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A Samuelsonian validation test for happiness data ☆

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ABSTRACT

There is growing interest in the use of subjective well-being data, such as survey questions about happiness and life satisfaction. The existing validation tests determine whether these subjective measures have a positive correlation with objective measures of well-being, such as suicide rates and frequency of smiling. We propose an alternative test consisting of three steps: using regression analysis to infer preferences from subjective well-being data; using those estimated parameters to predict how a rational utility-maximizer individual should have acted; and comparing predicted behavior with actual behavior. This validation test can be compelling for economists, because it compares decision utility (i.e., preferences inferred from behavior) to reported utility (i.e., preferences inferred from self-reported well-being). We provide an application of this test based on a model of food consumption, estimated with one of the most widely used measures of subjective well-being: life satisfaction. We find that, across individuals, a one percentage point increase in the actual expenditure share is associated with a 0.76 (SE 0.196) increase in the share predicted by life satisfaction. Additionally, life satisfaction performs significantly better than other objective and subjective measures of well-being (e.g., income, satisfaction with income). The evidence suggests that life satisfaction offers some useful information about experienced utility.

1. Introduction

There are two possible meanings of the term utility. On the one hand, Samuelson's decision utility refers to preferences as revealed by observed choices (Samuelson, 1948). On the other hand, Bentham's experienced utility refers to the actual feelings of pleasure and pain that an individual experiences in response to certain stimuli (Kahneman, Wakker, & Sarin, 1997). Samuelson's revealed preference principle is arguably the most important and influential concept in economics. However, this decision utility may sometimes be difficult to estimate or less reliable. For example, economic analysis often relies on the assumption that decision utility reflects experienced utility, but this assumption can be violated by bounded rationality, endogenous preferences, or problems of self-control, among others (Chetty, 2015; Kahneman et al., 1997).[1]

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[1] In some other cases, decision utility may be useful in itself for predicting behavior. Additionally, for some other applications, even though the presence of issues like endogenous preferences and self-control may play a role, decision utility may be deemed a good enough approximation.

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An alternative measure of experienced utility would be valuable for situations where decision utility is less reliable, too costly, or impossible to estimate. Economists and other social scientists have long sought a direct measurement of experienced utility. For example, Edgeworth (1881) fantasized about a hedonimeter, an instrument capable of measuring pleasure in real time. Neuroscience may someday provide this tool, but for now we rely on other sources of data. Among social scientists, there has been exponential growth in the use of subjective well-being data. For example, some studies use data on responses to questions like, "Are you very happy, pretty happy, or not too happy?" This literature, sometimes referred to as happiness economics, has grown rapidly over the last few decades (for a review, see Di Tella & MacCulloch (2006)). This growth was facilitated by the availability of subjective well-being data in countless surveys around the world and spanning several decades. These studies often compare the well-being of individuals or nations (e.g., Easterlin, 1974; Kahneman & Deaton, 2010; Ludwig et al., 2012; Stevenson & Wolfers, 2008, 2009). However, a significant number of these studies use subjective well-being data to test theories about human behavior (e.g., Easterlin, 1995; Gruber & Mullainathan, 2005; Luttmer, 2005; Oswald & Powdthavee, 2008; Perez-Truglia, 2013; Senik, 2004). In spite of the increasing use of subjective well-being data, a majority of economists remain skeptical, although this skepticism may be about subjective data in general and not just well-being data (Bertrand & Mullainathan, 2001).

Several studies provide validation tests for subjective well-being measures. These tests typically consist of gauging whether a subjective measure of well-being is positively correlated to objective measures of well-being, such as emotional expressions (e.g., Sandvik, Diener, & Seidlitz, 1993), neurological measures (e.g., Urry et al., 2004), third-party evaluations (e.g., Sandvik et al., 1993), aggregate suicide rates (e.g., Di Tella, MacCulloch, & Oswald, 2003), among others (for a recent review, see Diener, Inglehart, & Tay (2013)). Most economists seem unpersuaded by this evidence, because it does not discard the possibility that these subjective scores measure superficial aspects of life, like mood. For instance, suppose that reporting to like the Rolling Stones is positively correlated to the frequency of smiling. This correlation is not sufficient evidence to support a Rolling Stones Index to guide economic policy or test economic theories. Nevertheless, psychologists have devoted a large literature to investigating these subjective scores measures. They have identified several measurement challenges, such as sensitivity to contextual factors and selective memory, and developed tools to address them (e.g., Stone, Shiman, & DeVries, 1999).[2] However, methodological differences make such insights less compelling for the average economist. Thus, this paper proposes a framework for testing the validity of a subjective well-being measure that should be more compelling for economists.

Consider a context in which decision utility is believed to provide an accurate approximation of experienced utility. If, in that context, reported utility is similar to decision utility, then that would provide a compelling argument for using reported utility in cases where decision utility is absent or less reliable. Based on this insight, we propose a test consisting of three steps: using regression analysis to infer preferences from subjective well-being data; using those estimated parameters to predict how a rational utility-maximizer individual should behave; and comparing the predicted behavior with the actual behavior.

In addition to formulating a general version of the test, we provide a simple application based on a model of household consumption. To illustrate the intuition behind this application, assume that we have an hedonimeter that is capable of measuring well-being, H_i. After experimenting with different combinations of consumptions of two goods, X_1 and X_2, we find the following relationship in the data: $H_i \approx \hat{\mu}_i^1 \cdot \ln(X_1) + \hat{\mu}_i^2 \cdot \ln(X_2)$. If this individual rationally maximized H_i, then she should choose an expenditure share equal to $\hat{s}_i^1 = \frac{\hat{\mu}_i^1}{\hat{\mu}_i^1 + \hat{\mu}_i^2}$. To test the validity of the hedonimeter, we should measure the expenditure share that this individual chooses in reality, and compare that share to the prediction of the hedonimeter.

We estimate a model of food consumption using panel data on subjective well-being, expenditures, and prices from a Russian household panel. The life satisfaction data is used to estimate consumption preferences in two categories of food: animal source and non-animal source. We assume that preferences are heterogeneous across individuals but stable over time. Thus, we can exploit the panel structure of the data to estimate individual-specific preference parameters. Ideally, we would test whether the actual and predicted choices are equal for every individual. However, because of data limitations, our application lacks enough power to perform an ideal version of the test. Instead, we perform a weaker version of the test by measuring the cross-individual association between actual and predicted expenditure choices.

We find that, across individuals, a one percentage point increase in the actual expenditure share is associated with an increase of 0.76 (SE 0.196) percentage points in the expenditure share predicted by life satisfaction. Indeed, we cannot reject the hypothesis of a regression coefficient of 1, which corresponds to the ideal value in the context of this test. However, given the imprecise estimation of this parameter, we cannot reject the hypothesis that the coefficient equals 0.5 either. Additionally, we show that life satisfaction performs significantly better in this test relative to other objective and subjective measures of well-being (e.g., income, satisfaction with income, perception of economic ranking, and health self-evaluation). The evidence suggests that life satisfaction offers useful information about experienced utility. However, it is unknown whether life satisfaction would perform well in the strong version of the test.

To the best of our knowledge, only a few papers provide validation tests that are similar to our test. First, Oswald and Wu (2010) use objective data to compare state-level averages of happiness and a quality-of-life measure inferred from residential choices. They report a statistically and economically significant correlation coefficient of 0.6 between the subjective and

[2] See Diener et al. (2013) for a recent review. Indeed, there are still important disagreements in some respects – for example, there is a debate as to whether happiness measures more frequency rather than average intensity of pleasurable moments (Diener, Sandvik, & Pavot, 1991).