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# Introduction and Overview

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Subjective well-being involves people's evaluations of their lives, encompassing how happy or satisfied they say they are overall, and their reported emotional experiences at specific times. Economists are often skeptical of self-reported data on subjective outcomes, but in recent years economists have increasingly analyzed data on subjective well-being. From 2000 to 2007, for example, there were 263 papers on subjective well-being according to a search of *Econ Lit*, up from just twenty-five in the 1990s.<sup>1</sup> If it can be measured, even approximately, there is no question that subjective well-being should be of interest to economists and other social scientists.

Perhaps related to the outpouring of research into subjective well-being, policymakers and statistical agencies around the world have shown increased interest in measuring subjective well-being as part of their national statistics. In addition to Bhutan, whose king called for a measure of Gross National Happiness in the early 1970s without having much idea of how to measure or define it, the governments of Canada, the United Kingdom, France, and Australia have initiated programs to consider developing indicators of subjective well-being. Are these efforts silly? Has research progressed to the point that happiness could be measured along with GDP or investment? Or even unemployment?

This volume considers a more limited goal than measuring Gross National Happiness, but a goal that dramatically departs from the standard economic measurements that guide policy. The goal is to develop a system of National Time Accounting (NTA). National Time Accounting is a frame-

At the time of publication, Alan B. Krueger was on leave from Princeton University and the National Bureau of Economic Research, serving as assistant secretary for economic policy and chief economist for the U.S. Department of Treasury.

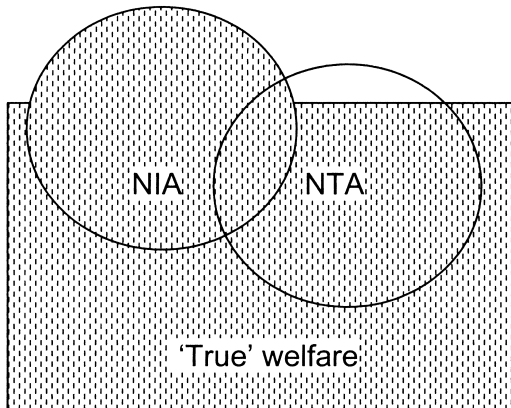
1. These figures are based on a search on the terms "life satisfaction," "subjective well-being," or "self-reported happiness."

work for measuring, comparing, and analyzing the way people spend their time across countries, over historical time, or between groups of people within a country at a given time. Although time-use data have long been collected and studied, most past efforts to evaluate time use rely on researchers' external judgments regarding which activities constitute enjoyable leisure and which constitute arduous work and home production. The method for NTA described in the first chapter of this volume, "National Time Accounting: The Currency of Life," instead relies on individuals' own evaluations of their emotional experiences during their various uses of time. This approach is called "evaluated time use." One feature of our use of evaluated time use is that we explicitly allow for emotions to be multidimensional during specific time periods. Someone can feel happy, tired, and stressed all at the same time, for example.

The intended contribution of National Time Accounts is nicely summarized in figure I.1, which is borrowed from George Loewenstein's chapter. A society's well-being or "true welfare" is represented by the rectangle. Widely used measures from the National Income Accounts (NIA), such as gross domestic product (GDP) per capita and consumption per capita, only represent a component of total welfare because well-being depends on more than economic output and material consumption. In addition, aspects of life that contribute to economic output may detract from well-being. For example, an increase in pollution could be associated with decreased welfare but increased production and national income. Thus, the circle representing NIA partly falls outside the box representing total welfare. National Time Accounting partly overlaps with NIA, but also reflects other features of well-being that are not captured by NIA. For example, time spent socializing with friends is not measured in national income but is important for well-being. Key questions are: how big is the circle representing NTA? How much overlap is there between NTA and NIA? And how big is the area in the well-being box that is not measured by either NTA or NIA?

The readers of other National Bureau of Economic Research volumes should be warned that this volume deviates somewhat from the usual model. The volume is focused on measuring subjective well-being, and authors were invited to specifically use the NTA approach as a leaping-off point, to offer criticisms of the method or provide alternative ways of measuring subjective well-being. The first chapter, by Alan Krueger, Daniel Kahneman, David Schkade, Norbert Schwarz, and Arthur Stone, sets the scene. The chapter is the culmination of an eight-year effort by four psychologists and one economist (Krueger) to measure people's evaluated time use. The authors lay out their method of NTA and provide some illustrative findings based on a nationwide telephone survey of nearly 4,000 people that they conducted with the Gallup Organization in the spring and summer of 2006. Results from other paper-and-pencil diary-based surveys and real-time data collection efforts are also presented and compared.

Krueger et al.'s (implicit) perspective:



**Fig. I.1 National Time Accounting in perspective**

Put briefly, their method is based on collecting time-diary information from individuals. For various episodes of the day, they also collect information on individuals' reported emotional experiences, such as the intensity of pain, happiness, stress, and so forth. Their chapter provides some background information on the development of their survey instrument, and on the validity of their data. Interesting differences between various methods of collecting the enjoyment associated with various activities are explored. Based on their time diary data, Krueger et al. propose a summary measure of subjective well-being called the U-index, or percentage of time that an individual or group of individuals spends in an unpleasant emotional state. An unpleasant emotional state is defined as an interval in which the strongest emotion is a negative one. The U-index has several advantages over more conventional measures of subjective well-being. Most importantly, because it involves an ordinal ranking of individuals' reported positive and negative emotions, individuals can interpret and use the scales differently and the U-index is still meaningful as long as they assign the highest value to their most intense feeling. In addition, the U-index reflects more than one dimension of emotions.

Five main criticisms of this approach emerge from the other chapters in the volume. The first is that evaluated time use misses important features of experiences and life in general that are important for well-being. In terms of Loewenstein's Venn diagram, this argument is that NTA only represents a small fraction of the total well-being box. Indeed, Loewenstein argues in chapter 2, "I believe that much if not most of what makes life worthwhile is *not* captured by moment to moment happiness, but corresponds more closely, if not perfectly, to what Krueger et al. acknowledge to be absent from

NTA, namely ‘people’s general sense of satisfaction or fulfillment with their lives as a whole, apart from moment to moment feelings.’” He illustrates this point in a number of ways, perhaps most vividly by pointing to his father’s experience in a French prisoner of war camp during World War II. Despite enduring hunger to the point that “he dug up worms for food and chewed on shoe leather,” Loewenstein reports that his father considered his time in the POW camp the peak experience of his life. More generally, Loewenstein argues that NTA misses much of what gives people meaning in their lives.

In chapter 3, David Cutler evaluates NTA along similar lines. He notes, “The major issue is the distinction between the *process* of consumption and the *existential value* of consumption.” According to Cutler, the U-index and evaluated time use more generally, are “very good at measuring the utility of the process that goes into consumption. They are less good at measuring the value of what comes out.” Cutler also makes reference to Bentham’s classic felicity calculus, which involved an enumeration of pleasures and pains. He argues that, “Pleasures of wealth, skill, amity, a good name, piety, and benevolence are generally missing” from the U-index. Finally, Cutler notes that some activities that are not particularly pleasurable at the time, such as work, are nonetheless engaged in for the benefits that they yield later on, such as the pleasure of using income to consume. Since the time-use data cover a representative snapshot of time, activities that involve investments in future well-being should be captured in the aggregate, although they are hard to attribute to specific activities.

Some of the components of well-being that are currently missing from evaluated time use can be incorporated in the measure. For example, respondents could be asked if they are hungry or uncomfortable. Moreover, respondents could be asked whether each moment of time was meaningful or a waste of time. But we suspect that even the latter will not capture the meaningfulness component of well-being to the extent that Loewenstein has in mind.

Still, it is useful to bear in mind that NTA reflects a dimension of well-being that is not captured in conventional economic statistics. Consumption statistics, for example, do not capture the sense of meaning or fulfillment in consumers’ lives. Steven Landefeld, the director of the Bureau of Economic Analysis, evaluates NTA in comparison to the criteria often applied to the National Income Accounts in chapter 4. Although NTA does not have the advantage of double-entry bookkeeping—which is a central feature of the National Income Accounts—from his vantage point, “The National Time Accounts (NTAs) are a major step forward in the measurement of well-being.” To some extent, the development of NTAs could relieve pressure to use the National Income Accounts to make welfare conclusions for which they are not well suited.

The second criticism of NTA, raised most prominently by William Nordhaus in chapter 5, is more fundamental. Nordhaus argues that emotions, and

subjective experience more generally, are not interpersonally comparable. Nordhaus notes that to be interpersonally comparable a variable “must have a uniquely defined zero and a well-defined unit of increment.” He further argues that the zero point (and presumably the increment) must be stable across time, people, and countries. He claims there simply is no interpersonally cardinal scale for reporting subjective data such as happiness and pain. If this is correct, happiness or pain cannot be compared across people. He goes further and implies that the strength of various emotions at a point in time cannot be compared by a given person. In this worldview, it is folly for a doctor to ask patients to rate their pain on a scale of zero to ten, as is commonly done, or to ask a given patient if her broken leg hurts more than her dislocated shoulder.

Now the U-index does not require that everyone use the same zero point and same increment. All that is required is that, at a moment in time, whatever zero point and increment people have in mind are applied to their rating of positive and negative emotions. Nordhaus recognizes this, but argues, “The U-index of KKSSS would appear to avoid the difficulties of some happiness indexes by its creation of an ordinal index. But, their procedure simply pushes the difficulty into the background.” We shall have more to say about this criticism in the rejoinder, but for now we note that Nordhaus’s critique is more a philosophical than empirical argument. It does not rest on any evidence, and is made in such a way that it is not empirically testable. Also note that even if one accepts the view that subjective data are not interpersonally comparable, it is nonetheless the case that subjective reports have predictive power. For example, across-subject differences in self-reported life satisfaction correlate with life expectancy, physiological measures, and job turnover.

The third line of criticism is the polar opposite of Nordhaus’s interpersonal comparability critique: in chapter 6 Richard Layard laments that the measure of well-being that Krueger et al. emphasize is not a cardinal metric. This was a conscious decision. Krueger et al. chose the U-index precisely because it minimizes assumptions necessary for interpersonal comparisons of utility. The fraction of time spent in an unpleasant state can be compared across individuals even if the underlying cardinal utilities are not interpersonally comparable. But Layard points out that a cardinal measure is necessary to draw inferences about parameters that are essential for important policy questions, such as the diminishing marginal utility of income. Layard presents evidence on the curvature of the “utility function” with respect to income based on self-reported overall happiness data. The similarity of the parameters may indicate that the data provide interpretable cardinal measures, or it may be a coincidence of the way that individuals utilize response scales. We return to this point in the rejoinder. We note that Layard is not doctrinaire. He is not committed to the development of one well-being measure. Indeed, he begins his chapter by observing that the development of

evaluated time-use data described in chapter 1 “represents an excellent use of time by its five authors.”

A fourth criticism of NTA is contained in David G. “Danny” Blanchflower’s chapter (chapter 7). Blanchflower compares the results of evaluated time use to those of more conventional well-being measures, including life satisfaction and happiness. Blanchflower notes that many of the findings from evaluated time-use data are replicated in more conventional data on subjective well-being. For example, both the U-index and conventional measures of life satisfaction and happiness show higher levels of well-being among wealthier, higher educated, and older individuals. Blanchflower points out an advantage of the NTA data, however. Namely, the evaluated time-use data can be used to understand why some groups are happier than others. That is, some differences in well-being between groups can be traced to differences in time use. Blanchflower highlights that this advantage comes at some cost. First, NTA data are costly and more difficult to collect than conventional subjective well-being data. Secondly, and more importantly, when it comes to data, sunk costs are not necessarily sunk. In particular, comparable historical and cross-country data on life satisfaction and happiness are valuable even if they are less informative than NTA. Blanchflower devotes considerable attention to exploring national differences in subjective well-being with overall life satisfaction and happiness data. He also notes that the contrast between the difference in subjective well-being between France and the United States using the U-index and life satisfaction is suggestive that NTA can help overcome biases in conventional happiness measures that are sometimes introduced when “nations have different languages and cultures” that lead to different reporting practices.

Finally, Erik Hurst (chapter 8) raises a fifth objection to our approach to NTA: some people seek out and want to experience negative emotions. For example, people sometimes pay money to watch movies that make them sad. This is a valid point. There are also some activities that people engage in that cause pain but raise happiness even more; for example, exercise. Over all episodes of the day, however, positive emotions and negative ones tend to be inversely correlated. The U-index presumes that an experience is unpleasant if a negative emotion is felt more strongly than a positive one, but, as Hurst argues, this may not be the case for all people all the time. Hurst raises another important point: people self-select the activities they engage in. Thus, it is not straightforward to infer that an activity that is rated as highly enjoyable by its average participant will be enjoyable to someone who does not partake in that activity. This type of selection problem is common in economic data, and can be addressed with econometric methods (e.g., instrumental variables) or by implementing a random assignment experiment. Despite noting these limitations of NTA, Hurst concludes, “Overall, I think this research design has merit.”

Research on National Time Accounting is at an early stage. It took decades

for the National Income and Product Accounts to be developed, and some thorny issues were never fully resolved. The chapters of this book closely examine one promising approach to developing National Time Accounts. The authors bring different expertise and different methods to evaluate NTAs, yet most are optimistic that progress can be made. But the early stage of the research program should be borne in mind. One important purpose of this volume is to stimulate further research and interest in developing National Time Accounts. Many of the criticisms of NTA that are identified by the scholars in this volume can be researched—some can be overcome by tweaking the current survey method or by using evaluated time use as the outcome of randomized control trials; some may be solvable with future advances in subjective measurement; and some must be borne in mind as limitations that will also leave users of NTAs with some uncertainty.

The chapters contained in this book were originally presented at a conference at the National Bureau of Economic Research in Cambridge, MA on December 7 and 8, 2008. The authors engaged in lively discussions about research opportunities involving NTAs and the potential for national statistical agencies to produce NTAs. The conference was supported in part by the National Institute of Aging, and Richard Suzman's participation and encouragement is gratefully acknowledged.