COMMENT on NATIONAL TIME ACCOUNTING

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This is a fascinating study. There can be nothing more important than how people spend their time, and how they feel as they do it. The novel contribution of this study is the emphasis on feeling, which lay behind the original proposal for "National Well-Being Accounts". I assume that this is still the main objective, and the switch of logo to "National Time Accounts" is just to highlight the importance of time use as a determinant of well-being.

The paper is full of interesting and illuminating analysis. But I shall concentrate on two main areas where I have reservations:

(i)   the value of the U-index as a measure of well-being, and

(ii)   the importance of time-use in explaining differences in well-being.

1. THE U-INDEX AND PUBLIC POLICY

Public policy usefulness

I want to examine how helpful the U-index is for purposes of public policy. This is not of course the only reason to do social science, but in the end most social science gets used in policy debate. Given this, it is best to set up an enquiry so that its findings are as explicitly helpful for policy-making as possible.

Among economists the standard approach to public policy is to think of social welfare (W) as an additive aggregate of individual happiness H_i, perhaps with diminishing marginal social welfare attaching to increments of individual happiness:[1]

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[1] eg Atkinson and Stiglitz, 1980,Part II.

$$W = \sum_i f(H_i) \qquad (f' > 0, f'' \le 0)$$

If f( ) is linear, we have the standard "sum of happiness" criterion advocated by Bentham:

$$W = \sum_i H_i$$

Clearly for either formulation we must have cardinal measures of utility where a unit interval at one point on the scale has the same meaning as a unit interval at another point – and the units are comparable across individuals.

With the aid of such a formulation we can think about any problem of public policy and derive the standard reasons for government intervention, which include not only equity but also efficiency (when there are externalities, information problems or economies of scale). Much public policy is not aimed at the elimination of misery (on equity grounds mainly) but also at providing the conditions for a civilised life for all (largely an efficiency issue). So an index focussed on misery only is of limited use. Nor can equity and efficiency be treated separately – all policy decisions involve elements of both.

If this argument is right, it would be more helpful to record for each episode a scalar measure of well-being than simply a dichotomous measure of whether the person is miserable or not. Even for purposes of equity analysis it would be helpful to know just how miserable a person was – not simply whether he fell below some cut off.

Properties of the U -index

This would certainly be true unless the dichotomous measure has intrinsically better properties than the scalar measure. I cannot see that it has. For example, let us consider the U − measure used for an episode in Columbus/Rennes study. Here $U_i = 1$ iff

$$H_i < Max(Tense_i, Blue_i, Angry_i)$$

and otherwise zero. The claim is that this measure avoids the problem that each of these measures (H_i and the others) is allegedly ordinal. Thus we cannot compare the H_i of person i with the H_j of person j. But, if i uses the upper end of every scale while j uses the lower end of every scale, then the comparison of H and $Blue$ is unaffected by individual vagaries of reporting practice between individuals.

But is it likely that a person who over-reports their happiness will also over-report their depression? The opposite is at least as likely. Indeed the paper has on page 25 an illustration of this opposite mechanism: when H is asked about before Pain (rather than the other way round), the mean of H is higher and of Pain lower.

So, if all the affect measures are truly ordinal, I do not see that the U procedure overcomes the problem. (Moreover, the procedure requires that a person can compare on a scale of 0-6 how Happy he is with how Angry he is. This is asking quite a lot. And how bad is righteous anger anyway if a person is high on the happiness scale?)

So, if the measures are truly ordinal, the procedure only partly handles the problem. Moreover, by comparing two numbers, it adds to problems of measurement error, while it loses so much of the information along the whole scale of H.

Is happiness ordinal?

But **is** H purely ordinal, with massive variation in individual uses of the scale? Most of section 3 of the paper argues the opposite. So does every study in which we regress H_i on X_i, and get well defined estimates of the effect of X_i on H_i. Getting well defined estimates is particularly impressive when a similar estimate is obtained from studies conducted on widely different populations.

An example of this is a recent study by Layard, Mayraz and Nickell (2007). The aim of the study was to see how quickly the marginal utility of income falls as income rises – a

key parameter for all public policy (including cost-benefit analysis and optimal taxation). The 6 surveys used are shown in Table 1 and cover 50 countries and 33 years. The happiness/life-satisfaction variable in each study was put through a linear transformation to fit into a scale from 0 – 10. All the analyses included (besides income) country-times-year dummies as well as sex, age, education, marital status and employment status. The estimated equation was

$$H_{it} = \alpha_{ct} \frac{y_{it}^{1-\rho} - 1}{1 - \rho} + \sum_{j} \beta_j x_{jit} + y_{ct} + \varepsilon_{it} \qquad (1)$$

where i is individual, t time, c country, j characteristic and ρ is the elasticity of marginal utility with respect to real income.

Table 2 shows the estimated values of ρ. The results of the very different surveys are remarkably close. Nor do they differ significantly between sub-groups of the population.

Since ρ is not so far from unity, the following logarithmic formulation is a reasonably accurate approximation

$$H_{it} = \alpha \log y_{it} + \sum_{j} \beta_j x_{jit} + y_{ct} + \varepsilon_{it} \qquad (2)$$

Table 2 shows the values of α obtained from the different surveys. The estimates are less similar than for ρ but still remarkable given the diversity of sources.

Clearly the finding about ρ is influenced by the assumption that people use the happiness scales in a truly cardinal way. This is not easy to check. We do ordered logit and probit analysis and obtain almost identical estimates of ρ, but this procedure depends crucially on the assumption of symmetrical cardinal errors.

The better approach is to ask what one would mean by a true interval scale of happiness. One might suppose that each unit on the scale should be proportional to a Just Noticeable Difference (JND). If this were the case and people were retested on their replies, people who replied low on the scale should have the same degree of difference between their two replies as do people high on the scale. In other words, a regression of Test 2 values on Test 1 values should exhibit homoscedastic errors. In a test-retest study of net affect, Krueger and Schkade (2007) did not reject homoscedasticity.

Time use and happiness

The analyses using U_i are of course fascinating. But I would love to know how different the analysis would look if it measured well-being by H_i rather than U_i, or even by a U_i defined as unity for $H_i > H_O$. (What is the correlation of H_i with U_i?)

2. THE ROLE OF TIME-USE

It is extremely interesting to know how happy people are when they are doing different things. It can aid reflection on life-style. And it can help with public policy.

Work-life balance

But as the paper correctly says, there are no simple public policy conclusions. For example, if people do not much enjoy their work, it does not follow they should work less, since the marginal money they earn may justify the comparative disutility.

In discussing optimal work-life balance, the more important information would be about distributions affecting choice: that is about externality and misforecasting. If we can show that people's happiness depends on relative income as well as on absolute income, then there is a negative externality. A number of studies have investigated the

impact of other people's income upon individual happiness,[2] but the estimates are not yet precise enough to yield estimates of optimal tax. Similarly, there is evidence that people under-predict the (negative) effect of current consumption on future happiness (Rabin et al). Again the parameter estimates are not yet well-defined. But studies of these issues are at least as relevant for public policy as studies of time use.

Explanatory power

But what about the explanatory power of time-use patterns in explaining the average happiness of different people or groups? I had expected the explanatory power to be greater. For example, the $U-$index is 2.8 points higher for Americans than French. But only 1.0 points of this is due to time-use. Similarly, changing patterns of time use in the US predict a 1 point fall in the U index since the 1960s. But did it happen? And how much do differences in time-use explain the differences between individuals in the sample (or did I miss this somewhere?).

One fascinating aspect of the France/US comparison (Columbus v Rennes) is that while the $U-$index is higher for Americans, so is average life-satisfaction. But these apparent differences are readily reconciled once we look at the distribution of life satisfaction (see below).

	US	French
% not very satisfied or not at all satisfied	23.0%	17.2%
$U-$index (average)	18.8%	16.0%
$U-$index for bottom quartile	58%	48%

It does not seem necessary to consider differences in reporting habits, since in both types of data the US has a bigger tail of unhappy people. It would, however, be interesting to

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[2] Some are summarised in Layard (2005) Annex 4.2

see how this looked if we used not the $U-index$ but numbers below a certain level of happiness.

As Table 8.2 shows, the bigger US tail of unhappy people is not mainly due to greater income inequality.[3] It must be due to other aspects of inequality, perhaps more closely related to human relationships.

CONCLUSION

My provisional conclusion is this: DRM and PATS are excellent ways to get at the average experienced happiness over a day. They are also fascinating in what they reveal about happiness in different types of time use. But whether the $U-index$ is the best summary measure I doubt. It may appeal to the reading public, but for policy-makers it urgently needs to be complemented by scalar data on happiness.

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[3] It is interesting that here income does affect feelings, measured by the U-index (see also Table 1). This contrasts with the finding in Kahneman et al (2006) for the Columbus sample, where feelings are measured by net affect and are broadly related to income.

Table 1

Survey	Countries	Years	Obs.	Happiness variable	Income variable
General Social Survey	United States	1972-2004	17,603	Happiness (3 levels)	Yearly gross
World Values Survey	Worldwide	1981-2003	37,288	Life satisfaction (1-10)	Varies
European Social Survey	Europe	2002,2004	26,687	Both (0-10)	Monthly net
European Quality of Life Survey	Europe	2003	8,175	Both (1-10)	Monthly net
German Socio-Economic Panel	Germany	1984-2005	78,877	Life satisfaction (0-10)	Monthly net
British Household Panel Survey	Britain	1996-2004	43,484	Life satisfaction (1-7)	Monthly net

Table 2

Parameter estimates for equations (1) and (2)
(95% confidence intervals in brackets)

	ρ	α
General Social Survey	1.20 (0.91-1.48)	0.70 (0.61-0.80)
World Values Survey	1.25 (1.05-1.45)	0.62 (0.57-0.66)
European Social Survey	1.34 (1.12-1.55)	0.60 (0.55-0.64)
European Quality of Life Survey	1.19 (0.87-1.52)	0.82 (0.73-0.91)
German Socio-Economic Panel	1.26 (0.90-1.63)	0.55 (0.51-0.59)
British Household Panel Survey	1.30 (0.97-1.62)	0.35 (0.30-0.40)
Overall	1.26 (1.16-1.37)	

Sub-groups

Men	1.22 (1.06-1.39)
Women	1.26 (1.11-1.40)
30-42	1.27 (1.12-1.42)
43-55	1.26 (1.10-1.41)
Low ed	1.13 (0.85-1.40)
Mid ed	1.21 (1.01-1.42)
High ed	1.26 (1.16-1.37)
Couples	1.27 (1.11-1.43)
Never married	1.44 (1.13-1.77)
Others	1.34 (1.12-1.55)

References

Atkinson A.B. and Stiglitz J.E. (1980) 'Lectures on Public Economics', Lecture 2, 'Household Decisions, Income Taxation and Labour Supply'. London: McGraw-Hill Book Company (UK) Limited.

Layard, R (2005), 'Happiness: Lessons From A New Science, Annex 4.2, available at http://cep.lse.ac.uk/layard/annex.pdf. New York: The Penguin Press.

Kahneman, D et al (2006) 'Would you be happier if you were richer? A focusing Illusion'. Princeton University Mimeo.