data series from 1973 to 2006 and the sample to twenty-five OECD countries i.e. Austria; Belgium; Canada; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Japan; Luxembourg; Mexico; the Netherlands; Norway; Poland; Portugal; Slovakia; Spain; Sweden; Turkey; the UK and the USA.  The excluded OECD countries are Australia; Iceland: Korea; New Zealand and Switzerland.  The data should be thought of as an unbalanced panel of countries.  The coverage is as follows - Austria (1995-2006); Belgium (1973-2006); Canada (1989-2000); the Czech Republic (2001-2006); Denmark (1973-2006); Finland (1995-2006); France (1973-2006); Germany (1973-2006); Greece (1981-2006); Hungary (2001-2006); Ireland (1977-2006); Italy (1973-2006); Japan (1974-2004); Luxembourg (1974-2005); the Netherlands (1974-2005); Poland (2001-2005); Portugal (1985-2005); Slovakia (2001-2005); Spain (1985-2005); Sweden (1995-2005); UK (1973-2006); USA (1991-2; 1998; 2001-2005).  I also have data on life satisfaction for 1995 for Norway and from 2001-2005 for Turkey.

Data on life satisfaction are taken from the World Database of Happiness based on the averages of a four point scale.  Answers to the question Q2 above are coded 1 if not at all satisfied, two if not

very satisfied, three if fairly satisfied and four if very satisfied, as used in Figures 2a and 2b. Unemployment rates and inflation (consumer prices – all items) are OECD data.

Table 3 reports five different regressions.  Column 1 regresses the mean life satisfaction score in the country on a set of country dummies with the UK the excluded category, and year dummies. The pattern of the country dummies is consistent with the findings from the micro-data, that happiness is highest in Denmark and lowest in Hungary and Slovakia.  The UK ranks eighth, below, in order: Denmark, the Netherlands; the USA; Sweden; Luxembourg; Ireland and Finland. Column two adds a lagged dependent variable.  Although the country dummies reduce in size, the cross-country pattern remains largely unchanged.

Column 3 of Table 3 includes the country and year dummies and also includes the inflation rate, GDP per capita in $US at constant exchange rate and constant prices, and the unemployment rate.[5] Higher inflation and higher unemployment lower happiness while GDP has no effect. Experiments were also undertaken with the GDP growth rate, which was always insignificant – results not reported. Interestingly, adding a significant lagged dependent variable in column 4 lowers the size of the coefficients on inflation and unemployment, although they both remain significant at conventional levels.  Column 5 reports results excluding both the lagged dependent variable and GDP per capita.

Table 4 experiments with a variety of further specifications.  Column 1 drops the insignificant GDP variable which has little impact.  Column 2 adds a nominal interest rate variable, comprised from an assortment of Treasury Bill Rates[6] taken from the IMF's International Financial Statistics database, which is significant and negative, although it drives the inflation rate to insignificance. Column three replaces the nominal rate with the real rate, which is just the nominal rate minus the inflation rate, and now both the inflation rate and the real rate of interest are statistically significant and negative.  GDP is insignificant when added back in column four, while the unemployment rate, inflation rate and real rate of interest are all significant and negative.  Column 5 shows that the significance of the inflation rate, the unemployment rate and the real rate of interest remains when the lagged dependent variable is removed.

In general, the literature has found that a percentage point increase in unemployment has a greater impact on happiness than does a percentage point increase in inflation.  Wolfers (2003) found that a percentage point increase in the unemployment rate causes 4.7 times more unhappiness than a percentage point increase in inflation.  Di Tella, MacCulloch and Oswald (2001) estimated that an additional percentage point of unemployment caused *twice* as much of a reduction in happiness as an additional percentage point of inflation, once country time trends were introduced.  These results were found using disaggregated data, to which I now turn my attention.

## 4.  Econometric analysis - Disaggregated Data

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[5] Source: OECD GDP database – (expenditure approach).  HVXVOB: Per head, US$, constant prices, constant exchange rates, OECD base year

http://stats.oecd.org/wbos/default.aspx?datasetcode=SNA_TABLE1

[6] A mortgage rate is used for Luxembourg.

An alternative way of modelling well-being is to use data at a disaggregated level. In this section I make use of data at the individual level from the *Eurobarometer* surveys for a number of EU member countries along with data from Norway, Croatia and Turkey for the period 1973-2006 (where available). These are the data that were used to generate the average life satisfaction levels used for these countries in the earlier section, that were downloaded from the World Database of Happiness. The life satisfaction question Q2 above has been asked in some, but not all, *Eurobarometer* Surveys conducted for the EU every year since 1973 for member countries. As new countries such as Greece, Spain and Portugal join they are added to the surveys so there are fewer years of data on them. The biggest change in the number of countries in the survey series occurred in 2004 with the Accession of ten new countries (Czech Republic; Cyprus; Estonia; Hungary; Latvia; Lithuania; Malta; Poland; Slovakia and Slovenia known as the A10). Bulgaria and Romania who became EU members in 2007 were also added to the surveys in 2004 as were the two EU Candidate Countries of Croatia and Turkey. I only have suitable macro-economic data from the OECD on four of these countries (Czech Republic; Hungary; Poland and Slovakia) so the other twelve countries are excluded from my analysis. Data are available on Norway for 1994-1998 when it was an EU Candidate Country and a member of the OECD. Overall, I make use of micro-data on over 680,000 individuals from twenty countries - Austria; Belgium; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Luxembourg; the Netherlands; Norway; Poland; Portugal; Slovakia; Spain; Sweden and the UK. I then map in annual data on unemployment, inflation and the interest rate for each country. Comparable schooling data are not available in the *Eurobarometer* surveys for 1995 so that year is excluded.

Table 5 reports the results of estimating a series of life satisfaction equations columns, using micro data from these *Eurobarometer* surveys for the period 1973-2006.[7] The estimation procedure is ordered logit in the first three columns with the dependent variable set to one if 'not at all satisfied' and through to four if the respondent reported they were 'very satisfied with the life you lead'. Ordinary Least Squares (OLS) is used for simplicity in the final two columns with the dependent variable coded one through four. The equations have the usual set of personal controls for age, gender, schooling, marital status and labour force status. In all cases the standard errors are clustered at the level of the country*year to overcome the problem of the common component in the residuals, known widely as the Moulton (1986, 1991) problem. This adjustment is necessary when a regression at the level of the individual includes a RHS variable at the level of the country and year.

It is apparent across this group of 20 countries that life satisfaction is U-shaped in age, minimising at age 46, is lower for men and for those with less schooling and is especially low for the unemployed. Life satisfaction is lowest in Hungary followed by Slovakia and highest in Denmark.

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[7] Sample periods covered by country in the Eurobarometers are as follows with sample sizes in parentheses (n=820,313).
1975-2006 – Belgium (63,799); France (65,270); Denmark (62,967); Germany (96,353); Ireland (62,585); Italy (66,124); Luxembourg (26,305); Netherlands (63,781) and the UK (71,656).
1985-2006 – Portugal (43,690) and Spain (43,430).
1981-2006 – Greece (51,955).
1997-2006 – Austria (20,863); Finland (21,185) and Sweden (21,007).
2004-2006 - Czech Republic (4,367); Hungary (4,037); Poland (3,885) and Slovakia (4,514).
1990-1994 - Norway (8,962).

The UK ranks seventh out of twenty behind, in order, Denmark, the Netherlands, Norway, Sweden, Luxembourg and Ireland. The ranking of countries is consistent with those found in Table 3 using aggregated country level data. Interestingly, the rank ordering of these countries, derived from column 1 of Table 5 is highly correlated (r=+.84) with the 2006 Human Development Index published by the United Nations. [8]  The HDI is a score that amalgamates three indicators – lifespan, educational attainment and adjusted real income.

|  | Life satisfaction rank | HDI rank (2006) |
|---|---|---|
| Austria | 10 | 14 |
| Belgium | 9 | 13 |
| Czech Republic | 14 | 30 |
| Denmark | 1 | 15 |
| Finland | 8 | 11 |
| France | 13 | 16 |
| Germany | 12 | 21 |
| Greece | 18 | 24 |
| Hungary | 20 | 35 |
| Ireland | 6 | 4 |
| Italy | 15 | 17 |
| Luxembourg | 5 | 12 |
| Netherlands | 2 | 10 |
| Norway | 3 | 1 |
| Poland | 16 | 37 |
| Portugal | 17 | 28 |
| Slovakia | 19 | 42 |
| Spain | 11 | 19 |
| Sweden | 4 | 5 |
| UK | 7 | 18 |

Column 2 of Table 5 now adds the annual inflation rate, unemployment rate and GDP per capita. Adding these various macro variables has little impact on the other coefficients, including those on the country dummies. As previously found in the aggregate equations above both inflation and unemployment enter significantly negative – higher unemployment and higher inflation lower happiness.  Higher output, in contrast to the aggregate equation, is found to enter significantly and raises satisfaction.  The real interest rate is added in column three which drives the GDP variable to insignificance.  Column 4 uses Ordinary Least Squares (OLS) for ease of interpretation.  The size of the coefficients fall, but the broad pattern of the results found in column 2 remains unchanged. The equation in column 4 includes a full set of country time trends, which although significant as a set of controls, passing the relevant F-test, in order to pick up differential time trends in satisfaction across countries. However, these have little impact on either the inflation rate or unemployment rate coefficients, which is confirmed in column 5 that excludes the country*time interaction terms. When the GDP and real interest rate terms were included separately or collectively with the country time trends they were always significant and hence were omitted in column 5.

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[8] Downladable from http://hdr.undp.org/hdr2006/

The Easterlin (1974) hypothesis suggests that income growth in richer countries is not correlated with growth in happiness, whereas there is such a correlation in poorer countries. Table 6 explores this issue further by re-estimating the equation in column 5 of Table 5 for groups of countries. Countries are grouped together based on GDP per capita in US$ at constant prices and constant exchange rates. Column 1 of the Table is restricted to the thirteen richest countries - Austria; Belgium; Denmark; Finland; France; Germany; Ireland; Italy; Luxembourg; the Netherlands; Norway; Sweden and the UK. The unweighted average GDP per capita for this group is $28,777. Inflation and unemployment both enter negatively, while GDP per capita is insignificant. In column 2 the equivalent equation is estimated for the remaining seven countries - the Czech Republic; Greece; Hungary; Poland; Portugal; Slovakia and Spain. This group has an unweighted average GDP per capita of $9,947.[9] For this sample, once again both the inflation and unemployment terms are negative, but now GDP per capita enters significantly and positive. The impact of the GDP variable is especially marked in column 3 for the former East European countries of the Czech Republic, Hungary; Poland and Slovakia. These are the poorest countries in the sample. In column 4 for the Southern European countries, which have somewhat higher GDP levels than those from Eastern Europe, the GDP variable was also significant, although with a considerably lower coefficient than was the case in column 3. The final column reports an equivalent equation for the six richest, mostly northern European countries of Denmark; Finland; France; Luxembourg; Norway and Sweden. GDP was insignificant for this richest group of countries. For all countries, inflation and unemployment enter negatively in a life satisfaction equation. These results are consistent with the Easterlin (1974) hypothesis.

Table 7 explores the impact of inflation and unemployment for a variety of sub-groups. Each row of the table reports the results of estimating an OLS equation with the same controls as in column 5 of Table 5. Indeed, the first row of Table 7 reports the results from that overall equation. OLS is used here because it is simpler to interpret the coefficients. What stands out from the table is the stability of the findings, across virtually all groups, that higher unemployment and higher inflation lower happiness.

In all of the life satisfaction equations estimated to this point I have included controls for the current inflation rate in the country*year cell. It is perfectly feasible, though, that an individual who experienced high inflation, and especially hyper-inflation, during their adult lifetime would be more concerned about the consequences of higher inflation than somebody who had, say, only experienced low and stable inflation. To isolate any such effects I mapped onto the data file a variable representing the highest annual inflation rate an individual had experienced in their adult lifetime. I map in such a variable separately by single year of age for each country and year cell. For example, for the survey taken in Austria in 1990 for someone aged 45 years, the highest annual inflation rate between 1964 and 1990 would be used i.e. 96.2%. Similarly, a 45 year old sampled in Austria in 2005 would have the highest inflation rate of 9.5% between 1979 and 2005. And so on in each age*country*year cell. The distribution of this variable is as follows.

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[9] GDP per capita for 2006 was as follows Austria - $25,996; Belgium - $24,389; Denmark - $32,482; Finland - $27,662; France - $23,234; Germany - $24,478; Greece - $16,923; Hungary - $6,109; Italy - $19,656; Luxembourg - $54,149; Netherlands - $25,677; Poland - $5,519; Slovakia - $5,139; Spain - $16,045; Sweden - $31,188; UK - $27,638. Source: OECD GDP database – (expenditure approach). HVXVOB: Per head, US$, constant prices, constant exchange rates, OECD base year. http://stats.oecd.org/wbos/default.aspx?datasetcode=SNA_TABLE1
 Data on GDP is unavailable for 2006 for the Czech Republic – the 2005 figure was $6,627.

|            | Mean | Standard deviation |
|------------|------|--------------------|
| Austria    | 216  | 654  |
| Belgium    | 27   | 35   |
| Denmark    | 20   | 6    |
| Finland    | 38   | 37   |
| France     | 38   | 25   |
| Germany    | 138  | 333  |
| Greece     | 177  | 175  |
| Ireland    | 20   | 3    |
| Italy      | 233  | 232  |
| Netherlands| 14   | 4    |
| Norway     | 17   | 6    |
| Portugal   | 31   | 10   |
| Spain      | 23   | 4    |
| Sweden     | 16   | 6    |
| UK         | 23   | 3    |

The inflation rates by country are plotted in a series of figures in the appendix.  I also mapped in a variable for the average inflation experience during an individual's adult lifetime for each age*country*year cell.

Table 8 presents the evidence on whether individuals' personal experiences of inflation over their lifetime have any incremental value in explaining their level of life satisfaction.  Column 1 of Table 8 replicates the results of Table 5, Column 5, for a smaller subset of countries for which I have long time series of inflation data back to the 1950s (Austria; Belgium; Denmark; France; Germany; Greece; Ireland; Italy; Netherlands; Norway; Portugal; Spain; Sweden; UK) – the coefficients on both inflation and unemployment are comparable to the results in Table 5.  I cluster the standard errors as previously by country and year.  Column 2 adds the variable reflecting the *average* annual inflation experience of each individual in our sample given their age, country, and year the life satisfaction survey was conducted; this term is insignificant.  Column 3 substitutes the average annual experience term for the *highest* annual inflation rate experienced by each individual over their lifetime.  This term is negatively signed and significant, and its inclusion has essentially no effect on either the coefficients on inflation or unemployment.  The coefficient on individual unemployment is little different from the full sample case.  An individual who has experienced high inflation in the past has lower happiness today, even holding constant today's inflation and unemployment rates.[10]

## 6.  Conclusions
Previous literature has found that both unemployment and inflation lower happiness (Di Tella, et al. (2001) and Wolfers (2003)).  This paper extends the literature by looking at more countries over a longer time period. It provides aggregated data from a panel of 25 countries, including EU

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[10] It is also apparent that the effect of this term could be greater for individuals in those countries that have experienced much higher rates of inflation in the past than others.  For example, the term may play more significance for Austrians or Italians given the historic magnitude of inflation in these countries. This is a possible area for future research.

countries, four East European countries plus Mexico, Canada, the USA and Japan alongside micro-data from a subset of twenty European countries on nearly seven hundred thousand respondents.

What do our estimates suggest about the relative size of the effects from the unemployment rate and the inflation rate? The effects of unemployment and inflation, which in row 1 of Table 7 have coefficients of -.0110 and –.0090 respectively, taken from the equation reported in column 5 of Table 5, represent the effect upon wellbeing of a one percentage point change in each of the two independent variables, for simplicity with the interest rate, GDP per capita and lagged dependent variable omitted. As an example, consider the impact of an increase in the rate of unemployment from the sample mean of seven and a half percent by one percentage point to eight and a half percent. According to our estimate, this single-point rise in unemployment diminishes life satisfaction by 0.0110 units. Consider instead an increase in the inflation rate from the mean of 4.9% by one percentage point to 5.9%. This single-point rise in inflation leads to a 0.0090 reduction in units of life satisfaction. These effects of unemployment and inflation are not small. Consider the consequences of a rise in the unemployment rate of four percentage points, which is equal to the standard deviation of unemployment in the sample. This produces a decline in well-being of 4 times -.0110, which is -.044, and is slightly higher in absolute terms than the standard deviation of life satisfaction in our panel of countries (mean = 3.14, standard deviation = .04). Moreover, equality of the two coefficients can be rejected statistically. Life satisfaction is therefore not captured exactly by a simple linear misery function defined on the sum of inflation and unemployment rates, because unemployment has a larger weight.

Following Di Tella et al (2001) – henceforth DMO – the implicit utility-constant trade-off between inflation and unemployment can now be calculated. As in conventional economic theory, their methodology leads to a measure of the marginal rate of substitution between inflation and unemployment – the slope of the indifference curve.

> "It is useful to explain what such correlations are likely to mean within a conventional natural rate of unemployment analytical framework. The estimation describes preferences themselves. Standard economic models suggest, of course, that there is no downward-sloping Phillips Curve in the long run. Knowledge of iso-utility contours is then of use to policy-makers primarily because it informs the choice of an optimal disinflationary path. Our estimates, and more broadly this kind of methodology, can be viewed as aiding central bankers concerned with the choice of policy trajectories" (2000, p. 338)

There are, however, two consequences of unemployment – society as a whole becomes more fearful of unemployment (Blanchflower (1991) and some people actually loose their jobs; there are aggregate and personal effects of unemployment. DMO argue that a way has to be found to measure the two unpleasant consequences of a rise in unemployment. DMO develop a way to take account of the extra cost of joblessness, namely, to work out the sum of the aggregate and personal effects of unemployment. They do so first by calculating the direct effect of an increase in the unemployment rate on society, as I have done above – I obtained -.0110. The fear of losing a job appears to be quite prevalent. In a recent survey of working conditions across thirty two European countries 14.1% and 13.3% across the EU25, of workers agreed or strongly agreed that they might

lose their job in the next six months.[11] [12]  The proportions were especially high in Eastern Europe and low in Denmark, Luxembourg, Norway and the UK.  In the US General Social Survey workers are asked how likely it is that they will lose their job or be laid-off in the next 12 months and, on average across the 2002, 2004 and 2006 surveys 11.2% answered 'very likely' or 'quite likely' (variable *joblose*).  The fear of unemployment appears widespread.

DMO argue that it is apparent from the microeconomic life satisfaction and happiness data that the person who actually becomes unemployed experiences a much larger cost.  I concur. The loss to the individual from being unemployed can be calculated from the coefficient on being 'unemployed' in a life-satisfaction micro regression, like the one reported in column 5 of Table 5, estimated with OLS to keep the units consistent – I get -.3636.  The entire well-being cost of a 1 percentage-point increase in the unemployment rate is therefore given by the sum of two components.  Combining the two, I have .0110 + .0036= .0146 as society's overall wellbeing cost of a one percentage point rise in the unemployment rate.  The implication is that the wellbeing cost of a 1 percentage point increase in the unemployment rate equals the loss brought about by an extra **1.62** percentage points of inflation.[13]  How do I get this?

The reason is that $(0.0146/0.0090) = 1.62$, where 0.0146 is the marginal unemployment effect on well-being, and 0.0090 is the marginal inflation effect on well-being from row 1 of Table 7.  Hence 1.62 is the marginal rate of substitution between inflation and unemployment.  This is almost identical to the 1.66 obtained by DMO and I replicate exactly their estimate with their set of countries for many more years, although I get a slightly higher estimate for their countries and their time period of 1973-1991. [14]  Interestingly though, the result is driven by the preferences of those

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[11] In the 2005 European Working Conditions Survey workers were asked (Q37a) '*How much do you agree or disagree with the following statements describing some aspects of your job?  - I might lose my job in the next 6 months – Strongly agree; Agree; Neither agree nor disagree; Disagree; Strongly disagree?'.*  The proportion answering that they agreed or strongly agreed by country was as follows - Austria 9%; Belgium 9%; Cyprus 14%; Czech Republic 33%; Germany 13%; Denmark 7%; Estonia 19%; Spain 15%; Finland 13%; France 8%; Greece 21%; Hungary 22%; Ireland 10%; Italy 9%; Lithuania 23%; Luxembourg 6%; Latvia 19%; Netherlands 18%; Malta 15%; Poland 27%; Portugal 19%; Sweden 20%; Slovenia 27%; Slovakia 15%; United Kingdom 7%; Norway 7%; Switzerland 12%; Bulgaria 23%; Croatia 19%; Romania 18% and Turkey 19%.

[12] The same question was also asked in the 2003 European Quality of Life Survey; Austria 4.7%; Belgium 6.6%; Bulgaria 5.1%; Cyprus 12.5%; Czech Republic 15.9%; Denmark 8.5%; Estonia 20.5%; Finland 7.8%; France 9.5%; Germany 6.5%; Greece 12.4%; Hungary 9.1%; Ireland 6.3%; Italy 6.7%; Latvia 30.1%; Lithuania 32.0%; Luxembourg 8.3%; Malta 8.1%; Netherlands 2.6%; Poland 17.5%; Portugal 12.0%; Romania 17.7%; Slovakia 19.3%; Slovenia 9.4%; Spain 9.6%; Sweden 8.6%; Turkey 27.6%; UK 6.7%; weighted total 11.3%.

[13] The estimated trade-off is **2.81** if the macro estimates are used, for example, from column 3 of Table 5, along with the estimate of the individual unemployment effect of -0.3636 in row 1 of Table 7. The estimate is **1.61** if the estimates are used in column 4 of Table 5 which include the country*year interactions.

[14] Note that Di Tella et al (2001) use rolling three year averages and adjust for these omitted variable bias by running first stage micro life satisfaction equations in each country and year cell and then using the averaged residuals at the second stage of the regression.  Using the micro data and adjusting the standard errors by clustering, the rhs variables by country and year accomplishes essentially the same adjustment.  DMO do not make clear why they use three year rolling averages and we can see no compelling reasons to do so here; in any case this is unlikely to matter.

living in Greece, Portugal and Spain. This is apparent from Table 6: excluding them the preference is lowered, but including them generates the bigger role for unemployment.

One alternative way to calculate the marginal rate of substitution between inflation and unemployment is to control for the real rate of interest, rather than allowing it to vary as I have done so far. If I recalculate with this specification the unemployment/inflation trade-off becomes **1.38** ((-.0110+.0036)/.0106).

What would I estimate the impact on well to be of these changes? In the case of the UK I experimented by adding to the micro life satisfaction equations interaction terms between the UK dummy and the inflation rate, the unemployment rate and the unemployed dummy. The results on the relevant coefficients, using the same controls as in Table 5, are presented below with t-statistics in parentheses (n=743,397, Pseudo $R^2$=.1583).

| | |
|---|---|
| Unemployed | -.3566 (27.00) |
| Unemployment rate | -.0121 (6.14) |
| Inflation rate | -.0099 (5.00) |
| UK*inflation rate | .0040 (1.86) |
| UK*unemployment rate | .0049 (1.69) |
| UK*unemployed | -.0549 (1.95) |

This implies coefficients of -.0059 on the inflation rate for the UK, of -.0072 on the unemployment rate and -.4115 on the unemployed dummy, and consequently a slightly higher unemployment/inflation trade-off of **1.92**.[15]

It is also feasible to obtain estimates for sub-groups. I find that females have a similar trade-off to males (1.61 and 1.58 respectively). The least educated and the old are more concerned about unemployment – they put the *highest weight on unemployment*. Conversely, the young and the most educated and those still studying put the greatest weight on inflation. This runs counter to the idea that older people care more about inflation as they are more likely to have experienced it during their adult lives.[16] The results are also consistent with this finding when the analysis is done by cohorts defined by year of birth. Older cohorts care more about unemployment than younger cohorts.

Johns and Ormerod (2007) have criticised estimates of the trade-off between inflation and unemployment because the estimates, they argue, 'vary between different studies'. This lack of

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[15] If instead the sample excluded Spain, Greece and Portugal, as in Table 8, which in addition now adds a set of UK interactions as done here, only the UK*inflation interaction term is significant. When that interaction alone is included along with the other controls, the estimated unemployment/inflation trade-off for the UK is **1.29**.

[16] In contrast Lombardelli and Saleheen (2003) show that older people in the UK have *higher* expectations for inflation because they have experienced periods of higher inflation over their adult lives. They found that people in the age group 45–54 had experienced the highest level of inflation, an average inflation rate of 7.3% over their adult lives. They found that lifetime inflation experience has a significant effect on people's inflation expectations.

consensus, they argue is "entirely typical of results in applied macro-economics….Moreover, as any economic forecaster knows, macro-economic relationships break down more frequently and more spectacularly than statistical, econometric theory suggests". What is striking is how wrong Johns and Ormerod are in relation to the micro-economic happiness data used here. Unlike macroeconomic data which Johns and Ormerod argue, "contains very little genuine information" (2007, p.50), micro data contains information in abundance. Micro-econometric analysis concerns itself with aggregation and omitted variable biases; stability not instability is the order of the day, as is apparent from the estimates presented here (see Blanchflower and Oswald, 1994).

The main results of the paper can then be summarised as follows:

1. The northern European countries, especially the Danes, have generally higher happiness and life satisfaction scores than residents of Southern Europe, especially Portugal, Italy, Greece and Spain. Residents of former Eastern bloc countries have particularly low happiness scores.

2. The happiness ranking of countries remains broadly the same when macro controls are included.

3. Consistent with the Easterlin hypothesis, rising GDP per capita does not raise happiness for developed countries. There is evidence, however, that higher GDP per capita has a positive effect for poorer countries. This impact was especially marked for the former Communist countries of the Czech Republic, Hungary, Poland and Slovakia.

4. I estimate the unemployment/inflation trade-off as closer to one and a half than one as implied by the 'misery index'. I find that the least educated and, somewhat surprisingly, the old put the highest weight on unemployment. Conversely, the young and the most educated put the greatest weight on inflation.

5. Past experience of high inflation during an individual's adult lifetime lowers their happiness, over and above the impacts from higher contemporaneous inflation and/or unemployment rates.

6. Unemployment *is* more costly than inflation in terms of its impact on wellbeing. Our estimates imply that, across EU countries, a one percentage point increase in the unemployment rate lowers well being by approximately 1.6 times as much as a one percentage point increase in the inflation rate.

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**Table 1: Life satisfaction and happiness, by country (ranked by life satisfaction)**

| Country | Life satisfaction mean | Happiness mean |
|---|---|---|
| Denmark | 8.4 | 8.3 |
| Finland | 8.1 | 8.1 |
| Austria | 7.8 | 7.9 |
| Sweden | 7.8 | 7.9 |
| Ireland | 7.7 | 8.1 |
| Luxembourg | 7.7 | 8.0 |
| Belgium | 7.5 | 7.7 |
| Netherlands | 7.5 | 7.7 |
| Spain | 7.5 | 7.8 |
| United Kingdom | 7.3 | 7.7 |
| Malta | 7.3 | 7.9 |
| Germany | 7.2 | 7.6 |
| Italy | 7.2 | 7.5 |
| Cyprus | 7.2 | 7.8 |
| Slovenia | 7.0 | 7.4 |
| France | 6.9 | 7.3 |
| Greece | 6.8 | 7.6 |
| Czech Republic | 6.5 | 7.2 |
| Poland | 6.2 | 6.9 |
| Romania | 6.2 | 7.2 |
| Portugal | 6.0 | 6.8 |
| Estonia | 5.9 | 6.8 |
| Hungary | 5.9 | 7.1 |
| Slovakia | 5.7 | 6.5 |
| Turkey | 5.6 | 6.5 |
| Latvia | 5.5 | 6.4 |
| Lithuania | 5.4 | 6.4 |
| Bulgaria | 4.4 | 5.9 |
| EU15 | 7.3 | 7.6 |
| EU25 | 7.1 | 7.5 |

Question 31: All things considered, how satisfied would you say you are with your life these days? Scale from 1 'very dissatisfied', to 10 'very satisfied.'
Question 42: Taking all things together on a scale of one to 10, how happy would you say you are? Here one means very unhappy and 10 means you are very happy

Source: European Quality of Life Survey, 2003

**Table 2: Time series trends in happiness in the USA and life satisfaction in the UK**

A) Happiness in the USA (General Social Survey)

|      | Not too happy | Pretty happy | Very happy |
|------|---------------|--------------|------------|
| 1972 | 13            | 51           | 36         |
| 1974 | 13            | 49           | 38         |
| 1975 | 13            | 54           | 33         |
| 1976 | 13            | 53           | 34         |
| 1977 | 10            | 56           | 35         |
| 1980 | 13            | 53           | 34         |
| 1982 | 15            | 55           | 34         |
| 1983 | 13            | 56           | 31         |
| 1984 | 13            | 52           | 31         |
| 1985 | 11            | 60           | 35         |
| 1986 | 11            | 56           | 29         |
| 1987 | 13            | 57           | 32         |
| 1988 | 9             | 57           | 29         |
| 1989 | 10            | 58           | 34         |
| 1990 | 9             | 58           | 33         |
| 1991 | 11            | 58           | 33         |
| 1993 | 11            | 57           | 31         |
| 1994 | 12            | 59           | 32         |
| 1996 | 12            | 58           | 29         |
| 1998 | 12            | 56           | 32         |
| 2000 | 11            | 58           | 32         |
| 2002 | 12            | 57           | 30         |
| 2004 | 13            | 55           | 31         |
| 2006 | 13            | 56           | 31         |

B) Life satisfaction in the UK (Eurobarometers)

|      | Not at all satisfied | Not very satisfied | fairly satisfied | very satisfied |
|------|----------------------|--------------------|------------------|----------------|
| 1973 | 3                    | 11                 | 53               | 33             |
| 1975 | 4                    | 11                 | 54               | 31             |
| 1976 | 4                    | 12                 | 56               | 28             |
| 1977 | 4                    | 12                 | 55               | 29             |
| 1978 | 3                    | 10                 | 55               | 32             |
| 1979 | 4                    | 11                 | 58               | 28             |
| 1980 | 4                    | 10                 | 51               | 35             |
| 1981 | 5                    | 11                 | 53               | 31             |
| 1982 | 4                    | 9                  | 52               | 35             |
| 1983 | 4                    | 10                 | 56               | 30             |
| 1984 | 3                    | 10                 | 55               | 32             |
| 1985 | 4                    | 9                  | 55               | 32             |
| 1986 | 4                    | 9                  | 56               | 31             |
| 1987 | 4                    | 10                 | 55               | 32             |
| 1988 | 3                    | 9                  | 54               | 34             |

| | | | | |
|---|---|---|---|---|
| 1989 | 3 | 8 | 53 | 35 |
| 1990 | 3 | 10 | 56 | 31 |
| 1991 | 4 | 9 | 55 | 32 |
| 1992 | 4 | 9 | 54 | 32 |
| 1993 | 3 | 10 | 54 | 32 |
| 1994 | 3 | 9 | 54 | 34 |
| 1995 | 3 | 11 | 56 | 30 |
| 1997 | 3 | 10 | 56 | 32 |
| 1998 | 3 | 9 | 57 | 31 |
| 1999 | 2 | 9 | 59 | 30 |
| 2000 | 3 | 9 | 59 | 29 |
| 2001 | 2 | 8 | 56 | 34 |
| 2002 | 2 | 9 | 57 | 32 |
| 2003 | 3 | 9 | 57 | 31 |
| 2004 | 2 | 7 | 54 | 36 |
| 2005 | 2 | 9 | 57 | 33 |
| 2006 | 2 | 10 | 53 | 34 |

**Table 3:** **Macro data: life satisfaction, 1973-2006 (OLS)**

|  | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Life satisfaction$_{t-1}$ |  | .6206 (16.43) |  | .5689 (13.64) |  |
| Inflation$_t$ |  |  | -.0062 (3.38) | -.0031 (2.37) | -.0057 (3.22) |
| Unemployment rate$_t$ |  |  | -.0118 (4.59) | -.0046 (2.63) | -.0124 (5.03) |
| GDP$_t$ per capita*$10^5$ |  |  | .2230 (1.08) | .0675 (0.51) |  |
|  |  |  |  |  |  |
| Austria | -.0508 (1.52) | -.0332 (1.64) | -.0803 (2.51) | -.0451 (2.19) | -.0836 (2.64) |
| Belgium | -.0219 (0.92) | -.0145 (1.01) | -.0255 (1.12) | -.0177 (1.22) | -.0270 (1.19) |
| Canada | .5784 (10.94) | -.7512 (9.06) | .5761 (1.66) | -.6707 (7.70) | .5737 (11.64) |
| Czech Republic | -.3241 (7.32) | -.1156 (3.76) | -.2780 (4.58) | -.1174 (2.81) | -.3135 (7.59) |
| Denmark | .4066 (20.82) | .1599 (7.57) | .3715 (5.11) | .1688 (7.64) | .3815 (16.76) |
| Finland | .0144 (0.53) | .0130 (0.65) | .0472 (1.47) | .0252 (1.22) | .0464 (1.44) |
| France | -.3088 (15.82) | -.1161 (6.24) | -.2924 (2.81) | -.1250 (6.61) | -.2943 (12.96) |
| Germany | -.1210 (6.20) | -.0449 (3.00) | -.1339 (5.80) | -.0566 (3.66) | -.1340 (5.82) |
| Greece | -.5228 (24.99) | -.1939 (7.76) | -.4485 (2.99) | -.1876 (6.41) | -.4715 (17.32) |
| Hungary | -.6440 (17.84) | -.2526 (6.86) | -.5826 (9.54) | -.2640 (5.73) | -.6306 (15.16) |
| Ireland | .0471 (2.42) | .0138 (0.96) | .0839 (3.29) | .0359 (2.17) | .0762 (3.13) |
| Italy | -.3684 (15.39) | -.1309 (6.56) | -.3352 (13.80) | -.1353 (6.50) | -.3443 (15.12) |
| Japan | -.4480 (17.80) | -.1768 (7.80) | -.5499 (15.92) | -.2402 (7.45) | -.5268 (19.22) |
| Luxembourg | .1613 (6.66) | .0710 (4.55) | .0520 (1.45) | .0394 (1.71) | .0779 (2.87) |
| Mexico | -.2520 (4.78) | -.2431 (4.14) | -.2102 (3.05) | -.2370 (3.63) | -.2592 (5.06) |
| Netherlands | .2251 (9.29) | .0843 (5.05) | .1839 (7.67) | .0798 (4.69) | .1831 (7.66) |
| Norway | .1959 (1.93) |  |  |  | .1327 (1.39) |
| Poland | -.4462 (9.33) | -.1480 (4.20) | .1116 (1.15) | -.1013 (2.27) | -.2960 (5.51) |
| Portugal | -.5147 (18.76) | -.1943 (7.70) | -.2557 (3.91) | -.2129 (6.64) | -.5253 (19.92) |
| Slovakia | -.6153 (12.87) | -.2058 (5.28) | -.4941 (12.55) | -.1640 (3.45) | -.4591 (8.60) |
| Spain | -.2055 (7.49) | -.0731 (4.01) | -.4156 (6.22) | -.0471 (2.10) | -.1279 (4.30) |
| Sweden | .1889 (5.47) | .0761 (3.45) | -.1095 (3.20) | .0725 (3.29) | .1571 (4.82) |

| | | | | | |
|---|---|---|---|---|---|
| Turkey | -.5233 (10.94) | -.0591 (1.55) | .1529 (4.65) | | |
| USA | .1905 (4.86) | .1114 (3.90) | .1482 (3.64) | .1080 (3.56) | .1673 (4.56) |
| Constant | 3.1810 | 1.2065 | 1.4230 | 3.1997 | 3.2283 (73.52) |
| Year dummies | 31 | 31 | 31 | 31 | 31 |
| Adjusted $R^2$ | .9266 | .9622 | .9107 | .9630 | .9108 |
| N | 470 | 429 | 460 | 422 | 462 |

**Table 4:  Macro data: life satisfaction, 1973-2006 (OLS)**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Life satisfaction$_{t-1}$ | .5713 (13.83) | .5743 (13.50) | .5744 (13.50) | .5731 (13.38) | |
| Inflation$_t$ | -.0029 (2.32) | -.0007 (0.43) | -.0049 (3.16) | -.0050 (3.18) | -.0100 (4.49) |
| Unemployment rate$_t$ | -.0046 (2.77) | -.0043 (2.49) | -.0044 (2.49) | -.0040 (2.01) | -.0122 (4.80) |
| Nominal Interest rate | | -.0041 (2.32) | | | |
| Real interest rate | | | -.0042 (2.32) | -.0042 (2.34) | -.0059 (2.22) |
| GDP$_t$ per capita $*10^5$ | | | | .0859 (0.43) | |
| Austria | -.0458 (2.24) | -.0461 (2.27) | -.0461 (2.27) | -.0452 (2.19) | -.0812 (2.60) |
| Belgium | -.0181 (1.26) | -.0196 (1.37) | -.0196 (1.37) | -.0189 (1.31) | -.0320 (1.44) |
| Canada | -.6756 (7.83) | -.6865 (7.85) | -.6865 (7.85) | -.6831 (7.75) | .5794 (11.95 |
| Czech Republic | -.1284 (4.18) | -.1271 (4.13) | -.1271 (4.13) | -.1122 (2.26) | -.3076 (7.55) |
| Denmark | .1710 (7.94) | .1762 (7.99) | .1762 (7.99) | .1731 (7.43) | .3998 (17.10 |
| Finland | .0248 (1.21) | .0234 (1.14) | .0234 (1.14) | .0230 (1.11) | .0489 (1.54) |
| France | -.1253 (6.64) | -.1269 (6.65) | -.1269 (6.65) | -.1267 (6.60) | -.2982 (13.32 |
| Germany | -.0563 (3.65) | -.0642 (4.05) | -.0642 (4.05) | -.0642 (4.04) | -.1451 (6.19) |
| Greece | -.1937 (7.31) | -.1837 (6.81) | -.1837 (6.81) | -.1761 (5.45) | -.4448 (16.15 |
| Hungary | -.2768 (7.30) | -.2555 (6.57) | -.2555 (6.57) | -.2387 (4.28) | -.5941 (13.99 |
| Ireland | .0329 (2.10) | .0311 (1.97) | .0311 (1.97) | .0339 (2.03) | .0808 (3.35) |
| Italy | -.1375 (6.77) | -.1297 (6.35) | -.1297 (6.35) | -.1268 (5.87) | -.3172 (13.73 |
| Japan | -.2317 (8.27) | -.2468 (8.25) | -.2468 (8.25) | -.2556 (7.18) | -.5601 (19.23 |
| Luxembourg | .0475 (2.71) | .0402 (1.97) | .0402 (1.97) | .0330 (1.28) | .0825 (2.60) |
| Mexico | -.2517 (4.32) | -.2336 (4.01) | -.2336 (4.01) | -.2151 (2.97) | -.2150 (4.12) |
| Norway | | | | | .1750 (7.31) |
| Netherlands | .0792 (4.68) | .0764 (4.49) | .0764 (4.49) | .0776 (4.48) | .1363 (1.45) |
| Poland | -.1135 (2.97) | -.0992 (2.57) | -.0992 (2.57) | -.0858 (1.77) | -.2633 (4.86) |
| Portugal | -.2211 (8.11) | -.2225 (7.80) | -.2225 (7.80) | -.2112 (5.40) | -.5208 (18.78 |
| Slovakia | -.1769 (4.34) | -.1806 (4.35) | -.1806 (4.35) | -.1664 (3.19) | -.4530 (8.39) |
| Spain | -.0528 (2.69) | -.0529 (2.67) | -.0529 (2.67) | -.0467 (1.95) | -.1209 (4.07) |
| Sweden | .0736 (3.36) | .0757 (3.46) | .0757 (3.46) | .0741 (3.33) | .1647 (5.11) |

| | | | | | |
|---|---|---|---|---|---|
| USA | .1137 (4.02) | .1058 (3.72) | .1058 (3.72) | .0979 (2.90) | .1612 (4.42) |
| Constant | 1.4123 (10.26) | 1.4097 | 1.4179 | 1.3881 | 3.3244 |
| Year dummies | 31 | 31 | 31 | 31 | 31 |
| Adjusted $R^2$ | .9631 | .9634 | .9634 | .9633 | .9136 |
| N | 424 | 406 | 406 | 404 | 437 |

## Table 5: Micro Life satisfaction equations – ordered logits

| | 1 | | 2 | | 3 | | (4 – OLS) | | (5 - OLS) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Inflation$_t$ | | | -.0241 | (4.67) | -.0287 | (5.16) | -.0115 | (4.23 ) | -.0090 | (5.09) |
| Unemployment rate$_t$ | | | -.0234 | (4.37) | -.0233 | (3.64) | -.0150 | (4.87 ) | -.0110 | (5.86) |
| GDP per capita$_t * 10^4$ | | | .0886 | (1.96) | .0657 | (0.84) | | | | |
| Real interest rate | | | | | -.0087 | (1.36) | | | | |
| Age | -.0406 | (49.49) | -.0384 | (16.95) | -.0382 | (16.50) | -.0134 | (17.17 ) | -.0134 | (17.01) |
| Age$^2$ | .0005 | (51.48) | .0004 | (19.18) | .0004 | (18.71) | .0001 | (19.43 ) | .0001 | (19.29) |
| Male | -.0817 | (16.47) | -.0966 | (11.06) | -.0985 | (11.07) | -.0322 | (10.78 ) | -.0322 | (10.78) |
| 16-19 yrs schooling | .2127 | (36.45) | .2359 | (19.29) | .2365 | (18.88) | .0854 | (18.27) | .0863 | (18.22) |
| 20+ yrs schooling | .4377 | (63.27) | .4663 | (29.55) | .4664 | (28.88) | .1661 | (26.26 ) | .1669 | (27.06) |
| Still studying | .3094 | (13.65) | .3258 | (7.97) | .3387 | (8.23) | .1218 | (8.84 ) | .1180 | (8.04) |
| Married | .3129 | (44.58) | .3407 | (19.67) | .3399 | (19.17) | .1209 | (21.23 ) | .1199 | (2.90) |
| Living as married | .1448 | (13.29) | .1461 | (8.11) | .1528 | (8.41) | .0498 | (7.97 ) | .0502 | (8.01) |
| Divorced | -.4427 | (34.73) | -.4294 | (2.38) | -.4297 | (20.09) | -.1581 | (2.57 ) | -.1595 | (2.64) |
| Separated | -.5218 | (25.24) | -.5566 | (19.56) | -.5590 | (19.37) | -.2083 | (19.86 ) | -.2064 | (19.57) |
| Widowed | -.2817 | (25.32) | -.2436 | (13.85) | -.2455 | (13.58) | -.0849 | (13.56 ) | -.0859 | (13.60) |
| Self-employed | .0237 | (2.87) | .0335 | (2.68) | .0291 | (2.29) | .0067 | (1.49 ) | .0069 | (1.50) |
| Home | -.0268 | (3.51) | -.0439 | (3.24) | -.0467 | (3.33) | -.0227 | (4.73 ) | -.0216 | (4.44) |
| Student | .1754 | (7.77) | .2027 | (5.08) | .1965 | (4.85) | .0667 | (4.96 ) | .0712 | (5.01) |
| Retired | -.1496 | (17.34) | -.0925 | (5.99) | -.0926 | (5.87) | -.0392 | (6.95 ) | -.0407 | (7.26) |
| Unemployed | -.9682 | (97.44) | -.9558 | (28.28) | -.9560 | (27.93) | -.3599 | (3.03 ) | -.3636 | (3.66) |
| Austria | .1626 | (1.31) | -.2984 | (4.22) | -.2932 | (4.21) | -.1530 | (.50 ) | -.0960 | (4.13) |
| Belgium | .1196 | (11.63) | -.2395 | (4.26) | -.2491 | (4.80) | -.0366 | (.79 ) | -.0802 | (4.27) |
| Czech Republic | -.2507 | (8.40) | -.8167 | (7.14) | -.8433 | (5.04) | -1.2310 | (2.15 ) | -.3190 | (16.59) |
| Denmark | 1.4186 | (131.13) | .9979 | (2.64) | 1.0381 | (17.43) | .2718 | (9.65 ) | .3229 | (22.15) |
| Finland | .2759 | (17.66) | -.0847 | (1.50) | -.0820 | (1.44) | -.0497 | (.31 ) | -.0023 | (.12) |
| France | -.6222 | (6.88) | -.9488 | (23.72) | -.9559 | (24.17) | -.4674 | (16.96 ) | -.3273 | (23.59) |

| | (1) | | (2) | | (3) | | (4) | | (5) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Germany | -.3305 | (36.38) | -.7103 | (2.58) | -.7238 | (21.10) | -.2568 | (6.05 ) | -.2282 | (19.04) |
| Greece | -1.1396 | (102.42) | -1.2315 | (15.59) | -1.2175 | (13.23) | -.3774 | (6.80 ) | -.4634 | (21.04) |
| Hungary | -1.1507 | (37.63) | -1.6963 | (14.76) | -1.6840 | (9.67) | -1.6060 | (2.91 ) | -.6803 | (35.32) |
| Ireland | .3917 | (37.52) | .1759 | (3.74) | .1748 | (3.84) | .0910 | (2.62 ) | .0506 | (3.41) |
| Italy | -.7295 | (71.58) | -.9761 | (17.35) | -.9363 | (16.48) | -.5236 | (16.51 ) | -.3445 | (17.64) |
| Luxembourg | .6474 | (45.88) | .0232 | (.32) | .0781 | (0.91) | -.1081 | (2.31 ) | .0416 | (2.57) |
| Netherlands | .7921 | (76.53) | .3700 | (11.46) | .3673 | (10.96) | .0698 | (2.13 ) | .1211 | (1.78) |
| Norway | .7551 | (29.78) | .2574 | (2.50) | .3177 | (2.52) | -.7374 | (2.45 ) | .1078 | (3.51) |
| Poland | -.5110 | (16.11) | -.8549 | (7.05) | -.8621 | (5.52) | 1.0410 | (1.90 ) | -.3277 | (11.62) |
| Portugal | -1.0524 | (9.82) | -1.2700 | (14.29) | -1.2802 | (9.87) | -.2943 | (4.88 ) | -.4991 | (21.47) |
| Slovakia | -.9695 | (32.75) | -1.2886 | (1.54) | -1.3275 | (8.27) | -.7039 | (.85 ) | -.4988 | (17.26) |
| Spain | -.2478 | (21.03) | -.3727 | (5.71) | -.3831 | (4.99) | -.1443 | (2.70 ) | -.1274 | (7.76) |
| Sweden | .7805 | (49.33) | .2805 | (7.80) | .2935 | (7.47) | -.0812 | (0.74) | .1055 | (8.35) |
| _cut1/constant | -3.9978 | | -4.1920 | | -4.2436 | | 3.5983 | | 3.513 | (9.60) |
| _cut2 | -2.2335 | | -2.4076 | | -2.4579 | | | | | |
| _cut3 | .5521 | | .4360 | | .3784 | | | | | |
| | | | | | | | | | | |
| Year dummies | Yes | | Yes | | Yes | | Yes | | Yes | |
| Country trends | No | | No | | No | | Yes | | No | |
| | | | | | | | | | | |
| N | 783,551 | | 740,403 | | 713,668 | | 743,397 | | 743,397 | |
| Pseudo/ $\overline{R}^2$ | 0.0748 | | 0.0804 | | 0.0794 | | .1605 | | 0.1582 | |

Notes: excluded categories UK; employee, no children: left school before age 15; single. All equations include 29 year dummies. Standard errors are clustered by country and year. Column 5 is estimated by OLS

Source: Eurobarometer trend file (ICPSR# 4357). Eurobarometers #65.2 (2006); 64.2 (2005); 63.4 (2005); 62.0 (2004); 61.0 (2004); 60.1 (2003).

**Table 6: Micro Life satisfaction equations – ordered logits**

| | 1 | | 2 | | 3 | | 4 | | 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Richest countries | | Poorest countries | | East Europe | | South Europe | | North Europe | |
| Inflation$_t$ | -.0404 | (5.44) | -.0382 | (4.15) | -.0365 | (3.82) | -.0139 | (1.52) | -.0298 | (1.94) |
| Unemployment rate$_t$ | -.0179 | (3.15) | -.0522 | (3.90) | .0293 | (2.63) | -.0263 | (2.15) | .0032 | (.16) |
| GDP per capita$_t$ * $10^4$ | .0000 | (1.14) | .0002 | (3.79) | .0017 | (1.36) | .0002 | (6.52) | .0000 | (1.34) |
| Age | -.0373 | (17.50) | -.0429 | (5.47) | -.0958 | (1.88) | -.0376 | (5.91) | -.0428 | (11.17) |
| Age$^2$ | .0004 | (19.79) | .0004 | (5.74) | .0009 | (1.12) | .0003 | (6.04) | .0005 | (12.07) |
| Male | -.1253 | (13.42) | .0109 | (.69) | -.0793 | (2.38) | .0128 | (.92) | -.1281 | (8.79) |
| 16-19 yrs schooling | .2063 | (16.91) | .2864 | (9.33) | .4245 | (8.35) | .2901 | (11.64) | .1891 | (8.73) |
| 20+ yrs schooling | .4284 | (26.04) | .5445 | (14.78) | .9525 | (11.21) | .4545 | (15.56) | .4386 | (14.11) |
| Still studying | .3220 | (9.48) | .2113 | (1.82) | .9597 | (4.33) | .1896 | (1.97) | .3293 | (5.18) |
| Married | .3868 | (2.77) | .2046 | (4.91) | .4032 | (6.19) | .2334 | (6.58) | .5189 | (17.23) |
| Living as married | .1709 | (8.69) | .1864 | (4.21) | .2612 | (2.88) | .1430 | (3.36) | .2856 | (1.51) |
| Divorced | -.4290 | (19.22) | -.3771 | (6.29) | -.2916 | (4.18) | -.3480 | (6.32) | -.2961 | (9.23) |
| Separated | -.5811 | (19.80) | -.3772 | (4.27) | -.5155 | (1.93) | -.4316 | (6.72) | -.4596 | (9.70) |
| Widowed | -.2208 | (11.46) | -.3111 | (6.75) | -.0527 | (.57) | -.3084 | (8.01) | -.0606 | (1.77) |
| Self-employed | .0362 | (2.51) | .0487 | (2.06) | .2200 | (3.43) | .0485 | (2.30) | -.0292 | (1.15) |
| Home | -.0660 | (4.32) | .0523 | (2.40) | -.2485 | (2.42) | .0030 | (.15) | -.0680 | (2.02) |
| Student | .1735 | (5.05) | .3797 | (3.16) | .0008 | (.00) | .3311 | (3.31) | .2116 | (3.34) |
| Retired | -.1011 | (5.93) | -.0719 | (2.18) | -.1273 | (1.50) | -.0296 | (1.14) | -.0653 | (1.60) |
| Unemployed | -1.0325 | (27.10) | -.6517 | (15.72) | -.8379 | (15.21) | -.7643 | (16.94) | -.7212 | (18.17) |
| Austria | -.3271 | (4.66) | | | | | | | | |
| Belgium | -.2737 | (5.04) | | | | | | | | |
| Czech Republic | | | 1.0662 | (2.37) | | | | | | |
| Denmark | 1.0151 | (21.49) | | | | | | | .7407 | (5.23) |
| Finland | -.1338 | (2.35) | | | | | | | -.6814 | (3.59) |
| France | -.9858 | (25.42) | | | | | | | -1.4342 | (7.69) |
| Germany | -.7707 | (2.38) | | | | | | | | |
| Greece | | | -.8483 | (12.81) | | | -.6011 | (4.31) | | |
| Hungary | | | .3890 | (.81) | .4249 | (2.97) | | | | |

| | (1) | | (2) | | (3) | | (4) | | (5) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ireland | .1596 | (3.30) | | | | | | | | |
| Italy | -.9807 | (17.50) | | | | | -1.1275 | (4.23) | | |
| Luxembourg | .0804 | (1.10) | | | | | | | | |
| Netherlands | .3458 | (1.38) | | | | | | | | |
| Norway | .2510 | (2.79) | | | | | | | .0811 | (.78) |
| Poland | | | 1.5138 | (3.37) | 1.7075 | (6.59) | | | | |
| Portugal | | | -.5013 | (2.32) | | | | | | |
| Slovakia | | | 1.1988 | (2.52) | 2.1899 | (6.62) | | | | |
| Spain | | | | | | | .3005 | (2.18) | | |
| Sweden | .2626 | (7.25) | | | | | | | -.1184 | (1.17) |
| _cut1/constant | -4.8329 | | -1.8894 | | 6.1833 | | -1.8246 | | -5.1142 | |
| _cut2 | -3.0407 | | -.1005 | | 8.1788 | | -.0655 | | -3.3313 | |
| _cut3 | -.1668 | | 2.6752 | | 11.3359 | | 2.7396 | | -.3752 | |
| | | | | | | | | | | |
| N | 597,246 | | 143,157 | | 15,392 | | 188,158 | | 184,860 | |
| Pseudo/ $R^2$ | 0.0729 | | 0.0384 | | 0.0618 | | 0.0325 | | 0.105 | |

Notes:  excluded categories UK; employee, no children: left school before age 15; single.  All equations include 20 year dummies. Standard errors are clustered by country and year. Excluded category in column 2 is Spain, column 4 is Portugal and column 5 is Luxembourg.
Source: Eurobarometer trend file (ICPSR# 4357).  Eurobarometers #65.2 (2006); 64.2 (2005); 63.4 (2005); 62.0 (2004); 61.0 (2004); 60.1 (200 3).

**Table 7:** **Coefficients of inflation and unemployment in micro life satisfaction equations (OLS)**

| | Inflation rate | Unemployment rate | Unemployed coefficient | Unemployment/ Inflation trade-off | N |
|---|---|---|---|---|---|
| All | -0.0090 | -0.0110 | -0.3636 | 1.62 | 743,397 |
| Di Tella countries | -0.0142 | -0.0199 | -0.3639 | 1.66 | 743,397 |
| Di Tella < 1992 | -0.0100 | -0.0136 | -0.3870 | 1.74 | 335,184 |
| Wolfers countries | -0.0093 | -0.0097 | -0.3635 | 1.43 | 743,397 |
| | | | | | |
| Poorer countries | -0.0178 | -0.0344 | -0.2515 | 2.07 | 128,750 |
| Remaining countries | -0.0147 | -0.0081 | -0.3830 | 0.81 | 614,647 |
| UK | -0.0105 | -0.0097 | -.3818 | 1.29 | 614,617 |
| | | | | | |
| Males | -0.0105 | -0.0121 | -0.4420 | 1.58 | 356,788 |
| Females | -0.0078 | -0.0098 | -0.2851 | 1.61 | 386,609 |
| | | | | | |
| <16 years schooling | -0.0057 | -0.0137 | -0.3722 | 3.05 | 256,851 |
| 16-19 years schooling | -0.0097 | -0.0116 | -0.3715 | 1.58 | 267,769 |
| 20+ years schooling | -0.0111 | -0.0069 | -0.3296 | 0.91 | 150,486 |
| Still studying | -0.0109 | -0.0051 | -0.0051 | 0.47 | 68,291 |
| | | | | | |
| Age 15-24 | -0.0117 | -0.0077 | -0.3417 | 0.95 | 135,501 |
| Age 25-34 | -0.0119 | -0.0103 | -0.3568 | 1.17 | 140,429 |
| Age 35-44 | -0.0108 | -0.0146 | -0.4179 | 1.73 | 130,589 |
| Age 45-54 | -0.0082 | -0.0132 | -0.4366 | 2.14 | 112,901 |
| Age 55-64 | -0.0093 | -0.0129 | -0.3447 | 1.75 | 100,818 |
| Age 65+ | -0.0041 | -0.0078 | -0.1081 | 2.17 | 118,610 |
| | | | | | |
| Born before 1950 | -0.0064 | -0.0133 | -0.3723 | 2.68 | 354,599 |
| Born in or after 1950 | -0.0090 | -0.0107 | -0.3653 | 1.59 | 388,798 |
| Born 1950-69 | -0.0077 | -0.0122 | -0.4023 | 2.09 | 262,586 |
| Born 1970+ | -0.0056 | -0.0124 | -0.2958 | 2.76 | 126,212 |

Notes: all coefficients are statistically different from zero at the 5% level. Each row is obtained from a separate regression with age and its square, gender, three schooling variables, 5 marital status dummies, 29 year dummies and nineteen country dummies for Austria; Belgium; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Luxembourg; Netherlands; Norway; Poland; Portugal; Slovakia; Spain; Sweden with the UK the excluded category. For calculation of unemployment/inflation trade-off see text. 'Di Tella countries' are Belgium; France; Denmark; Greece; Germany; Ireland; Italy; Luxembourg; Netherlands; Portugal; Spain and the UK from 1975-1991. 'Wolfers countries' add Austria, Norway, Finland and Sweden. Poorer countries are Greece, Portugal and Spain.

**Table 8: Inflation experiences**

|  | 1 |  | 2 |  | 3 |  |
|---|---|---|---|---|---|---|
| Inflation$_t$ | -.0094 | (5.16) | -.0095 | (5.18) | -.0096 | (5.25) |
| Unemployment rate$_t$ | -.0114 | (5.82) | -.0115 | (5.88) | -.0119 | (6.05) |
| Average inflation experience |  |  | -.0010 | (1.02) |  |  |
| Highest inflation experience |  |  |  |  | -.0001 | (3.44) |
| Age | -.0133 | (16.42) | -.0133 | (16.38) | -.0134 | (16.74) |
| Age$^2$ | .0001 | (18.68) | .0001 | (18.58) | .0001 | (19.11) |
| Male | -.0327 | (10.48) | -.0328 | (10.43) | -.0329 | (10.51) |
| 16-19 yrs schooling | .0873 | (17.72) | .0873 | (17.73) | .0871 | (17.80) |
| 20+ yrs schooling | .1664 | (26.12) | .1665 | (26.13) | .1664 | (26.23) |
| Still studying | .1178 | (7.88) | .1174 | (7.84) | .1174 | (7.82) |
| Married | .1186 | (19.86) | .1185 | (19.84) | .1189 | (19.92) |
| Living as married | .0481 | (7.38) | .0483 | (7.38) | .0496 | (7.61) |
| Divorced | -.1621 | (20.04) | -.1623 | (20.05) | -.1622 | (20.05) |
| Separated | -.2065 | (19.13) | -.2065 | (19.12) | -.2061 | (19.12) |
| Widowed | -.0866 | (13.17) | -.0864 | (13.09) | -.0852 | (12.95) |
| Self-employed | .0057 | (1.22) | .0057 | (1.20) | .0056 | (1.19) |
| Home | -.0243 | (4.80) | -.0244 | (4.80) | -.0244 | (4.81) |
| Student | .0710 | (4.90) | .0713 | (4.92) | .0715 | (4.93) |
| Retired | -.0395 | (6.88) | -.0394 | (6.84) | -.0395 | (6.89) |
| Unemployed | -.3657 | (29.77) | -.3658 | (29.74) | -.3660 | (29.71) |
| Austria | -.0956 | (4.17) | -.0969 | (3.45) | -.0904 | (3.96) |
| Belgium | -.0807 | (0.23) | -.0955 | (4.17) | -.0807 | (4.39) |
| Denmark | .3220 | (21.96) | .3212 | (21.82) | .3206 | (21.78) |
| Finland | -.0001 | (0.00) | .0014 | (0.07) | .0032 | (0.16) |
| France | -.3271 | (23.35) | -.3254 | (23.29) | -.3254 | (22.99) |
| Germany | -.2286 | (19.35) | -.2297 | (19.18) | -.2229 | (18.85) |
| Greece | -.4596 | (20.71) | -.4512 | (18.89) | -.4485 | (20.32) |
| Ireland | .0524 | (3.50) | .0540 | (3.61) | .0549 | (3.68) |
| Italy | -.3434 | (17.47) | -.3374 | (15.85) | -.3306 | (16.34) |
| Netherlands | .1199 | (10.55) | .1179 | (10.12) | .1181 | (10.33) |
| Norway | .1072 | (3.47) | .1064 | (3.44) | .1057 | (3.42) |
| Portugal | -.4979 | (21.41) | -.4939 | (21.13) | -.4973 | (21.47) |
| Spain | -.1240 | (7.41) | -.1206 | (7.10) | -.1200 | (7.14) |
| Sweden | .1057 | (8.12) | .1054 | (8.07) | .1054 | (8.04) |
|  |  |  |  |  |  |  |
| Constant | 3.5198 |  | 3.5262 |  | 3.5264 |  |
|  |  |  |  |  |  |  |
| N |  | 703,172 |  | 703,172 |  | 703,172 |
| R$^2$ |  | 0.1549 |  | 0.1549 |  | 0.1550 |

Notes: excluded categories UK, employee, no children: left school before age 15; single. All equations include 20 year dummies. Standard errors are clustered by country and year. Average inflation experience refers to the average annual inflation rate experienced by an individual over their life to the survey date. Highest inflation experienced refers to the highest annual inflation rate experienced by an individual over their life to the survey date.

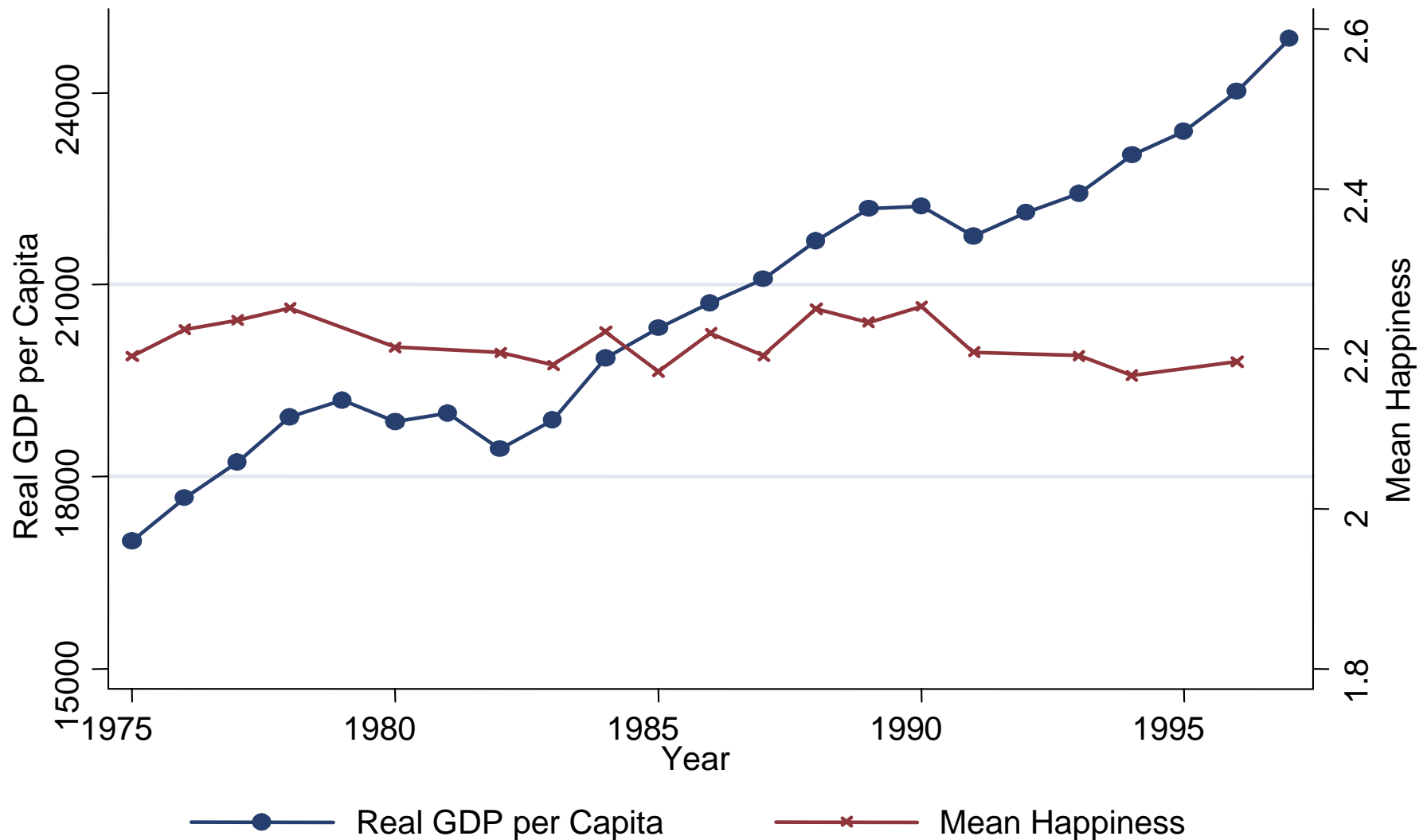**Figure 1:** Average happiness and real GDP per capita for repeated cross-sections of Americans.

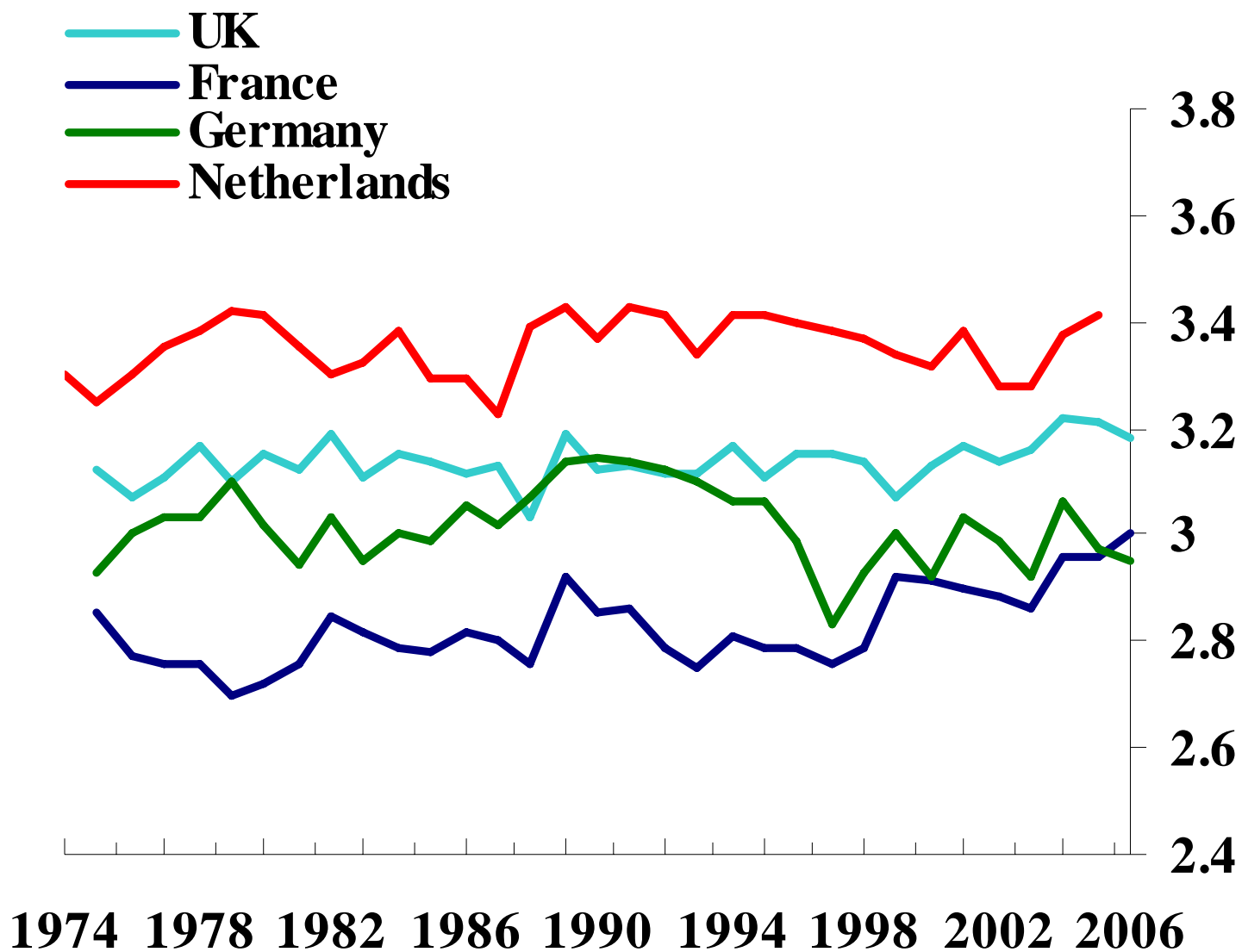**Figure 2a:** Mean life satisfaction scores, 1973-2006

Legend:
- UK
- France
- Germany
- Netherlands

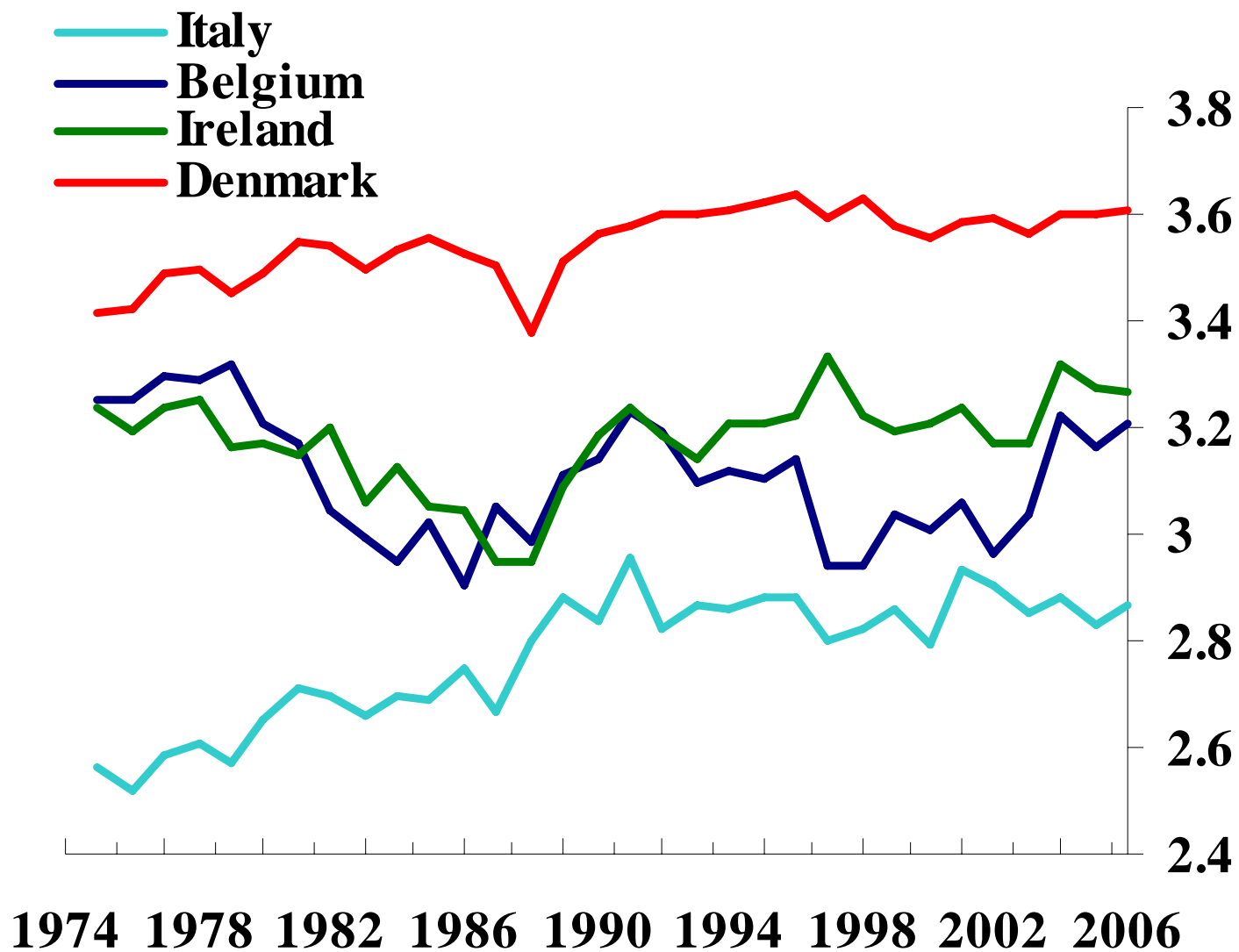**Figure 2b:** Mean life satisfaction scores, 1973-2006)

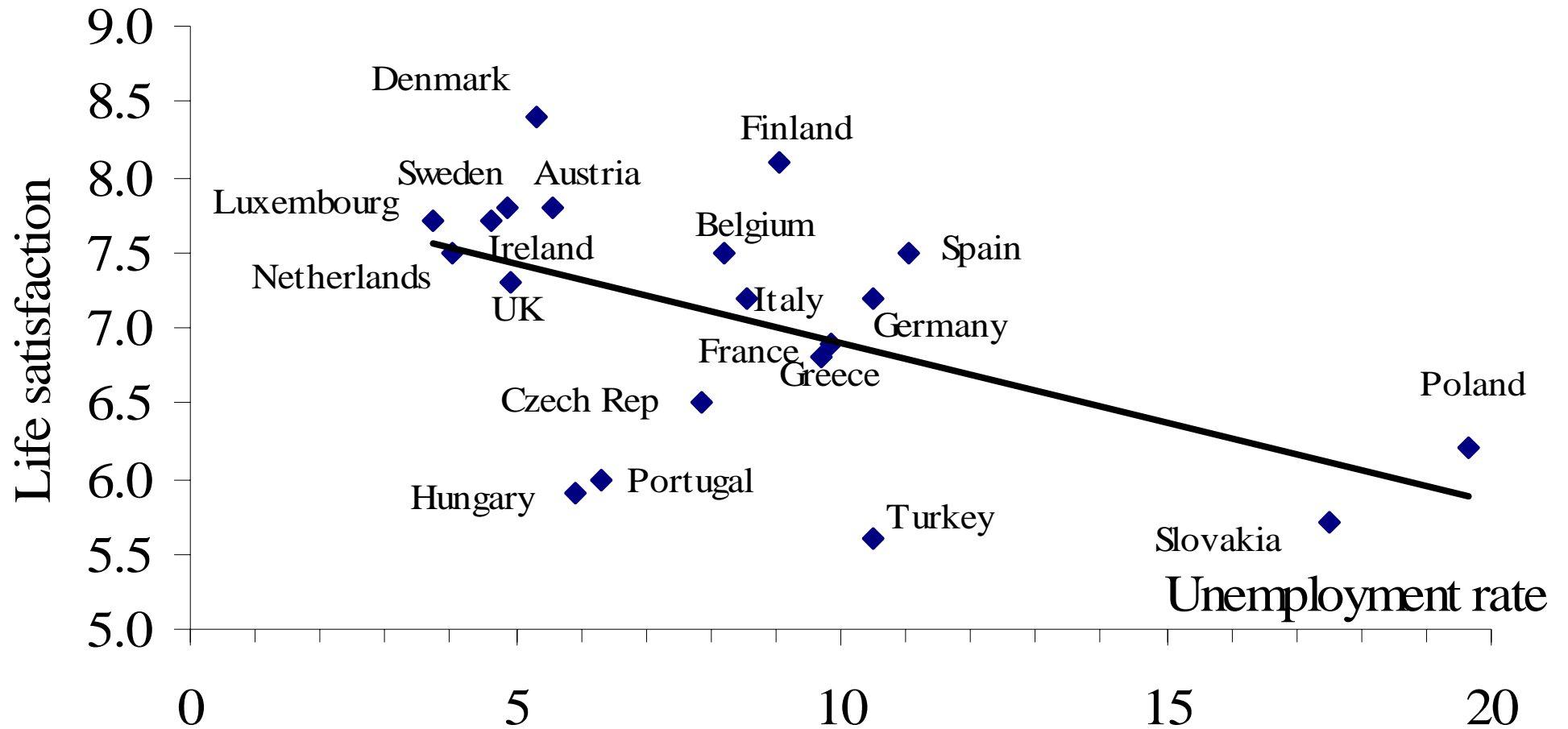# Figure 3: Life satisfaction and the unemployment rate (2003)

**Figure 4:** **Life satisfaction and inflation (HICP, 2003)**

## Figure 5: Life satisfaction and GDP per capita (Source: Wolfers, 2003)



World Values Survey
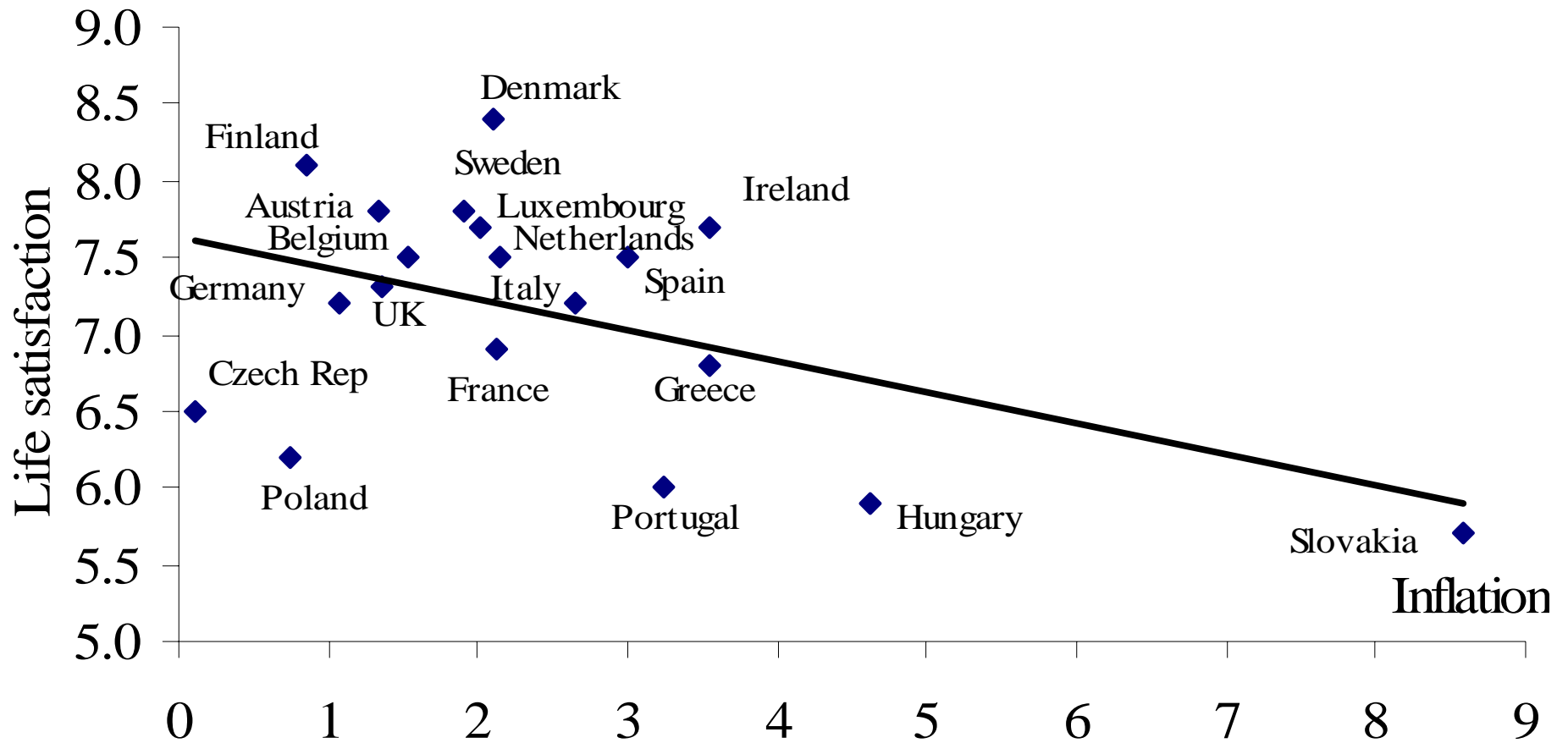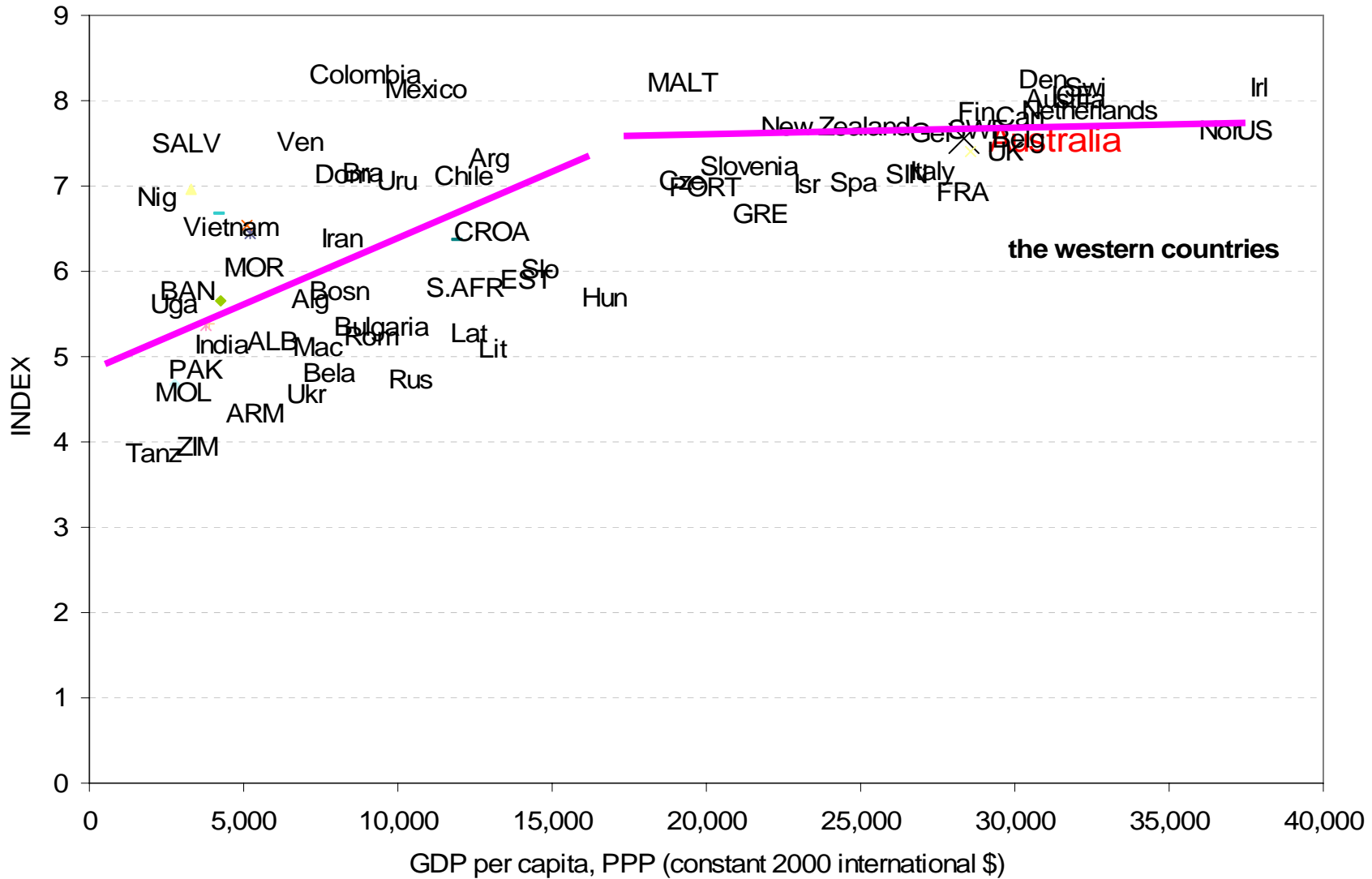Life Satisfaction = -0.9 + 0.8 * Log GDP (t=8.3)

**Figure 6: 1995/2000 World Values Survey results (Source: Wolfers, 2003)**

## Appendix A: Inflation rates over time in Europe



Figure A

(UK, Sweden, Denmark, Norway)



Figure B

(Netherlands, Spain, France, Ireland)



Figure C

(Portugal, Finland, Belgium)



Figure D

Peak at 1022    Peak at 491

(Italy, Germany)



Figure E

Peak at 2544    Austria