Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness

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Evidence from Surveys of Happiness[1]

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Modern macroeconomics textbooks rest upon the assumption of a social welfare function defined on inflation, π, and unemployment, U.[2] Yet no formal evidence for the existence of such a function has been presented in the literature.[3] Although an optimal policy rule cannot be chosen unless the parameters of the presumed $W(\pi, U)$ function are known, that has not prevented its use in a large theoretical literature in macroeconomics.

This paper has two aims. The first is to show that citizens care about these two variables, namely, that inflation and unemployment belong in a well-being function. The second is to calculate the costs of inflation in terms of unemployment -- in other words to try to measure the relative size of the weights attached to these variables in social well-being. Policy implications emerge.

[2] See, for example, Olivier Blanchard and Stanley Fischer (1989), Michael Burda and Charles Wyplosz (1993) and Robert Hall and John Taylor (1993). Early influential papers include Robert Barro and David Gordon (1983).

[3] Gregory Mankiw [1997] describes the question "How costly is inflation?" as one of the four major unsolved problems of macroeconomics.

Economists have often puzzled over the costs of inflation. Survey evidence presented in Robert Shiller (1996) shows that, when asked how they feel about inflation, individuals report a number of unconventional costs, like exploitation, national prestige and loss of morale. Yet skeptics wonder. One textbook concludes: "*we shall see that standard characterisations of the policy-maker's objective function put more weight on the costs of inflation than is suggested by our understanding of the effects of inflation; in doing so, they probably reflect political realities and the heavy political costs of high inflation.*" (pp. 567-8, Blanchard and Fischer (1987)). Since reducing inflation is often costly, in terms of extra unemployment, some observers have argued that the industrial democracies' concern with nominal price stability is excessive -- and have urged different monetary policies.[4]

This paper proposes a new approach. It uses subjective data collected from random samples of individuals. These data cover many countries and provide self-reported measures of how happy and satisfied individual respondents are with their lives. We then correlate happiness data with inflation and unemployment in what could be called "well-being" functions to study these questions. Only a few economists have looked at patterns in reported well-being. Richard Easterlin (1974) helped to begin the literature. Later contributions include Yew-Kwang Ng (1996), Robert Frank (1985), Ronald Inglehart (1990), Andrew Oswald (1997), and David Morawetz et al (1977). More recently Ng (1997) discusses the measurability of happiness, and Daniel Kahneman, Peter Wakker and Rakesh Sarin (1997) provide an axiomatic defence of experienced utility, and propose applications to economics. Our paper also borders on

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[4] A recent contribution to this debate in the U.S. is Paul Krugman's piece "Stable Prices and Fast Growth: Just Say No", *The Economist,* August 31st, 1996.

work in the psychology literature; see for example Edward Diener (1984), David Myers (1993), and William Pavot (1991).

Section I describes the main data source, the Euro-Barometer Survey Series. Partly the creation of Ronald Inglehart at the University of Michigan, this records happiness and life satisfaction information on 264,710 people living in twelve European countries over the period 1975 to 1991. We also examine the United States General Social Survey, which records similar information on 26,668 individuals over the period 1972-94. Section II obtains a regression-adjusted measure of the well-being in a particular year and country – the level not explained by an individual's personal characteristics. This unexplained or residual macroeconomic well-being measure is the paper's focus.

Using a panel analysis of nations, we show that reported well-being is strongly correlated with inflation and unemployment. It is should be emphasised that we do not ask people whether they dislike inflation and unemployment. Instead individuals are asked in surveys how happy they are with life, and we show that -- possibly unknown to them -- their en masse answers move systematically with their nation's level of joblessness and rate of price change.[5] The data seem to trace out an economy's well-being function. Section III concludes.

I. Happiness Data

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[5] Our analysis complements the survey approach of, for example, Shiller (1996) who uses questions regarding inflation.

In the Euro-Barometer Survey Series, a cross-section sample of Europeans are interviewed each year. One question asks "*Taking all things together, how would you say things are these days--would you say you're very happy, fairly happy, or not too happy these days?*". Another elicits answers to a "life satisfaction" question. This, included in part because the word happy translates imprecisely across languages, is worded, "*On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?*". We concentrate on the life satisfaction data because they are available for a longer period of time – from 1975 to 1991 instead of just 1975-86. Unsurprisingly, happiness and life satisfaction are correlated (the correlation coefficient is 0.56 for the available period 1975-86), so the focus on life satisfaction may be sufficient. The working-paper version of this paper, available on request, presents extra results using happiness statistics.

We also study happiness data from the United States General Social Survey (1972-1994). There the happiness question reads "*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?*". The question was asked in each of 23 years. There is no life-satisfaction question for the U.S. It would be ideal if the well-being question's wordings were identical in the European and US cases, but they are not. However, most of the paper's conclusions rest upon cross-Europe results, where the wording of questions is the same.

We study well-being regressions for both Europe and the US. These are similar to the early micro-econometric happiness regressions for the US and the UK presented in David Blanchflower et al (1993) (Inglehart (1990) also documents the patterns in the

micro data, mainly by looking at cross-tabulations). Although coefficients do not have a

cardinal interpretation, the following personal characteristics are positively associated

with reported well-being, and are statistically significant, in both continents: being

employed, female, young or old (not middle aged), educated, married (neither divorced,

not separated nor a widow), with few children, or belonging to a high-income quartile.

Separate happiness regressions for each of the European countries largely repeat these

results. For example, being unemployed is associated with much lower reported

happiness levels in every European country.

Table A1 in the appendix presents a micro-econometric life satisfaction regression

for Europe. Greater family income increases the likelihood that a respondent reports a

high level of well-being. This effect of income is monotonic and is reminiscent of the

utility function of standard economics. The regression evidence is also consistent with the

common-sense idea that unemployment is a major economic source of human distress (on

psychiatric stress data see Andrew Clark and Oswald (1997)). Our working paper reports

further patterns from micro well-being regressions.

II. The Inflation-Unemployment Trade-Off in Happiness Equations

We study a basic regression of the form

$$LIFE\ SATISFACTION_{it} = \alpha\ INFLATION_{it} + \beta\ UNEMPLOYMENT_{it} + \varepsilon_i + \delta_t + \mu_{it}$$

where *LIFE SATISFACTION* is the average life satisfaction in country *i* in year *t* that is

not explained by personal characteristics, *UNEMPLOYMENT* is the unemployment rate

in country *i* in year *t*, *INFLATION* is the rate of change of consumer prices in country *i*

and year t, ε_i is a country fixed effect, δ_t is a time effect (a year fixed effect), and μ_{it} is an error term. Later regressions include a country-specific time trend.

A two-step methodology is employed. In the first stage, micro-econometric OLS life satisfaction regressions are estimated for each country in the sample.[6] The mean residual life-satisfaction is then calculated for each nation in each year, which gives approximately 150 observations (ten countries times fifteen years) in a second-stage regression. These country-by-year unexplained life-satisfaction components are the dependent variable in a second-stage regression of the form given in the equation above. Three-year moving averages of the explanatory variables are used. This smooths out some of the noise evident in the data (and, we found, produces succinct estimating equations while leaving the substantive conclusions unaffected when compared to equations with many lagged and autoregressive terms).

For three reasons, issues of simultaneity are ignored. First, it might be believed that 'happiness' does not mold the levels of inflation and unemployment. Second, the aim is the simple one of documenting correlations in the data. Third, it is unclear what variable could serve as an instrument. Nevertheless, future research may have to return to this issue.

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[6] Using residuals from the probit regressions introduces issues that have not been resolved in the statistical literature. The use of OLS regressions has the well-known problem that the data imply the distance between the categories very satisfied and fairly satisfied is the same as the distance between the categories fairly satisfied and not very satisfied. Experiments suggested to us that the precise cardinalization assumed did not alter the results (e.g. a binary representation of well-being led to similar equations).

Data Definitions

LIFE SATISFACTION: The average of the residuals from a Life Satisfaction Ordinary Least Squares regression on personal characteristics. The residuals are averaged for each country and year in the sample (Mean=-0.010; Standard deviation=0.078).

UNEMPLOYMENT: The unemployment rate (three year moving average) from the OECD Economic Outlook (1995) (Mean=0.087; Standard deviation=0.037).

INFLATION: The inflation rate (three year moving average), as measured by the rate of change in consumer prices, from IMF World Tables (1994) (Mean=0.086; Standard deviation=0.059).

Results

Regression (1) of Table 1 studies the dependence of life satisfaction on the unemployment rate and the rate of inflation. The specification includes time and country dummies. The coefficients from regression (1) in Table I imply that higher unemployment and higher inflation both decrease life satisfaction. These effects, with coefficients of –2.0 and –1.2, are each significantly different from zero at the 1% level. The implicit utility-constant trade-off between these variables is therefore approximately 1.7. In order to have a meaningful discussion about a trade-off we must make implicit assumptions, such as that, over the relevant range, utility is linear (so the margin is equal to the average). It is not possible to give a cardinal answer to the question 'how much does well-being rise as inflation and unemployment decline?'.

It is necessary to make clear within a natural rate framework what such correlations mean. The estimation may be best thought of as describing preferences. Standard economic models suggest that there is no downward-sloping Phillips Curve,

except in the short run, so knowledge of the iso-utility contours are of use to policy-makers primarily in informing choice of an optimal dis-inflationary path. The estimates described above, and more broadly this kind of methodology, may be of value to central bankers concerned with the choice of policy trajectories.

Regression (2) in Table I shows that both unemployment and inflation continue to enter negatively and significantly once we introduce country-specific time trends (as requested by a referee). The coefficients on the two variables are now more similar (equality of the coefficients, in regression 2, cannot be rejected statistically at normal confidence levels). Hence life satisfaction appears to be reasonably well-approximated by a simple linear misery function defined on the sum of inflation and unemployment, $W=W(\pi+U)$.

Regressions (3) and (4) in Table I divide the sample into two time periods: before 1984 and after 1983. The coefficients keep their signs, although, as is to be expected, they are not now as well-defined. Degrees of freedom here are a source of potential concern; but this approach is primarily designed as a check on robustness. Column (5) adds into the equation a squared term in inflation – to test if inflation is particularly bad at high levels – but this leaves the key result unaffected. If an additional squared term in unemployment is entered, its effect is negligible.

Table II presents some further tests of the relationship between inflation, unemployment and well-being. Regression (6) in Table II controls for a lagged dependent variable. It shows that there is a little autoregression, but that life satisfaction data continue to be strongly correlated with macroeconomic variables.

Regression (7) tests whether well-being depends on changes in the two macroeconomic variables. We use the growth in inflation (or unemployment) from one year to the next. There is some evidence that these changes matter. Both enter with the expected negative sign. Regression (8) in Table II shows that the inclusion of a lagged dependent variable reinforces these findings. But the underlying ideas remain the same.

It could be argued that the above calculations underestimate the cost of unemployment. The reason is that the first-stage regressions have already controlled for the personal cost of being unemployed. There is a simple way to take account of the first-stage cost of joblessness. We can calculate from regression (1) that an increase in the unemployment rate from 0 to 1% would have a cost equal to approximately 0.02 for the average citizen whether employed or unemployed. This number may be viewed as capturing a 'fear of unemployment' effect. On the other hand, from microeconomic data, a person falling unemployed experiences an actual loss equal to 0.33 in the same units. This number comes from the coefficient on being unemployed in a life-satisfaction micro regression, like the one in appendix Table A1, estimated with OLS to keep the units consistent. The average cost of a 1% point increase in the unemployment rate is therefore the sum of two components: 0.0033+0.02=0.0233. According to the estimates, that well-being cost equals the loss brought about by a 1.97% inflation rate.

Inflation, Unemployment and Happiness in the United States

Since there is no question on life satisfaction in the United States General Social Survey (1972-1994), it was not possible to include the US in the panel regressions. Using GSS happiness data we estimated an OLS happiness regression – available upon request - on personal characteristics for the U.S. and obtained the mean residuals for each year. The

year-to-year changes in the "happiness residuals" were negatively correlated with the corresponding year-to-year changes in the so-called misery index. When viewed as two individual explanatory variables, the yearly changes in happiness were somewhat more strongly associated with changes in the unemployment rate than inflation. Necessarily, the US findings stem from a single time-series regression. Broadly, the US results were approximately consistent with, though a little less well-defined than, the European results.

III. Conclusions

The paper presents a new approach to study standard questions in macro-economics. It studies reported well-being data on a quarter of a million people across twelve European countries and the United States. We show that people appear to be happier when inflation and unemployment are low. Consistent with the standard macroeconomics textbook's assumption that there exists a social objective function $W(\pi, U)$, randomly sampled individuals mark systematically lower in well-being surveys when there is inflation or unemployment in their country. The rates of price change and joblessness affect reported satisfaction with life after controlling for the personal characteristics of the respondents, country fixed effects, year effects, country-specific time trends, and a lagged dependent variable. A function reminiscent of the textbook $W(\pi, U)$ exists in the data.

A large literature in economics has tried to measure the losses from inflation. By examining the appropriate area under a money demand curve, Martin Bailey (1956) and

Milton Friedman (1969) originally concluded that inflation has only small costs. Similarly, Fischer (1981) and Robert Lucas (1981) find the cost of inflation to be low, at 0.3 per cent and 0.45 per cent of national income, respectively, for a 10 per cent level of inflation. The numbers implied by our happiness-equation estimates are consistent with larger welfare losses.

At the margin, unemployment depresses reported well-being more than does inflation. In a panel that controls for country fixed-effects and year effects, the estimates suggest that people would trade off a 1 percentage point increase in the unemployment rate for a 1.7 percentage point increase in the inflation rate. Hence, according to these findings, the famous 'misery index' $W(\pi+U)$ somewhat under-weights the unhappiness caused by unemployment.

It seems possible that the methods used in this paper -- the study of well-being regression equations -- may prove useful in other areas of macro-economics.

Table I: Life Satisfaction Equations for Europe 1975-91

	(1)	(2)	(3) Pre 84	(4) Post 83	(5)
Unemployment t	-2.0 (0.5)	-1.4 (0.5)	-1.4 (1.3)	-1.8 (1.2)	-1.4 (0.5)
Inflation t	-1.2 (0.4)	-1.4 (0.4)	-1.2 (0.6)	-2.4 (0.8)	-1.8 (0.9)
Inflation^2 t					1.9 (3.2)
Time Trends[1]	No	Yes	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes
No. of Obs.	150	150	75	75	150
Adj. R^2	0.13	0.51	0.61	0.59	0.51

Notes: [1] Standard errors are in parentheses. Time trends are country-specific. [2] Three-year moving averages of the explanatory variables are used.

Table II: Checks on Life Satisfaction Equations for Europe 1975-91

	(6)	(7)	(8)
Life Satisfaction t-1	0.2 (0.1)		0.2 (0.1)
Unemployment t	-1.3 (0.6)	-1.4 (0.5)	-1.4 (0.6)
Inflation t	-1.0 (0.4)	-1.5 (0.4)	-1.2 (0.4)
ΔUnemployment t		-1.2 (0.7)	-1.1 (0.7)
ΔInflation t		-0.7 (0.4)	-1.0 (0.4)
Time Trends[1]	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
No. of Obs.	139	150	139
Adj. R^2	0.50	0.53	0.53

Notes: [1] Standard errors are in parentheses. Time trends are country-specific.
[2] Three-year moving averages of the explanatory variables are used.

Appendix

Table A1: Life Satisfaction Micro-Equation for Europe (Ordered Probit) 1975-91.

Dep Var: Reported Life Satisfaction		Coefficient	Standard Error
Unemployed		-46.8	1.0
Self employed		6.1	0.8
Male		-6.7	0.5
Age		-2.8	0.1
Age Squared		3.18e-4	9.26e-6
Education to age: 15-18 years		4.8	0.6
≥ 19 years		9.0	0.7
Marital Status: Married		12.9	0.7
Divorced		-27.4	1.5
Separated		-33.8	2.2
Widowed		-15.7	1.1
Num. of children between 8 & 15 yrs:	1	-3.2	0.6
	2	-4.5	0.8
	3	-9.7	1.2
Income Quartiles : Second		16.8	0.7
Third		30.2	0.7
Fourth (highest)		45.8	0.7
Retired		7.9	0.9
In school		5.8	1.1
At home		4.8	0.7

Notes: [1] Number of Observations=264,710. Log-likelihood=269677. Chi^2(47)=49196. Cut1=-1.648, Cut2=-0.776, Cut3=0.893. [2] The regression includes country and year dummies from 1975 to 1991. The country dummies (standard errors) are: Belgium 0.494 (0.010), Netherlands 0.880 (0.010), Germany 0.358 (0.009), Italy -0.118 (0.009), Luxembourg 0.753 (0.014), Denmark 1.180 (0.010), Ireland 0.577 (0.010), Britain 0.520 (0.010), Portugal –0.260 (0.012), Greece –0.175 (0.010) and Spain 0.197 (0.013). The base country is France. [3] The exact question is: "On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?".

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