I Guess that's Why They Call it the Blues: Macro-Economic Conditions and Subjective Well-Being

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Chris M. Herbst
School of Public Affairs
Arizona State University
411 N. Central Avenue
Phoenix, AZ 85004-0687
Email: Chris.Herbst@asu.edu

Abstract

Several recent studies provide fairly consistent evidence that short-run economic downturns are associated with an array of physical health benefits. An open question is whether macro-economic conditions influence subjective well-being, as measured by survey questions on happiness and life satisfaction. Using novel data from the DDB Needham Life Style Survey, this paper documents a negative relationship between the unemployment rate and self-reported life satisfaction over the period 1985 to 2005. Although economic downturns reduce life satisfaction across a broad swath of the population, the negative effects are concentrated among those with the most tenuous labor market attachments. An auxiliary analysis of Unemployment Insurance (UI) benefits reveals that increases in benefit generosity are associated with improvements in life satisfaction. However, it appears that UI benefits are able to mitigate the well-being losses from economic downturns only when they are relatively mild.

I. Introduction

In 2008—as the U.S. economy slipped into a major recession—the unemployment rate increased from about 5 percent in the beginning of the year to 7.3 percent in December. During the same period, a daily barometer of Americans' subjective well-being recorded a 30 percent reduction in positive life evaluation, reaching a record low in the final months of the year (Gallup-Healthways, 2009). Indeed, over half of Americans at the start of 2008 reported life satisfaction levels high enough to be classified as "thriving" according to the Life Evaluation Index. By the end of the year, just 38 percent appeared to be "thriving" (Gallup-Healthways, 2009).

These short-run trends raise several important questions for researchers and policymakers. A first-order issue is whether macro-economic fluctuations influence subjective well-being, as measured by survey questions on happiness and life satisfaction. Such a focus is a break from previous work, which concentrates on the relationship between economic conditions and physical health (Ruhm, 2004). Nevertheless, psychologists have studied subjective well-being for decades, and economists are increasingly turning to these measures to understand how traditional macro-economic indicators affect people's perceptions about their lives (Diener, 1984; Frey & Stutzer, 2002). In fact, the well-being effects of economic downturns have been studied extensively in the European context, but this question has received far less attention in the U.S. Therefore, a key contribution of this paper is to provide such an analysis.

At first blush, this relationship may appear self-evident. However, it is not clear *a priori* if deteriorating economic conditions would improve or harm individuals' psychological well-being. On the one hand, a series of papers by Ruhm (2000; 2003; 2005; 2007) and others (Gerdtham & Ruhm, 2006; Neumayer, 2004) find that short-run economic downturns are associated with an array of *physical health* benefits. For example, increases in the unemployment rate lead to declines in mortality and heart disease as well as reductions in obesity rates. Some of these improved health outcomes are linked to increases in healthy behaviors, including reductions in alcohol and cigarette

consumption and increases in physical activity and healthy eating (Freeman, 1999; Ruhm, 1995; 2000; 2005; Xu & Kaestner, 2010). Therefore, insofar as recessions improve physical well-being, it is conceivable that positive spillovers are created, whereby individuals reap additional psychological benefits in the form of greater happiness and life satisfaction.

On the other hand, there are at least two mechanisms through which economic downturns can reduce subjective well-being. First, happiness may fall because deteriorating conditions lead to individual job losses and reductions in income. Indeed, a substantial literature finds that employed individuals are happier than the unemployed and that personal income is strongly related to subjective well-being (e.g., Blanchflower & Oswald, 2004; Stevenson & Wolfers, 2008). Second, an increase in the unemployment rate may affect those who are still working by increasing the anxiety and fear associated with becoming unemployed. More generally, recessions may strain the social fabric and decrease people's trust in economic and political institutions. Together, such considerations leave open the possibility that economic downturns reduce psychological well-being—including happiness and life satisfaction—while improving many aspects of physical health.

If economic contractions are in fact associated with reductions in subjective well-being, a second-order issue is whether certain elements of the U.S. social safety net are capable of mitigating those reductions. Of particular interest is federal-state Unemployment Insurance (UI) program, which provides up to 26 weeks of compensation to those experiencing involuntary job losses and who express a willingness to accept a new job. The UI program may buoy subjective well-being during a recession by smoothing consumption among the unemployed and alleviating the fear of unemployment among the working. Given that the UI program is viewed as the first line of defense against income loss, it is critical to determine whether such benefits bolster subjective well-being in increasingly severe economic downturns. To my knowledge, this issue has not been addressed by previous research.

Based on this discussion, the aims of this paper are twofold. It first provides a

comprehensive analysis of the impact of macro-economic conditions on subjective well-being. It then turns to an investigation of the relationship between UI benefits and well-being, focusing on whether such benefits are capable of increasing well-being in varied economic environments. The analyses rely on novel micro-data from the DDB Needham Life Style Survey, an extremely rich data archive that dates back to the mid-1970s, when the advertising agency DDB Needham commissioned a polling firm to inquire about Americans' consumer preferences and habits. Importantly for the current study, the Life Style Survey has consistently asked respondents a standard question about life satisfaction as well as several items on subjective health status. To proxy macro-economic conditions and UI generosity, I append to the Life Style Survey annual state-level measures of the unemployment rate and the average weekly UI benefit.

Analyses in this study use repeated cross-sections of Life Style Surveys between 1985 and 2005, thus introducing substantial cross-state and temporal variation in economic conditions and UI benefits. An advantage of this data structure is the ability to account for many hard-to-measure determinants of subjective well-being that are spuriously correlated with economic conditions. In particular, I introduce state fixed effects to account for permanent differences across states that may simultaneously influence local labor market conditions and well-being (e.g., human capital stocks), as well as year effects to account for time-varying national determinants of well-being (e.g., terrorist attacks or natural disasters). I also experiment with state-specific linear and quadratic time trends to purge the estimates of unobservables that are trending within states over time (e.g., crime rates). The empirical strategy therefore relies primarily on within-state over time changes in the unemployment rate to identify the impact of economic fluctuations on subjective well-being.

To preview the results, I find that economic downturns are associated with reductions in self-reported life satisfaction. A one percentage point increase in the unemployment rate decreases the fraction of individuals in the top well-being category (the most satisfied) by 3.1 percent, and increases the fraction of individuals in the bottom well-being category (the least satisfied) by 3.8

percent. Although economic downturns are found to reduce subjective well-being across a broad swath of the population—including those who remain employed—the negative effects are pronounced for individuals with the most tenuous labor market attachments. This study also finds that UI benefit generosity is positively correlated with life satisfaction, with larger well-being effects experienced by those whose labor market outcomes are more sensitive to economic fluctuations. However, it appears that UI benefits are able to increase subjective well-being as long as the unemployment rate remains below seven percent. Therefore, it seems unlikely that UI benefits will significantly offset well-being reductions during severe economic downturns.

II. Background

What is Subjective Well-Being?

Given the novelty of the subjective well-being outcomes used in this study, it is important to discuss what these measures capture and whether they are likely to be valid. Survey reports of "subjective well-being" capture subjective evaluations about quality-of-life from an individual's point of view (Fischer, 2009). There is widespread scholarly agreement that measures of subjective well-being comprise both affective and cognitive components. Often referred to as emotional well-being, the former dimension captures instantaneous feelings of and momentary changes in happiness, sadness, and other affectations that indicate the degree of pleasantness or unpleasantness in one's short-run experiences. The latter refers to the rational or intellectual components of well-being. In particular, it reflects "remembered" well-being that stems from cognitive evaluations about one's life as a whole.[1]

Survey-based measures of subjective well-being generally elicit views on the cognitive dimensions of quality-of-life (Kahneman & Deaton, 2010). Such questions tend to inquire about the

[1] Kahneman and Krueger (2006) argue that subjective well-being does not contain a "single, unifying concept that motivates all human choices and registers all relevant feelings and experiences" (p. 4). Consistent with the multi-dimensional nature of subjective well-being, Diener (2006) suggests that it "refers to all of the various types of evaluations, both positive and negative, that people make of their lives. It includes reflective cognitive evaluations, such as life satisfaction and work satisfaction, interest and engagement, and affective reactions to life events, such as joy and sadness. Thus subjective well-being is an umbrella term for the different valuations people make regarding their lives, the events happening to them, their bodies and minds, and the circumstances in which they live" (pp. 399-400).

direction and magnitude of happiness or life satisfaction. For example, the General Social Survey (GSS) since 1972 has asked respondents "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 DDB Needham Life Style Survey, in contrast, poses the following statement to its participants: "I am very satisfied with the ways things are going in my life these days." Respondents are then asked to indicate on a six-point Likert scale the intensity of their agreement or disagreement with the statement. Both measures capture global evaluations of subjective well-being, as opposed to domain-specific well-being (e.g., work and marriage), and both reflect an assessment of average quality-of-life over substantial time horizons.

Measures of subjective well-being are gaining considerable traction in applied empirical research, especially in economics (e.g., Frey & Stutzer, 2002; Gruber & Mullainathan, 2005; Kahneman & Krueger, 2006. As such, these items have been exposed to extensive reliability and validity tests (e.g., Bertrand & Mullainathan, 2001; Krueger & Schkade, 2008).[2] Subjective well-being measures are highly correlated with one another and are strongly associated with other dimensions of well-being (Fordyce, 1988). For example, reports of global happiness and life satisfaction are highly correlated with such physical attributes as smiling, laughing, and verbal expressions of positive emotion (Frey & Stutzer, 2002; Layard, 2005). Indicators of physical health, including self-reported health status and sleep quality, also appear to be correlated with subjective well-being (Diener et al., 2006). Happy individuals are rated similarly happy by friends and family, tend to smile and display more positive affect during social interactions, and are less likely to commit suicide (Helliwell, 2006; Kahneman & Krueger, 2006). Reported happiness responds in predicable ways to changing life events, even though basic personality traits maintain its stability (Ehrhardt et

[2] These measures are not without their criticisms (e.g., Bertrand & Mullainathan, 2001). For example, subjective well-being measures are prone to reporting errors stemming from question order-effects and the relative placement of these questions in the survey. It has been shown using the GSS that preceding the global happiness question with one on marital happiness has non-trivial effects on self-reported happiness. In addition, contemporaneous mood is found to influence on how people respond to subjective well-being questions.

al., 2000). Such evidence led Diener (1984) to conclude that subjective well-being measures contain "substantial amounts of valid variance" (p. 551).

Insights from Economic Theory and Previous Research

A simple model of the demand for health can be a useful way to illustrate the potential impact of macro-economic fluctuations on subjective well-being (Grossman, 1972). In this model, assume that individuals maximize utility subject to time and resource constraints. Utility is expressed as a function of current health status, non-market leisure time, the consumption of goods and services, and demographic characteristics that influence health (e.g., age, race/ethnicity, and educational attainment). In this model, consumption can be both health-promoting (e.g., medical care, physical activity, and healthy food) and health-degrading (e.g., sedentary activities and calorie-dense food). Also important are the environmental inputs to the production of health, which, for the purposes of this paper, include changes in labor market conditions. An insight from this framework is that economic downturns are predicted to have ambiguous effects on subjective well-being that operate through two channels. First, recession-induced shocks to leisure time and consumption could lead to behavioral changes that affect health and well-being. Second, for a variety of reasons the economic environment in which individuals operate could directly affect well-being without corresponding changes in individual behavior. I elaborate on these mechanisms below.

It is generally assumed that economic downturns reduce the opportunity costs associated with leisure, thus making time-intensive well-being investments (e.g., increased physical activity and healthy meal preparation) more probable. Similarly, reductions in the time price of leisure increase the likelihood that individuals will participate in formal medical care. These theoretical insights are generally supported by recent empirical work, which finds that economic downturns are associated with a variety of time-intensive healthy behaviors, ranging from increased physical activity and medical care utilization to increases in the home production of meals (Ruhm, 2000; 2005; Xu & Kaestner, 2010). Given the well-established link between physical and psychological well-being

(e.g., Hilleras et al., 1998; Ostir et al., 2000), it is conceivable that recession-induced improvements in physical health create positive spillovers that increase happiness and life satisfaction.

Economic downturns may also affect subjective well-being through changes in consumption. Specifically, negative income shocks from the loss of one's job are predicted to alter the mix of health-related goods and services purchased. Such changes can have conflicting effects on health and well-being. On the one hand, recession-induced decreases in income may inhibit unhealthy activities if these are normal goods. Indeed, previous research finds that economic downturns are associated with reductions in alcohol and cigarette consumption and increases in the home production of meals (Charles & DeCicca, 2008; Freeman, 1999; Ruhm 1995; 2000; Ruhm & Black, 2002). These behavioral changes imply that health and well-being might improve during a recession. Conversely, decreases in income are predicted to reduce investments in personal growth and well-being, and prohibit families from purchasing household technologies that reduce stress and promote healthy lifestyles. The loss of income may also encourage a shift toward increased consumption of inexpensive calorie-dense foods (e.g., fast food) and sedentary activities (e.g., television).[3] These resource constraints imply that economic downturns may lead to declines in well-being.

The discussion so far suggests that the well-being effects of economic downturns are largely driven by behavioral changes among those who experience job losses. However, the environment created by recessions may also affect those who remained employed, through for example increases in the anxiety associated with losing one's job and the uncertainty about maintaining financial stability. This is consistent with the "economic stress" hypothesis introduced by Catalano and Dooley (1983). A reduction in work hours can also reduce well-being indirectly through reductions in income and consumption, as well as directly through the increase in work-related stress associated with greater workloads to offset others' job losses. More generally, recessions may decrease

[3] A recent paper by Krueger (2007) finds that, while time spent watching television generates more happiness than some activities (e.g., child care and housework), it generates less happiness than activities that are likely to be sensitive to macro-economic conditions (e.g., going to a café or bar, leisure travel, purchasing of personal services, and attending sporting events).

happiness through social interactions with a spouse, family members, or friends who have experienced job separations, declining trust in economic and political institutions, or the negative externalities associated with the loss of economic activity (e.g., increases in crime).[4]

Aside from the studies on physical health discussed above, two additional strands of previous research are particularly relevant to the current study. The first strand compares subjective well-being across working and non-working individuals, irrespective of the macro-economic environment. This work finds that subjective well-being is lower among the unemployed, with longer periods of unemployment leading to steeper declines in well-being (Blanchflower & Oswald, 2004; Clark & Oswald, 1994; Di Tella et al., 2001; Helliwell, 2003). Furthermore, the unemployed are more likely to experience depression and commit suicide (Viinamaeki et al., 1996). Although personal income is strongly related to happiness and life satisfaction (e.g., Blanchflower & Oswald, 2004; Stevenson & Wolfers, 2008), other studies find that the reduction in well-being from losing one's job cannot be fully explained by the drop in income. This suggests a strong role for psychic or stigma costs associated with unemployment that lead to increased anxiety, a loss of self-esteem, and less personal control (Murphy & Athanasou, 1999).

A drawback of this work is that it may not capture the full impact of economic downturns, which are predicted to have well-being effects on the unemployed *and* employed. Therefore, the second strand of research—and the one most relevant to this paper—models subjective well-being as a function of aggregate economic conditions using country- or state-level unemployment rates (Alesina et al., 2004; Di Tella et al., 2001; 2003; Wolfers, 2003). As previously stated, most of this work explores happiness and life satisfaction in the European context, finding consistent evidence that increases in the unemployment rate lead to reductions in well-being. To my knowledge, only two papers examine the impact of U.S. economic fluctuations on subjective well-being (Alesina et

[4] There are small literatures examining the relationship between political institutions and happiness (e.g., Frey & Stutzer, 2000) and crime and happiness (e.g., Powdthavee, 2005). This work finds that both factors are important "environmental" determinants of well-being.

al., 2004; Wolfers, 2003).[5] Both studies draw on the GSS, using repeated cross-sectional samples over similar time periods.[6] Results from this work suggest that a one percentage point increase in the state unemployment rate reduces the fraction of "very happy" individuals by 0.3 to 0.5 percentage points.

III. Data and Empirical Framework

The DDB Needham Life Style Survey

I use the DDB Needham Life Style Survey to examine the relationship between economic conditions and subjective well-being. Each year since 1975, the advertising agency DDB Needham commissions Market Facts, a commercial polling firm, to conduct the survey on a sample of approximately 3,500 Americans. The questionnaire covers a remarkably diverse set of topics, ranging from consumer behavior and product preferences to recreational activities and political attitudes. Importantly for the current study, the Life Style Survey contains a large number of items measuring multiple domains of subjective well-being.[7]

Given the uniqueness of the Life Style Survey, it is important to mention several noteworthy characteristics. First, the questionnaire covers a remarkably diverse set of well-being topics, including life satisfaction, feelings of regret about the past, optimism about the future, self-reported physical condition, and a variety of stress-related physical symptoms. Second, the Life Style Survey has been conducted annually since the mid-1970s, with all well-being questions asked in precisely the same manner each year and the data collection procedures remaining stable over time. However, between 1975 and 1984, the survey included only married individuals. To maintain consistency in

[5] A handful of studies explore the relationship between state-level unemployment rates and traditional mental health outcomes. Ruhm (2003) finds that increases in the unemployment rate are positively related to self-reported non-psychotic mental disorders. Charles and DeCicca (2008) find that a positive relationship between the unemployment rate and self-reported feelings of sadness and hopelessness. Finally, Teft (forthcoming) finds a positive relationship between the unemployment rate and Google searches for "depression" and "anxiety."

[6] Alesina et al. (2004): 1981-1996. Wolfers (2003): 1973-1998.

[7] Putnam and Yonish (1999) and Groeneman (1994) provide detailed introductions to the Life Style Survey. It is important to note that this is a proprietary data archive, although the 1975-1998 surveys are freely available on Robert Putnam's *Bowling Alone* (2000) website.

the sampling frame, I begin the observation period in 1985.[8] Third, unlike the GSS data—which are collected through face-to-face interviews—the Life Style Survey is administered through the mail, thus allowing DDB Needham to inquire about sensitive issues while maintaining anonymity and reducing social desirability biases (Dillman, et al., 1996; Visser et al., 1996).

Finally, the Life Style Survey is based on a form of quota sampling called the "mail panel." Briefly, the process for creating the sample begins when Market Facts invites (by mail) large, representative samples to express a willingness to participate in future mail inquires on consumer habits. From this pool of several hundred-thousand individuals, Market Facts then selects a demographically representative sample for the DDB Needham Life Style Survey. Approximately 5,000 respondents are mailed a written questionnaire, for which the response rate is consistently between 70 percent and 80 percent. Mail panels in general and the Life Style Survey specifically have been subjected to extensive validity tests (e.g., Groeneman, 1994; Herbst, 2010; Heberlein & Baumgartner, 1978; Putnam & Yonish, 1999; Visser et al., 1996). Results from these tests indicate a striking similarity in the distribution of demographic characteristics for respondents in the Life Style Survey and GSS; a close agreement in the trends of attitudinal variables common to both surveys; and a strong correspondence in the demographic correlates of those attitudinal variables.

Appendix Table 1 provides additional comparisons between the Life Style Survey and GSS. I present summary statistics for a number of standard demographic variables found in both surveys. Summary statistics for the Life Style Survey come from the period 1985 to 2005, while those for the GSS come from the period 1985 to 2004, as no GSS was implemented in 2005. With the exception of the percent married and never married, summary statistics in Life Style Survey match closely those derived from the GSS. Consistent with Putnam and Yonish (1999), I find that the Life Style Survey overcounts married individuals and undercounts never married individuals relative to the

[8] The item on life satisfaction was introduced into the survey in 1983, precluding an analysis of well-being trends throughout the 1970s, as is possible with the GSS. The survey underwent a dramatic redesign in 2006. Therefore, I end the observation period in 2005.

GSS. However, comparisons of other important background characteristics—including race and ethnicity, educational attainment, and employment status—show a close correspondence in the distribution of demographic characteristics across the Life Style Survey and GSS.

The analysis sample is created by pooling cross-sections of Life Style Surveys between 1985 and 2005 and retaining individuals ages 18 and over, regardless of their employment status.[9] The main results are based on a sample of 75,609 respondents.[10] The primary left-hand-side variable in this analysis is a measure of contemporaneous life satisfaction. In particular, the questionnaire item is: "I am very satisfied with the way things are going in my life these days."[11] I also exploit several other items on subjective well-being, for example, those inquiring about financial security (e.g., "Our family income is high enough to satisfy nearly all our important desires"), optimism about the future (e.g., "I dread the future"), and various aspects of physical and mental health (e.g., "I feel I am under a great deal of pressure most of the time"). Respondents are asked to indicate the direction and intensity of their agreement with each statement on a scale of one ("definitely disagree") to six ("definitely agree").[12]

I append to the Life Style Survey a proxy for state-level macro-economic conditions, defined as the average, annual unemployment rate. This is calculated as a ratio of the unemployed civilian, non-institutional population ages 16 and over to the comparable population in the labor force (employed plus unemployed). These data are drawn from the Bureau of Labor Statistics' Local Area Unemployment Statistics (LAUS) database. Given that the main results are based on models that include state fixed effects and year dummies, it is important to provide some indication of whether

[9] It is important to note that this sample definition differs from some recent studies. For example, Charles and DeCicca (2008) define their analysis sample to include men ages 24-59 from large urban areas. Xu and Kaestner (2010) include men ages 25-55 with some college education or less. Consistent with theoretical discussion above, this paper defines the analysis sample more broadly to account for the possibility that economic conditions affect the subjective well-being of those inside and outside of the labor market. In auxiliary analyses, I examine the differential effects of economic conditions across individuals of different ages, and by gender.

[10] Year-specific sample sizes range from 3,021 in 2003 to 4,116 in 1988.

[11] The measure of life satisfaction used here is fairly close to other standard measures used in the happiness literature. For example, the Eurobarometer survey asks respondents: "On the whole, are you very satisfied, fairly satisfied, not very satisfied, and not at all satisfied with the life you lead?"

[12] The full set of responses is the following: 1 (definitely disagree), 2 (generally disagree), 3 (moderately disagree), 4 (moderately agree), 5 (generally agree), and 6 (definitely agree).

there is sufficient within-state variation in the unemployment rate. One way to assess this is by comparing each state's standard deviation in the unemployment rate to its mean for the study period. Of the 49 states (including the District of Columbia) represented in the analysis sample, the magnitude of the standard deviation is at least 20 percent of the mean in 30 states, and between 15 percent and 19 percent of the mean in the remaining states. Another approach is to examine the degree of change in state unemployment rates throughout the study period. To do so, I regress (the log of) the unemployment rate on a set of state-specific linear time trends. Although most states witnessed a secular decline in the unemployment rate between 1985 and 2005, the range in trends is fairly large (from a 5.3 percent decline to a 0.6 percent increase), with the average state experiencing a two percent reduction per year. Eleven states experienced average annual declines of three percent or more. Thus, it appears there is sufficient year-to-year variation within states to precisely identify the impact of the unemployment rate on subjective well-being.

Table 1 provides summary statistics for the subjective well-being outcomes used in this study. For ease of interpretation, I present the fraction of individuals expressing any agreement ("moderately," "generally," "definitely") with each statement. I do so for the full sample and separately for individuals at the 10^{th} and 90^{th} percentiles of the state unemployment rate. Approximately 68 percent of respondents are very satisfied with life, and about 60 percent feel that their income is high enough to satisfy their important needs. These percentages are slightly higher among those located in extremely favorable economic environments. It also appears that optimism about the future is higher in low-unemployment states, with 22 percent claiming that they dread the future in states at the 10^{th} percentile of the unemployment rate, compared to 27 percent in states at the 90^{th} percentile. Interestingly, several of the proxies for physical health point in the opposite direction. For example, the fraction claiming to be in very good physical condition is higher in high-unemployment states (61 percent) than in low-unemployment states (55 percent), and people report

fewer sleep problems when the unemployment rate is high. These naïve comparisons are largely consistent with previous work, but of course they should not be interpreted as establishing causality.

Empirical Strategy

Armed with individual-level survey data on subjective well-being and state-level macro-economic conditions over the period 1985 to 2005, I begin the empirical analysis by establishing the relationship between the unemployment rate and self-reported life satisfaction. In particular, I estimate versions of the following standard regression model (Charles & DeCicca, 2008; Ruhm, 2000; 2003; 2005; Wolfers, 2003):

$$(1)\ Y^*_{ist} = \varphi_t + \gamma_1 U_{st} + \mathbf{X'}_{ist}\beta + \eta_s + \varepsilon_{ist},$$

where i indexes individuals, s indexes states, t indexes years, and Y^* is a continuous latent representation of the ith respondent's life satisfaction score, Y. Given the ordered nature of the response categories in Y, I estimate (1) using an ordered probit, which standardizes the measure of life satisfaction conditional on the right-hand-side variables.[13] The U represents the state-specific unemployment rate, and the vector given by $\mathbf{X'}$ represents a number of observable demographic controls, including gender; age; race and ethnicity; marital status; the presence of children ages 0 to 17 in the household; and educational attainment. Note that (1) omits controls for employment status and household income, as these are likely to be endogenous. Inclusion of these variables also complicates the interpretation of the estimated effect of the unemployment rate, given that the macro-economic environment is expected to partially work through its impact on individuals' employment status and income. Nevertheless, I add these controls in extensions to the basic analysis, and I estimate auxiliary models that allow the impact of macro-economic conditions to vary across working and non-working individuals.

[13] I experiment with several other parameterizations of life satisfaction. For example, I break the index in half, assigning a value of one to individuals expressing any agreement with the life satisfaction statement (and a zero to those expressing any disagreement). I also create separate binary indicators that equal unity for those "definitely agreeing" and "definitely disagreeing" with the life satisfaction statement. The outcomes are modeled using linear probability models. Results are quite similar to those reported here.

The coefficient of interest in (1) is γ_1, which returns the estimated effect on life satisfaction of a one percentage point increase in the state-level unemployment rate.[14] Given that the raw ordered probit coefficients represent standardized changes in the life satisfaction index (conditional on the covariates), the coefficient on the unemployment rate can be interpreted as the standard-deviation change in life satisfaction due to a one percentage point increase in the unemployment rate.[15] I also report marginal effects (evaluated at the covariate means) associated with the likelihood of definitely agreeing and definitely disagreeing with the life satisfaction statement. These effects capture changes in life satisfaction at the top (most satisfied) and bottom (least satisfied) ends of the distribution. All regressions provide robust standard errors, clustered by the state-year.[16]

To produce unbiased estimates of the impact of macro-economic conditions on subjective well-being, one must deal with the possibility that there are unobserved or hard-to-measure correlates of local labor market conditions that also predict well-being. A simple example can highlight this concern. The average unemployment rate in the five happiest states (Utah, Maryland, Virginia, Colorado, and Georgia) is considerably lower than that in the five unhappiest states (Wisconsin, Kentucky, Nevada, Arkansas, and West Virginia) for reasons that may have nothing to do with local economic conditions.[17] Indeed, differences in the stock of human capital, the prevalence of extreme weather events, and political and social norms may exaggerate (or understate) the importance of economic conditions in explaining individuals' happiness because each is likely to be correlated with the macro-economy. Therefore, failure to account for these omitted confounders will lead to biased estimates of the unemployment rate.

[14] I experiment with a number of functional form changes to the unemployment rate. For example, I take the natural logarithm of the unemployment rate, enter a quadratic in the rate, and enter dummy variables indicting the quartiles of the rate. The coefficient on the logged unemployment rate continues to indicate a negative relationship with life satisfaction, but it is statistically insignificant. The quadratic term is statistically insignificant. In the dummy variable parameterization, only the coefficient at the top quartile is statistically significant.

[15] In robustness checks, I experiment with OLS models estimated on a standardized life satisfaction index. This yields very similar results to those rendered by the ordered probit. This is not surprising because, as stated in the text, the ordered probit model generates estimates based on a conditional, latent standard normal index of life satisfaction.

[16] Estimating separate regressions that cluster the standard errors by state and by year does not change the results. The Life Style Survey includes a weight, but there is insufficient documentation on how the weight is constructed. Therefore, I conduct the analyses using unweighted data. However, applying the weight does not change any of the results discussed in the text.

[17] The happiness rankings are taken from the Gallup-Healthways Life Evaluation Index.

Therefore, I take a number of the steps to mitigate the influence of unobserved heterogeneity. First, I introduce a vector of state fixed effects, η_s, to account for permanent differences across states that may simultaneously influence local labor market conditions and subjective well-being (e.g., human capital stocks). Second, I add year dummies, φ_t, to account for time-varying national determinants of well-being (e.g., terrorist attacks or natural disasters). Third, I experiment with state-specific linear and quadratic time trends to purge the estimates of unobservables that are trending at different rates within states over time (e.g., changing attitudes toward work or the introduction of technology to bolster productivity). It is important to note that each of these controls account for many other macro-economic indicators (e.g., income inequality and inflation) that are correlated with labor market conditions and which are shown to be important determinants of subjective well-being (Di Tella et al., 2001; 2003; Wolfers, 2003). In addition, these controls account for the implementation of state- and federal-level policy reforms that may have coincided with changes in economic conditions or were passed in response to them (e.g., federal welfare reform, federal and state EITCs, and the Bush tax legislation of 2001 and 2003).

Finally, I add to the model a number of state-level observables: (log of) personal per capita income, population density, a dummy variable to indicate Republican governors, the fraction of individuals voting Republican in the previous presidential election, and the (log of) violent and property crime rates. The controls for per capita income and population density further guard against differences across states and over time in the underlying stocks of wealth and human capital that may drive both economic activity and subjective well-being. The dummy variable for Republican governor accounts for politically induced cycles in taxes and spending that may alter economic activity and thus well-being, while the percentage voting Republican controls for unobserved attitudes and norms related to the government's role in catalyzing economic activity. The crime rate variables account explicitly for environmental correlates of well-being that are likely to fluctuate with the business cycle.

IV. The Impact of Macro-Economic Conditions on Subjective Well-Being

Estimates of the impact of the state-level unemployment rate on subjective well-being are presented in Tables 2 through 5. I first discuss results from the baseline model (Table 2), followed by a series of estimates from auxiliary models and robustness checks (Table 3). I then explore heterogeneity in the impact of macro-economic conditions across a number of demographic sub-groups (Table 4). Finally, I expand the analysis of subjective well-being to include measures beyond life satisfaction (Table 5).

Main Results and Robustness Checks

Estimates on the unemployment rate displayed in Table 2 confirm those in previous studies from the U.S. (Alesina et al., 2004; Wolfers, 2003) and Europe (Di Tella et al., 2001; 2003) that macro-economic downturns are associated with reductions in happiness and life satisfaction. The coefficient in column (1) comes from a model that includes only the state-level unemployment rate, while those in columns (2) through (4) add, respectively, the full set of observable demographic controls, year dummy variables, and state fixed effects. It appears that progressively adding controls has the effect of increasing the size of the coefficient on the unemployment rate. Indeed, the magnitude of the macro-economic impact undergoes a threefold increase as one moves from the sparsest to the fullest specification.

The raw ordered probit coefficient in column (4) implies that a one percentage point increase in the unemployment rate is associated with a 0.02 standard deviation decrease in self-reported life satisfaction. Translated into marginal effects, the coefficient implies a 0.5 percentage point decrease in the likelihood of being in the top well-being category ("definitely agree"), and a 0.3 percentage point increase in the likelihood of being in the bottom well-being category ("definitely disagree"). Given that 16.1 percent of respondents are in the top life satisfaction category and 8 percent are in the bottom category, the marginal effects imply well-being reductions of 3.1 percent and 3.8 percent, respectively.

How big is the impact of macro-economic conditions on self-reported life satisfaction? One way to assess this is by comparing the effect sizes discussed above to those of other well-known happiness "shifters." Particularly relevant for this study is a comparison to individuals' employment status (irrespective of prevailing economic conditions). Re-estimating the full model along with a binary indicator of unemployment yields a statistically significant ordered probit coefficient of -0.03, suggesting that the unemployed are less satisfied with life. Marginal effects of -0.7 (top category) and 0.4 (bottom category) percentage points imply well-being reductions of 4.4 percent and 5.0 percent, respectively. Thus, it appears that the decline in well-being from an economic downturn is only slightly smaller than that imposed by individual job losses.

Previous studies on physical health find that health improvements manifest fairly rapidly after economic conditions deteriorate, and then begin to slow down within two or three years (Ruhm, 2007; 2000). To investigate the timing in the reduction of life satisfaction, I impose various lag structures on the unemployment rate (e.g., three- and five-year lags). In results not shown here, it appears that life satisfaction starts its decline in the year macro-economic conditions deteriorate, and falls even more rapidly during the next year before returning to long-run levels throughout the remaining years. Thus, economic downturns have large, short-run negative effects on subjective well-being that dissipate fairly quickly after the initial shock.

As shown in Table 3, the estimated effect of the unemployment rate is robust to a number of specification changes. The first two rows add, respectively, state-specific linear and quadratic time trends and a set of supplementary state-level controls. As explained in the previous section, these variables attempt to further account for unobserved *state* heterogeneity that may be spuriously correlated with macro-economic conditions. Adding these controls does little to change the baseline estimates. To further insure against bias from other dimensions of states' economic environment, I include in the model a measure of the amount of variability in county-level unemployment rates

around the state rate.[18] This measure is intended to be a rough indicator of within-state inequalities in labor market conditions and wealth. As shown in row (3), inclusion of this variable does not change the coefficient on the unemployment rate.

The next two rows [(4) and (5)] provide tests of whether unobserved *individual* heterogeneity may be biasing the impact of the unemployment rate. Given the strong correlation between measures of life satisfaction and physical health, one concern is that the coefficient on the unemployment rate reflects the impact of economic conditions on both well-being dimensions. As shown in row (4), adding two proxies for physical health does not change the results.[19] Row (5) examines the role of self-selection into the labor market by estimating the model on the years 1992 to 2000, a period in which the U.S. economy experienced dramatic growth. The idea is that selection bias is likely to be more problematic when the economy is expanding because individuals can exert greater control over short-run work decisions. Constraining the analysis period in this manner leaves unchanged the estimated effect of the unemployment rate.

Recall that the conceptual model allows for the possibility that macro-economic conditions influence subjective well-being despite one's employment status. Row (6) begins to explore this possibility by adding to the model controls for employment status and income.[20] In this case, the coefficient on the unemployment rate is interpreted as the impact of macro-economic conditions net of changes to individuals' employment status and income. Interestingly, inclusion of these controls

[18] To create the measure of economic variability, EV, I first collected county-level unemployment rate data for each state and year over the period 1985-2004. I then define the measure in the following manner:

$$\mathrm{EV}_{w,\,st} = \frac{\sum(|\,CUR_{st} - SUR_{st}\,|\,w_{st})}{\sum w_{st}}$$

where *w* indicates a weighted version of EV calculated for each state, *s*, in year *t*. The CUR denotes a given county-level unemployment rate, SUR denotes the state unemployment rate, and *n* denotes the number of counties in *s*. The weight, *w*, is the size of a county's labor force, and is used to adjust for the differential size of labor markets both within and across states. This measure represents the absolute value of the average county-level deviation in unemployment rates from the overall, state-level unemployment rate. Higher values for EV indicate a greater spread of county-level unemployment rates around the state unemployment rate, and therefore increasingly heterogeneous labor market conditions.

[19] The proxies are self-reported physical condition ("I am in very good physical condition") and the prevalence of headaches ("I get more headaches than most people").

[20] Employment status is captured by a binary indicator that equals unity if a given individual is currently working. Income is expressed as real total family income, plus quadratic, cubic, and quartic polynomials in income. The raw income variable in the Life Style Survey is categorical. Therefore, I assign the mid-point of the income category into which each respondent falls and express that amount in constant 2005 dollars.

does not substantially change the estimated effect of the unemployment rate, suggesting that economic conditions affect life satisfaction in ways that extend beyond one's labor market status. These issues are investigated in greater detail next.

Heterogeneous Effects of Economic Downturns

The results discussed so far suggest that self-reported life satisfaction falls as the economy enters a recession. An important issue is whether these well-being declines are pronounced within certain demographic groups. It is plausible, for example, that those whose labor market outcomes (e.g., employment and earnings) experience the greatest sensitivity to economic fluctuations would also experience more dramatic changes in subjective well-being. Insights from previous work suggest that younger individuals, non-whites, and those with low levels of education tend to be disproportionately affected by macro-economic conditions (Bartik, 1993; Herbst & Stevens, 2011; Hoynes, 2000; Ruhm, 2000). Therefore, Table 4 explores the possibility that economic downturns have differential well-being effects across these demographic sub-groups.

It is clear from the table that while macro-economic conditions affect life satisfaction across a broad swath of the population, the negative effects appear to be concentrated among individuals with the weakest labor market attachments. For example, the predicted effect of rising unemployment within the group of 18- to 34-year-olds is twice as large as that among 35- to 64-year-olds and nearly six times greater than those ages 65 and over. In addition, the reduction in life satisfaction among non-whites is twice as large as that among whites, and men experience declines in well-being that are nines times greater than those experienced by women. In results not presented here, I stratify these demographic groups more finely to examine working-age (25 to 55) men. As expected, such individuals witness even greater reductions life satisfaction as the unemployment rate increases.[21]

The last two sub-group analyses in Table 4 are more explicit tests of proposition that those

[21] The raw ordered probit coefficient (and standard error) is -.045 (.007). Translated to marginal effects, a one percentage increase in the unemployment rate decreases by one percentage point the likelihood of being in the top well-being category (from a base of 12.3 percent), and increases by 0.6 percentage points the likelihood of being in the bottom category (from a base of eight percent). These represent reductions in life satisfaction of eight percent and 7.5 percent, respectively.

with relatively weak labor market attachments experience greater reductions in life satisfaction when the economy enters a recession. Specifically, I first stratify the sample according to employment status and then by educational attainment. Perhaps surprisingly, the employment results show that working and non-working individuals witness about equal-sized reductions in well-being. However, one must interpret this with caution, as stratifying by employment status may introduce a form of sample selection bias.[22] Results by educational attainment, on the other hand, reveal that life satisfaction among the low-skilled is substantially more sensitive to economic conditions than among the high-skilled. In fact, the group of high-education respondents is one of the few that is not predicted to experience a reduction in well-being during economic downturns.

Additional Measures of Subjective Well-Being

As previously stated, the Life Style Survey contains an extensive set of questionnaire items that tap dimensions of subjective well-being beyond global life satisfaction. In particular, there are items inquiring about financial security, optimism about the future, stress and anxiety, and physical well-being. It is conceivable that economic downturns may also affect these dimensions of subjective well-being, and so Table 5 reports results from analogous regressions using these statements as the outcome variables. Column (1) presents the full sample results, while columns (2) and (3) once again stratify the analyses by educational attainment.

Generally speaking, economic conditions do not appear to strongly influence many other dimensions of subjective well-being, and there are only a few instances in which the low-skilled are more responsive than the high-skilled. Among the outcomes that are sensitive to economic fluctuations are self-reports of financial satisfaction ("Our family income is high enough to support nearly all our important desires") and regrets about the past ("If I had my life to live over, I would sure do things differently"), with low-skilled individuals expressing greater agreement with both

[22] It should be noted that when the employment analysis is conducted with those ages 65 and over (a group with low employment rates and whose subjective well-being is untouched by economic conditions) omitted, the estimated effect of rising unemployment is greater among the non-working.

statements as the unemployment rate increases. It is interesting to note that high-skilled individuals experience *reductions* in stress and anxiety ("I feel I am under a great deal of pressure most of the time" and "I wish I knew how to relax") as the economy moves into a recession, a finding that is inconsistent with previous research on mental health outcomes (Charles & DeCicca, 2008; Ruhm, 2000; 2003; Teft, forthcoming). In a further departure from previous research, I find that none of the measures of self-reported physical health are sensitive to economic conditions (e.g., "I am in very good physical condition").

V. Can UI Benefits Mitigate the Reduction in Subjective Well-Being?

The preceding analyses document a robust relationship between macro-economic conditions and subjective well-being: increases in the state-level unemployment rate are associated with reductions in self-reported life satisfaction. I now consider whether UI benefits—which are paid to individuals experiencing no-fault job separations—are able to increase well-being, thereby mitigating some of the hardship experienced during recessionary periods. To my knowledge, this issue has received very little attention in the literature. Aside from a recent paper by Teft (forthcoming), which examines the relationship between UI claims and Google searches for "depression" and "anxiety," I am not aware of any research evaluating whether U.S. UI benefits influence subjective well-being.[23]

To conduct the analysis, I collect state-level information on average weekly UI benefits for the period 1985 to 2005. Data for the period 1985 to 1998 are drawn from the *Unemployment Insurance Financial Data Handbook*, an annual publication by the Employment and Training Administration, which resides within the U.S. Department of Labor. Data for the remaining years are drawn from the *Statistical Abstracts of the U.S.*, an annual data book published by the U.S. Census Bureau. The average weekly benefit amount is defined as a ratio of total benefits paid during a given calendar year to the total number of weeks during which benefits are paid. Given that UI benefits are

[23] Only one study examines the relationship between UI replacement rates and happiness in the European context (Di Tella et al., 2003).

determined in part by state-specific formulas, this variable serves as a reasonable proxy for the generosity of states' UI systems.[24] I express the weekly benefit amount in 2005 dollars.

Estimates of the impact of weekly UI benefits on life satisfaction are obtained by the following regression equations:

(2) $Y^*_{ist} = \varphi_t + \gamma_1 UIB_{st} + \gamma_2 U_{st} + \mathbf{X}'_{ist}\beta + \delta I_{st} + \eta_s + (\eta_s \times \text{trend}) + \varepsilon_{ist}$, and

(3) $Y^*_{ist} = \varphi_t + \gamma_1(UIB_{st} \times U_{<20th}) + \gamma_2(UIB_{st} \times U_{20th\text{-}39th}) + \gamma_3(UIB_{st} \times U_{40th\text{-}59th}) + \gamma_4(UIB_{st} \times U_{60th\text{-}79th}) + \gamma_5(UIB_{st} \times U_{>=80th}) + \mathbf{X}'_{ist}\beta + \delta I_{st} + \eta_s + (\eta_s \times \text{trend}) + \varepsilon_{ist}$, where

UIB_{st} denotes the average weekly UI benefit in state s and year t, I_{st} is the state-level per capita income, and $(\eta_s \times \text{trend})$ is a vector of state-specific linear time trends. All other variables are defined in the same manner as in equation (1), and the outcome variable (Y^*) continues to be the life satisfaction statement. The coefficient γ_1 in equation (2) returns the estimated effect of a $1,000 increase in UI benefits on self-reported life satisfaction. Note that this is an average effect, which is constrained to be identical for all individuals regardless of their employment propensity, skill-level, and economic environment in which they operate.

From a policy perspective, it is also important to determine in what types of macro-economic environments UI benefits influence subjective well-being, and for whom. Therefore, equation (3) allows the impact of UI benefits to vary across quintiles of the unemployment rate. To implement this approach, I first create quintile dummy variables by averaging the state unemployment rate over the period 1985 to 2005, and producing cut-points at the 19th percentile ($U_{<20th}$); between the 20th and 39th percentiles ($U_{20th\text{-}39th}$), 40th and 59th percentiles ($U_{40th\text{-}59th}$), and 60th and 79th percentiles ($U_{60th\text{-}79th}$); and the 80th percentile ($U_{>=80th}$) of the unemployment rate. I then interact the quintile dummy variables with the continuously measured UI benefit amount, and include these interactions along with the quintile dummies in the regression. Suppressed from the model is the "main effect"

[24] I also test a number of other UI parameters. For example, I experiment with the benefit replacement rate, defined as a ratio of average UI benefits to average wages, as well as a variable capturing total UI benefits paid as a percentage of total wages. Results using these measures are similar to those reported here.

associated with UI benefits, so that the coefficient on the interactions (γ_1-γ_4) can be interpreted as the impact of UI benefits at each quintile of the state unemployment rate.

Creating quintile distribution breaks in this manner has several advantages. It ensures a large number of observations in each cell, and allows states to fluctuate between unemployment rate quintiles.[25] In addition, there is considerable variation in the unemployment rate *across* the distribution breaks, which provides a test of the impact of UI benefits across diverse economic environments. But it also reduces the *within* quintile variation in the unemployment rate, thereby capturing UI benefit impacts in fairly specific economic environments.[26] Another advantage of the dummy variable approach is that it mitigates the multicollinearity problem that arises when interacting UI benefits with the continuously measured unemployment rate and including all three variables in the model.[27]

Given that UI benefits are determined in part by prevailing economic conditions (i.e., benefit payments rise along with the unemployment rate), I continue to control for the state-level unemployment rate in equations (2) and (3). Failure to control for the macro-economic environment would impart a downward bias on the impact of UI benefits. I also include in the model states' per capita income (I_{st}) as a rough proxy for earnings, upon which UI benefits are further based.[28] As opposed to economic conditions, failure to control for states' underlying wealth would impart an upward bias on the impact of UI benefits. Another concern is that UI benefit generosity might be correlated with other social safety net programs that influence subjective well-being. For example, it is conceivable that states with more generous UI systems also have in place generous AFDC/TANF benefits to smooth income losses during a recession. Failure to control for other social policies

[25] For example, Alabama experiences nine changes in its relative economic position (i.e., quintile shifts) between 1985 and 2005. Massachusetts experiences seven changes in its economic position.

[26] Summary statistics for the unemployment rate (mean, minimum, and maximum) in each quintile are as follows: 1st quintile: 3.8, 2.2, 4.4. 2nd quintile: 4.9, 4.5, 5.2. 3rd quintile: 5.6, 5.3, 5.9. 4th quintile: 6.4, 6.0, 6.9. 5th quintile: 8.1, 7.0, 13.1.

[27] Quintile distribution breaks is admittedly ad hoc, so I experiment with quartile and decile breaks as well. Results based on this are qualitatively similar to those reported here. I also experiment with creating distribution breaks based on each year's average unemployment rate (as opposed to the 1985-2005 average). Again, the results are quite similar to those discussed here.

[28] I also experiment with state-level controls for the earnings in the service and retail sectors. Given the high correlation between these earnings variables and per capita income, it is not surprising that inclusion of sectoral earnings does not materially change the results.

would therefore introduce an upward bias on the estimated effect of UI benefits. In specification checks, I experiment with controls for AFDC/TANF benefits and the EITC's maximum credit. Inclusion of these additional policy variables does not significantly change the results.

Table 6 presents the raw ordered probit estimates of the impact of UI benefits on life satisfaction. Columns (1) through (3) provide estimates of the average benefit effect, while columns (4) through (6) allow the effect to vary across quintiles of the state unemployment rate. These analyses correspond to equations (2) and (3), respectively. Both sets of analyses are conducted on the full sample as well as sub-samples of low- and high-skilled individuals. For the purposes of this analysis, I define "low-skilled" as those who are either unemployed or with a high school degree or less, while "high-skilled" are those who are employed or with at least some college education. I create these categorizations so that the analysis is focused on those who are the most and least likely to be affected by economic downturns and thus the most and least likely to turn to the UI system. Table 7 provides the marginal effects associated with the likelihood of moving into the top ("definitely agree") and bottom ("definitely disagree") life satisfaction categories.

Columns (1) through (3) reveal that increases in weekly UI benefits are associated with statistically significant increases in life satisfaction, with a pronounced positive effect on low-skilled individuals. Overall, a $100 increase in UI benefits is associated with a 1.1 percentage point increase in the likelihood of moving into the top life satisfaction category (from a base mean of 16.1 percent) and a 0.7 percentage point decrease in the likelihood of moving into the bottom life satisfaction category (from a base mean of 8.0 percent).[29] These marginal effects imply well-being improvements of 6.8 percent and 8.8 percent, respectively. Most of these well-being improvements accrue to those who are either unemployed or with low levels of education. Indeed, the marginal effects for this group imply life satisfaction improvements of 14.6 percent and 16.7 percent,

[29] Given that the weekly UI benefit averages $245 for the study period, it is important to point out that a $100 increase in benefits is substantial.

respectively. Reported life satisfaction among the working or highly educated are minimally influenced by UI benefits.

Results in columns (4) through (6) address the question of whether UI benefits have differential well-being effects in different macro-economic environments. Generally speaking, substantial heterogeneity is present. Looking at the full sample results [column (4)], UI benefits have negligible impacts on life satisfaction when the unemployment rate remains within the bottom two quintiles (corresponding to the range 2.2 percent to 5.2 percent). However, once the unemployment rate reaches the third quintile and extends into the fourth quintile (corresponding to the range 5.3 percent to 6.9 percent), UI benefits have large positive effects on life satisfaction. These positive effects then decline by about half when the unemployment rate moves into the top quintile (7.0 percent and above). The marginal effects indicate that a $100 increase in weekly UI benefits raises the likelihood of being in the top life satisfaction category by 1.4 percentage points (from a base of about 16 percent) and reduces the likelihood of being in the bottom category by 0.8 percentage points (from a base of about 8.0 percent) when the unemployment rate is in the third and fourth quintiles. These marginal effects imply well-being improvements of 8.8 percent and 10.0 percent, respectively. By comparison, well-being improves by 4.9 percent and 4.8 percent, respectively, when the unemployment rate reaches the top quintile.

The results by skill level reveal that UI benefits are associated with fairly steady increases in life satisfaction among those who are unemployed or with low levels of education. The largest impact is generated in the fourth quintile of unemployment, showing improvements of about 20 percent in the top and bottom life satisfaction categories, but UI benefits continue to have non-negligible, albeit imprecisely estimated, effects when unemployment reaches the top quintile. On the other hand, UI benefits are associated with *reductions* in life satisfaction among the working or highly educated when the unemployment rate is in the first and second quintiles. Such individuals

experience moderate well-being improvements when unemployment hits the next two quintiles, and very little improvement in the top quintile.

VI. Summary of Results and Discussion

Using novel data from the DDB Needham Life Style Survey, this paper documents a negative relationship between the unemployment rate and self-reported life satisfaction over the period 1985 to 2005. Furthermore, although economic downturns reduce life satisfaction across a broad swath of the population—including those who remain employed—the negative effects appear to be concentrated among individuals with the most tenuous labor market attachments. That is, the largest impacts are experienced by the young, non-whites, and those with low levels of education. On an optimistic note, this study also finds that UI benefit generosity is positively correlated with life satisfaction, with larger well-being effects experienced by those whose labor market outcomes are more sensitive to economic fluctuations. However, it appears that UI benefits are able to offset the well-being losses from economic downturns only when they are relatively mild.

Results in this study stand in contrast to the body of existing evidence that economic downturns render improvements in physical health and health behaviors (e.g., Charles & DeCicca, 2008; Gerdtham & Ruhm, 2006; Neumayer, 2004; Ruhm, 2000; 2003; 2005; 2007; Xu & Kaestner, 2010). On the other hand, the estimated decline in life satisfaction reported here accords with recent studies finding increases in depression- and anxiety-related symptoms and increases in suicide rates (Charles & DeCicca, 2008; Ruhm, 2000; Teft, forthcoming). Results in this study also match closely those in the small set of papers looking directly at measures of subjective well-being (Alesina et al., 2004; Di Tella et al., 2001; 2003; Wolfers, 2003). Overall, the picture emerging from this body of work is that economic downturns have disparate effects on health and well-being, with generally positive effects emerging in the physical health domain and negative effects emerging in the psychological domain.

Recall that the conceptual framework identified two mechanisms through which economic conditions may influence subjective well-being. The first is behavioral, which is to say through well-being changes introduced by the loss of employment and income (and, ultimately, consumption). This channel reflects declining well-being primarily among those who have become unemployed as a result of a recession. The second is structural, in the sense that macro-economic conditions may increase the fear of losing one's job, heighten the stress associated with friends or family members who may have lost jobs, and erode feelings of trust in economic and political institutions. Although the unemployed can certainly experience well-being reductions through this channel, it suggests that those remaining employed may too experience a decline in well-being.

Results in this study provide evidence in favor of both mechanisms at work. In particular, while it appears that economic downturns have the largest negative effects on those most sensitive to economic fluctuations, I find robust evidence of well-being reductions across most demographic groups. Particularly striking are the findings that the impact of economic downturns persists even after accounting for individual employment status and income affect, and that the working and non-working experience about equal-sized reductions in life satisfaction.

Regarding the analysis of UI benefits, a tentative conclusion is that such benefits are capable of mitigating some of the well-being losses suffered during recessionary periods. However, the preceding analysis illuminates some of the limits of UI benefits. Specifically, for the average individual, and even for the low-skilled, UI benefits increase life satisfaction as long as the unemployment rate remains in the neighborhood of five to seven percent. It is therefore unlikely that such benefits will substantially affect well-being during severe recessions. To put these findings into context, the two downturns covered by this analysis produced peak unemployment rates of 7.8 percent (June of 1992) and 6.3 percent (July of 2003). Although both recessions were fairly brief and shallow by historical standards, results in this study suggest that UI benefits would be capable of buoying subjective well-being only throughout the early-2000s recession. It is unlikely that such

benefits made much of an impact during the Great Recession of the late-2000s, when the unemployment rate peaked at 10.1 percent in October of 2009.

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Table 1: Summary Statistics for the Subjective Well-Being Outcomes

Outcome: Percent Agreeing with Each Statement	(1) N	(2) Full Sample	(3) 10th Percentile of the UR	(4) 90th Percentile of the UR
"I am very satisfied with the way things are going in my life these days"	75,609	.678 (.466)	.690 (.462)	.668 (.470)
"Our family income is high enough to satisfy nearly all our important desires"	75,488	.596 (.490)	.620 (.485)	.593 (.491)
"If I had my life to live over, I would sure do things differently"	75,710	.608 (.488)	.593 (.491)	.596 (.490)
"I dread the future"	75,809	.240 (.427)	.219 (.414)	.270 (.444)
"I feel I am under a great deal of pressure most of the time"	75,628	.527 (.499)	.523 (.499)	.524 (.499)
"I wish I knew how to relax"	75,462	.474 (.499)	.463 (.498)	.479 (.499)
"I am in very good physical condition"	75,578	.577 (.493)	.554 (.497)	.605 (.488)
"I have trouble getting to sleep"	75,600	.368 (.482)	.370 (.482)	.345 (.475)
"I get more headaches than most people"	75,636	.247 (.431)	.239 (.426)	.256 (.436)

Notes: Calculations come from the DDB Needham Life Style Survey, 1985-2005. All figures represent the percent of respondents "moderately," "generally," or "definitely" agreeing with each statement. The unemployment rate at the 10th percentile is 3.9 percent. At the 90th percentile, it is 7.8 percent. Standard deviations are reported in parentheses.

Table 2: Estimates of the Impact of Macro-Economic Conditions on Life Satisfaction, 1985-2005
Dependent Variable: "I am very satisfied with the way things are going in my life these days"

Variable	(1)	(2)	(3)	(4)
State-level unemployment rate	-.006**	-.005	-.007**	-.018***
	(.002)	(.003)	(.003)	(.004)
∂y/∂x: Definitely Agree *Sample Mean: .161*	-.001	-.001	-.002	-.005
∂y/∂x: Definitely Disagree *Sample Mean: .080*	.001	.001	.001	.003
Demographic controls		X	X	X
Year dummy variables			X	X
State fixed effects				X
Number of observations	75,609	75,609	75,609	75,609

Notes: Analyses are based on the DDB Needham Life Style Survey for the period 1985 to 2005. All models are estimated using an ordered probit regression. Each cell in the top row contains the coefficient (and standard error, in parentheses) associated with the average, annual state unemployment rate. Standard errors are adjusted for state-year clustering. The dependent variable is based on the statement: "I am very satisfied with the way things are going in my life these days." Responses categories are: 6=definitely agree, 5=generally agree, 4=moderately agree, 3=moderately disagree, 2=generally disagree, and 1=definitely disagree. The figures in the next two rows are the marginal effects (evaluated at the mean of each covariate) associated with the probability of "definitely agreeing" and "definitely disagreeing" with the life satisfaction statement. The demographic controls include gender, age, age-squared, race and ethnicity, marital status, presence of children ages 0-17 in the home, and educational attainment. Dummy variables are also included to account for missing data on the demographic controls. *, **, *** indicate that the coefficient on the unemployment rate is statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 3: Additional Results and Tests of Robustness
Dependent Variable: "I am very satisfied with the way things are going in my life these days"

Specification	(1) Coefficient on the Unemployment Rate	(2) ∂y/∂x: Definitely Agree *[Sample Mean]*	(3) ∂y/∂x: Definitely Disagree *[Sample Mean]*
(1) Add state-specific linear and quadratic time trends	-.013** (.006)	-.003 *[.161]*	.002 *[.080]*
(2) Add supplementary state-level controls	-.014*** (.004)	-.003 *[.161]*	.002 *[.080]*
(3) Add control for variability in state-level economic conditions	-.017*** (.004)	-.004 *[.161]*	.002 *[.080]*
(4) Add proxies for self-reported physical health	-.019*** (.004)	-.004 *[.161]*	.002 *[.080]*
(5) Estimate the model on the period 1992-2000	-.018* (.011)	-.004 *[.153]*	.002 *[.079]*
(6) Add controls for employment status and household income	-.021*** (.004)	-.005 *[.161]*	.003 *[.080]*

Notes: Analyses are based on the DDB Needham Life Style Survey for the period 1985 to 2005. All models are estimated using an ordered probit regression. Each cell in the top row contains the coefficient (and standard error, in parentheses) associated with the average, annual state unemployment rate. Standard errors are adjusted for state-year clustering. The dependent variable is based on the statement: "I am very satisfied with the way things are going in my life these days." Responses categories are: 6=definitely agree, 5=generally agree, 4=moderately agree, 3=moderately disagree, 2=generally disagree, and 1=definitely disagree. The figures in the next two columns are the marginal effects (evaluated at the mean of each covariate) associated with the probability of "definitely agreeing" and "definitely disagreeing" with the life satisfaction statement. The supplementary state-level controls include the log of per capita personal income, population density, a dummy variable for Republican governors, the percent voting Republican in the previous presidential election, and the log of violent and property crime rates. The proxies for health include controls for self-reported physical condition and prevalence of headaches. The controls for employment status and household income include a dummy variable for working individuals and total household income as well as squared, cubic, and quartic terms in household income (expressed in constant 2005 dollars). The demographic controls include gender, age, age-squared, race and ethnicity, marital status, presence of children ages 0-17 in the home, and educational attainment. Dummy variables are also included to account for missing data on the demographic controls. *, **, *** indicate that the coefficient on the unemployment rate is statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 4: Sub-Group Analyses
Dependent Variable: "I am very satisfied with the way things are going in my life these days"

Specification	(1) Coefficient on the Unemployment Rate	(2) ∂y/∂x: Definitely Agree *[Sample Mean]*	(3) ∂y/∂x: Definitely Disagree *[Sample Mean]*
Ages 18-34	-.033***	-.007 *[.139]*	.004 *[.080]*
	(.008)		
Ages 35-64	-.015***	-.003 *[.144]*	.002 *[.086]*
	(.005)		
Ages 65+	-.006	-.002 *[.244]*	.001 *[.064]*
	(.010)		
White	-.016***	-.004 *[.164]*	.002 *[.072]*
	(.004)		
Non-white	-.034***	-.007 *[.141]*	.007 *[.128]*
	(.012)		
Women	-.004	-.001 *[.168]*	.001 *[.084]*
	(.005)		
Men	-.037***	-.009 *[.153]*	.005 *[.076]*
	(.006)		
Working	-.019***	-.004 *[.140]*	.002 *[.072]*
	(.005)		
Non-working	-.016**	-.004 *[.201]*	.002 *[.097]*
	(.007)		
No more than high school	-.027***	-.007 *[.171]*	.005 *[.103]*
	(.007)		
More than high school	-.007	-.001 *[.155]*	.001 *[.062]*
	(.005)		

Notes: Analyses are based on the DDB Needham Life Style Survey for the period 1985 to 2005. All models are estimated using an ordered probit regression. Each cell in the top row contains the coefficient (and standard error, in parentheses) associated with the average, annual state unemployment rate. Standard errors are adjusted for state-year clustering. The dependent variable is based on the statement: "I am very satisfied with the way things are going in my life these days." Responses categories are: 6=definitely agree, 5=generally agree, 4=moderately agree, 3=moderately disagree, 2=generally disagree, and 1=definitely disagree. The figures in the next two columns are the marginal effects (evaluated at the mean of each covariate) associated with the probability of "definitely agreeing" and "definitely disagreeing" with the life satisfaction statement. The demographic controls include gender, age, age-squared, race and ethnicity, marital status, presence of children ages 0-17 in the home, and educational attainment. Dummy variables are also included to account for missing data on the demographic controls. *, **, *** indicate that the coefficient on the unemployment rate is statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 5: The Impact of Macro-Economic Conditions on Additional Measures of Well-Being

Subjective Well-Being Outcome	(1) Full Sample	(2) No More Than High School	(3) More Than High School
"Our family income is high enough to satisfy nearly all our important desires"	-.010**	-.020***	-.001
	(.004)	(.006)	(.006)
∂y/∂x: Definitely Agree *[Sample Mean]*	-.002 *[.152]*	-.004 *[.132]*	-.000 *[.168]*
∂y/∂x: Definitely Disagree *[Sample Mean]*	.002 *[.151]*	.005 *[.201]*	.000 *[.112]*
"If I had my life to live over, I would sure do things differently"	.008**	.016**	.000
	(.004)	(.006)	(.005)
	.002 *[.233]*	.005 *[.288]*	.000 *[.189]*
	-.001 *[.124]*	-.003 *[.125]*	.000 *[.124]*
"I dread the future"	.006	.012*	-.003
	(.004)	(.006)	(.006)
	.001 *[.049]*	.002 *[.079]*	-.000 *[.027]*
	-.002 *[.389]*	-.004 *[.323]*	.001 *[.438]*
"I feel I am under a great deal of pressure most of the time"	-.000	.008	-.009
	(.004)	(.006)	(.006)
	-.000 *[.112]*	.001 *[.130]*	-.001 *[.098]*
	.000 *[.115]*	-.001 *[.134]*	.001 *[.101]*
"I wish I knew how to relax"	-.006	.000	-.013**
	(.004)	(.007)	(.006)
	-.001 *[.120]*	.000 *[.153]*	-.002 *[.096]*
	.001 *[.159]*	.000 *[.161]*	.003 *[.157]*
"I am in very good physical condition"	.002	.002	.000
	(.004)	(.007)	(.006)
	.000 *[.091]*	.000 *[.100]*	.000 *[.085]*
	.000 *[.094]*	.000 *[.119]*	.000 *[.075]*
"I have trouble getting to sleep"	-.003	-.005	-.001
	(.004)	(.007)	(.005)
	-.000 *[.107]*	-.001 *[.140]*	-.000 *[.082]*
	.001 *[.309]*	.002 *[.298]*	.000 *[.318]*
"I get more headaches than most people"	.002	-.000	.003
	(.004)	(.006)	(.006)
	.000 *[.064]*	-.000 *[.078]*	.000 *[.053]*
	-.000 *[.400]*	.000 *[.394]*	-.001 *[.404]*

Notes: Analyses are based on the DDB Needham Life Style Survey for the period 1985 to 2005. All models are estimated using an ordered probit regression. Each cell in the top row contains the coefficient (and standard error, in parentheses) associated with the average, annual state unemployment rate. Standard errors are adjusted for state-year clustering. The responses categories for each outcome are: 6=definitely agree, 5=generally agree, 4=moderately agree, 3=moderately disagree, 2=generally disagree, and 1=definitely disagree. The figures below each coefficient and standard error are the marginal effects (evaluated at the mean of each covariate) associated with the probability of "definitely agreeing" and "definitely disagreeing" with each statement and the relevant sample mean (in italics). The demographic controls include gender, age, age-squared, race and ethnicity, marital status, presence of children ages 0-17 in the home, and educational attainment. Dummy variables are also included to account for missing data on the demographic controls. *, **, *** indicate that the coefficient on the unemployment rate is statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 6: Estimates of the Impact of Unemployment Insurance (UI) Benefits on Life Satisfaction, 1985-2005
Dependent Variable: "I am very satisfied with the way things are going in my life these days"

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Overall Impact of UI Benefits						
Average weekly UI benefit	.467*	.998**	.338			
($1,000s)	(.275)	(.493)	(.311)			
Panel B: Impact of UI Benefits by Unemployment Rate Quintile						
Average weekly UI benefit ($1,000s)						
× (Un. rate < 20th percentile)				.021	.593	-.213
				(.341)	(.605)	(.371)
× (Un. rate 20th – 39th percentile)				-.197	-.153	-.289
				(.320)	(.567)	(.353)
× (Un. rate 40th – 59th percentile)				.603**	.487	.528*
				(.304)	(.612)	(.317)
× (Un. rate 60th – 79th percentile)				.623*	1.447**	.528
				(.348)	(.580)	(.386)
× (Un. rate >= 80th percentile)				.317	.461	.251
				(.340)	(.595)	(.377)
Sample composition	Full Sample	Non-working/ Low-educ	Working/ High-educ	Full sample	Non-working/ Low-educ	Working/ High-educ
Number of observations	75,609	33,777	61,508	75,609	33,777	61,508

Notes: Analyses are based on the DDB Needham Life Style Survey for the period 1985 to 2005. All models are estimated using an ordered probit regression. Each cell in columns (1)-(3) contains the coefficient (and standard error, in parentheses) associated with the real average weekly unemployment insurance benefit ($1,000s). Each cell in column (4)-(6) contains the coefficient (and standard error, in parentheses) associated with the real average weekly unemployment insurance benefit ($1,000s) at each quintile of the state unemployment rate. Standard errors are adjusted for state-year clustering. The dependent variable is based on the statement: "I am very satisfied with the way things are going in my life these days." Responses categories are: 6=definitely agree, 5=generally agree, 4=moderately agree, 3=moderately disagree, 2=generally disagree, and 1=definitely disagree. All models include controls for gender, age, age-squared, race and ethnicity, marital status, presence of children ages 0-17 in the home, educational attainment, state unemployment rate, and state per capita income. Dummy variables are also included to account for missing data on the demographic controls. All models include state fixed effects, year dummy variables, and state-specific linear time trends. *, **, *** indicate that the coefficient on the unemployment rate is statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 7: Marginal Effects for the Impact of UI Benefits on Life Satisfaction

Group	(1) ∂y/∂x: Definitely Agree *[Sample Mean]*	(2) ∂y/∂x: Definitely Disagree *[Sample Mean]*
Panel A: Overall Impact of UI Benefits		
Average weekly UI benefit ($1,000s)		
Full Sample	.110 *[.161]*	-.065 *[.080]*
Non-working/Low-educ	.240 *[.165]*	-.175 *[.108]*
Working/High-educ	.077 *[.152]*	-.043 *[.073]*
Panel B: Impact of UI Benefits by Unemployment Rate Quintile		
× (Un. rate < 20th percentile)		
Full Sample	.005 *[.160]*	-.003 *[.073]*
Non-working/Low-educ	.142 *[.173]*	-.104 *[.095]*
Working/High-educ	-.048 *[.152]*	.027 *[.068]*
× (Un. rate 20th – 39th percentile)		
Full Sample	-.046 *[.157]*	.027 *[.076]*
Non-working/Low-educ	-.036 *[.156]*	.027 *[.106]*
Working/High-educ	-.065 *[.150]*	.037 *[.068]*
× (Un. rate 40th – 59th percentile)		
Full Sample	.143 *[.163]*	-.084 *[.080]*
Non-working/Low-educ	.117 *[.170]*	-.085 *[.108]*
Working/High-educ	.120 *[.153]*	-.068 *[.074]*
× (Un. rate 60th – 79th percentile)		
Full Sample	.148 *[.159]*	-.087 *[.088]*
Non-working/Low-educ	.348 *[.156]*	-.254 *[.119]*
Working/High-educ	.120 *[.151]*	-.068 *[.079]*
× (Un. rate >= 80th percentile)		
Full Sample	.075 *[.165]*	-.044 *[.084]*
Non-working/Low-educ	.110 *[.169]*	-.081 *[.110]*
Working/High-educ	.057 *[.153]*	-.032 *[.075]*

Notes: Marginal effects are based on the ordered probit estimates in Table 6. Each cell contains the marginal effect (evaluated at the mean of each covariate) associated with the probability of "definitely agreeing" [column (1)] and "definitely disagreeing" [column (2)] with the life satisfaction statement and the relevant sample mean (in italics). Separate marginal effects are calculated for the full sample, the non-working/low-education sub-sample, and the working/high-education sub-sample.

Appendix Table 1: Comparison of Demographic Characteristics for Respondents in the DDB Needham Life Style Survey and General Social Survey

	Life Style Survey 1985-2005	**GSS** 1985-2004
Female (%)	0.551	0.543
	(0.497)	(0.498)
Age (years)	47.11	44.30
	(15.98)	(16.96)
White (%)	0.859	0.823
	(0.348)	(0.382)
Black (%)	0.078	0.122
	(0.268)	(0.327)
Other Race/Ethnicity (%)	0.063	0.055
	(0.243)	(0.227)
Married (%)	0.707	0.590
	(0.455)	(0.492)
Widowed (%)	0.075	0.069
	(0.263)	(0.253)
Separated (%)	0.018	0.026
	(0.134)	(0.160)
Divorced (%)	0.086	0.101
	(0.280)	(0.302)
Never Married (%)	0.115	0.213
	(0.319)	(0.410)
Children Ages 0 to 17 (%)	0.382	0.392
	(0.486)	(0.488)
Less Than High School (%)	0.092	0.198
	(0.289)	(0.399)
High School (%)	0.330	0.312
	(0.470)	(0.463)
Some College (%)	0.303	0.260
	(0.460)	(0.439)
BA+ (%)	0.275	0.230
	(0.447)	(0.421)
Employed (%)	0.661	0.644
	(0.474)	(0.479)

Notes: All calculations are based on respondents with non-missing information on a given demographic characteristic and with non-missing information on the relevant well-being outcome (GSS: happiness; Life Style Survey: life satisfaction). All GSS figures are weighted using "wt," which is constructed by Stevenson and Wolfers (2008) (and based on the GSS weight "wtssall") to adjust for differences in the questionnaire placement of the happiness question throughout the survey period. See Stevenson and Wolfers (2008) for a detailed description of the process for constructing the revised weight.