

Subjective Well-Being: Keeping up with the Joneses.

Real or Perceived?

INCOMPLETE AND PRELIMINARY DRAFT

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Abstract

Using data from the General Social Survey, we study the role of income in self-reported happiness. Unexpected income gains increase happiness but individual happiness is not very persistent over time. Relative income is more important than absolute income, in particular, income relative to individuals' own cohort working in the same occupation group, and living in the same region. Perceptions about relative income are more important than actual relative income in explaining individual well-being. The results are robust to inclusion of individual fixed effects and also to instrumenting own income with sector level wages or compensation.

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1 Introduction

“Happiness is not achieved by the conscious pursuit of happiness; it is generally the by-product of other activities.” Aldous Leonard Huxley (July 26, 1894 - November 22 1963) British philosopher

“The pursuit of happiness” is called upon in the American Declaration of Independence and the Kingdom of Bhutan explicitly endeavors to maximize “Gross National Happiness.” Nonetheless, the economics profession has been wary of attempts to use measures of happiness in spite of the ubiquitous use of “utility” functions. We follow the convention of reserving the term “utility” for describing individuals choices between economic variables. However, self-reported well-being is related to “utility” in the sense that well-being helps predict individuals economic choices; see the survey by Bruno S. Frey and Alois Stutzer (2002).

In this paper, we study self-reported happiness which we also refer to as “subjective well-being.” We employ data from the U.S. General Social Survey which is a panel of about 3000 individuals from 1970 to 2002. The Survey provides self-reported measures of well-being, such as responses to questions about how happy and satisfied individual respondents are with their lives.

We show that income fluctuations matter for individual well-being. Because individual income may be endogenous, we verify that unexpected increases in the output or, more precisely, sectoral Gross Domestic Product (GDP) of the sector which the individual is working increases individual happiness. Moreover, we show that relative income is much more important than absolute income in explaining individual well-being. In particular, income relative to individuals’ own cohort working in the same occupation group and living in the same region.

We then attack the unexplored issue of whether actual relative income matters for well-being or whether it is the perception of relative income. If individuals envy the cars and houses of the Joneses (the relevant comparison group), then actual relative income must be the relevant variable. On the other hand, if people simply care about their relative income then what must matter is what they *think* the Joneses make. In General Social Survey, unlike any other survey data, individuals are asked their opinion about their income relative to an average American family.

We show that perceptions about relative income are more important than actual relative income in explaining happiness. We also find that perceptions about relative income are more important for females than males and perceptions play a much important role for middle income group than low and high income group. Also, actual income is not important for the happiness of middle income individuals. Interestingly, we also find that people's perceived relative income when they were 16 years old has a direct and significant impact on current happiness.

Section 2 gives an overview of the economic literature on well-being. Section 3 discusses the data and the construction of the variables used in the paper. Section 4 presents the basic framework and estimation strategy while Section 5 presents the empirical findings of the paper. Section 6 concludes. An appendix gives more detailed information about the U.S. General Social Survey and the variables used in the paper.

2 Literature Review

Research on the concept and measurement of happiness has made great progress in psychology since the 1950s. While there is virtually no direct connection between psychology and theoretical economics. The high level of rigor typical for experimental psychology have helped to make the new idea of measurable happiness palatable to at least some economists. But it took considerable time before an economist actually used happiness data in economics (Easterlin, 1974).

We can classify happiness research in to two: research about individual characteristics, mainly income; and research about the impact of macroeconomic variables on happiness. Most economists take it as a matter of course that higher income leads to higher happiness. And why not? A higher income expands individuals and countries opportunity set; that is, more goods and services can be consumed. Psychologists are more subtle in this respect. They are not so confident that higher income always leads to more satisfaction. Easterlin (1974) concluded that "money does not buy happiness." Tibor Scitovsky (1976), in his book "The Joyless Economy: The Psychology of Human Satisfaction" argues that a high level of wealth brings continuous comfort and thereby prevents the pleasure that results from incomplete and intermittent satisfaction of desires. More recently, Robert Frank (1999) emphasizes that ever-increasing income and consumption have nothing to do with happiness.

Many scholars have identified a striking and curious relationship. Per capita income in United States has risen very dramatically in recent decades, but the proportion of people considering themselves to be “very happy” has fallen over the same time period. The effects of income on happiness can also be studied by comparing people with different incomes at a particular point in time who live in the same country. At first sight, people with higher income have more opportunities to achieve whatever they desire. They can buy more material goods and services and have a higher status in society. Conversely the poor are unhappy. After all, if someone does not like a high income and believes that poverty makes people happier, he or she is free to dispose of his high income at no cost. Perhaps people are really seeking nonmaterial goals in life such as fulfillment or the meaning of life and are disappointed when material things fail to provide them (Dittmar, 1992). Happiness in this sense can not be achieved by material factors.

Many economists in the past have noted that individuals compare themselves to others with respect to income, consumption, status, or utility. In other words, *relative income* may matter more than actual income. One of the earliest researchers to voice this opinion was Thorstein Veblen (1899). He coined the term conspicuous consumption to describe the desire to impress other people. The relative income hypothesis has been formulated and econometrically tested by James Duesenberry (1949), who posits an asymmetric structure of externalities. People look upward when making comparisons and wealthier people, therefore, impose a negative externality on poorer people but not vice versa. As a result, savings rates depends on the percentile position in the income distribution and not solely on the income level. A major line of research has been begun by Bernard van Praag and Arie Kapteyn (1973). They construct an econometrically estimated welfare function with a “preference shift” parameter that captures the tendency of material wants to increase as income increases. They find that increases in income shift aspirations upward but that individual satisfaction nevertheless increases. The preference shift destroys about 60 to 80 percent of the welfare effect of an increase in income; that is, somewhat less than a third remains.

Fred Hirsch (1976) emphasizes the role of relative social status by calling attention to “positional goods.” For instance, only the rich will be able to afford servants. Robert Frank (1985) argues that production of positional goods in the form of luxuries, such as exceedingly expensive watches or yachts, is a waste of productive resources, as overall happiness is thereby decreased

rather than increased.

Social comparison theories say that people evaluate features of themselves or their lives by comparing themselves with others. This was used to explain some otherwise puzzling aspects of satisfaction research. However, attempts to confirm social comparison theory in real-life settings have not always confirmed it. Examples of such studies are Diener and Fujita (1997) and Diener, Diener and Diener (1995). Wright (1985) found that there was an effect of self-rated health on satisfaction, but this was not affected by the comparison of others.

Gilbert and Trower (1990) argue that people choose their own targets for comparison. Different inferences can be made from comparisons. The choice of a comparison target is a flexible process and is not determined solely by the proximity of accessibility of relevant others (Wood et al., 1997). There may be two exceptions to this. One is academic achievement (Diener and Fujita, 1997). The second is industrial wages. In fact, people often make these comparisons; Ross et al. (1986) found that 89 percent of the people made comparisons with members of their immediate circle for satisfaction at home, 82 percent for satisfaction at work, but only 61 percent did this for satisfaction with life as a whole. Wills (1981) assembled findings which shows people can both increase or decrease their well-being by comparison depending on their reference point. Strack et al. (1990, 1985), Lyubomirsky and Ross (1997) confirm these findings.

There are a number of reasons why an interpretation based chiefly on “relativity” notions seems plausible. First, a certain amount of empirical support have been developed for the relative income concept in other economic applications, such as savings behavior and more recently, fertility behavior, and labor force participation (Duesenberry, 1952; Easterlin, 1973, 1969; Freedman, 1963; Wachter, 1971). Second, similar notions such as “relative deprivation” have gained growing theoretical acceptance and empirical support in sociology, political science, and social psychology over the past several decades (Berkowitz, 1971; Davies, 1962; Gurr, 1970; Homans, 1961; Merton, 1968; Pettigrew, 1967; Smelser, 1962; Stouffer et al., 1949).

In a recent interesting article, Alberto Alesina, Rafael Di Tella, and Robert MacCulloch (2001) find a large, negative, and significant effect of inequality on happiness in Europe, but not in the U.S. According to the authors, there are two potential explanations for this. First, Europeans prefer more equal societies. Second, social mobility is (or is perceived to be) higher

in the U.S., so being poor is not seen as affecting future incomes. They test these hypotheses by partitioning the sample across income and ideological lines. There is evidence of “inequality generated” unhappiness in the U.S. only for a sub-group of “rich leftists.” In Europe, inequality makes the poor unhappy, as well as the “leftists.” This favors the hypothesis that inequality affects European happiness because of their lower social mobility (since no preference for equality exists amongst the rich or the right). Recently, Carol Graham (2004) argues that absolute income levels matter up to a certain point—particularly when basic needs are not met but after that, relative income differences matter more.

Economists mainly have been trying to understand the impact of *macroeconomic variables* such as inflation, unemployment, growth on happiness. Oswald (1997) shows that happiness with life appears to be increasing in the United States. The rise is small—it seems that extra income is not contributing dramatically to the quality of peoples’ lives. Since the early 1970s, reported levels of satisfaction with life in European countries have on average risen very slightly and unemployed people are very unhappy. Reported happiness is high among married, high income, women, whites, well-educated, self-employed, retired, and homemakers. Happiness is apparently U-shaped in age. Oswald (1997) finds that what matters for happiness is individuals’ own income not relative income.

Economists have been also studying the relationship between *individual characteristics* and happiness. In a recent article, Rainer Winkelmann (1998) investigates interdependencies at the family level. He also demonstrates how to model and test for such interdependencies using the framework of an ordered probit model with multiple random effects. There clearly are important interdependencies in reported well-being among members of the same family, some of which may have biological origins. These need to be reckoned with, if one wants to understand the determinants of subjective well-being.

People of higher *age* may be less happy than young people. This idea may have been strengthened by the “youth cult” projected by the media which suggests that many desirable qualities of life lie with youth. In some regards, the elderly are indeed objectively worse off. They tend to be in poorer health and have lower income, and fewer of them are still married. Somewhat surprisingly, many studies have found that older people are subjectively more happy than are young people, but this effect tends to be very small. There are four potential explanations

of the observed positive relationship between age and happiness: First, the elderly have lower expectations and aspirations. Second, the gap between goals and achievement is lower. Third, older individuals have had time to adjust to their conditions. Fourth, they learn how to reduce negative life events and to regulate negative affects. The positive relationship between age and happiness has, however, been challenged and contradictory findings have been reported (Horley and Lavery, 1995). Economists have identified a U-shaped relationship between age and happiness (Oswald 1997, Blanchflower and Oswald, 2000). For several reasons it is difficult to capture the influence of age on well-being. The term happiness may change its meaning with age. The age effect may interfere with a cohort effect. Even causation is not as clear as it seems to be at first sight. Happy people live a little longer than unhappy people, which contribute to a positive correlation between age and happiness. Because of these problems, much care should be taken when claiming that age leads to unhappiness, or that the elderly are happier than the young.

Race. Blacks tend to be less happy than whites in all psychological and sociological studies in the United States. But it also hold for other countries such as South Africa, where whites, followed are the happiest people followed by Indians, coloreds and blacks (Moller, 1989). The reasons lower incomes, less education, and less skilled jobs for black people. If one control for these factors, the difference in happiness between races become small. A major reason for the lower subjective well-being of the blacks maybe lower self-esteem, which in turn is likely to be caused by their lower status in society. Economists have found that American blacks are less happy than whites (Blanchflower and Oswald, 2000)

When people are asked to evaluate the importance of various areas of their lives, good *health* obtains the highest ratings. Happiness and health are highly correlated, but this only holds for self-reported health ratings. This is partly due to self-reported happiness and self-reported health both being influenced by personality. For example, neurotic persons recalled more symptoms of bad health and they a lower level of happiness than non-neurotics (Larsen, 1992). The effect of objective health on happiness is smaller. People seem to be remarkably effective in coping. Thus, they compare themselves to people in worse health, which induces a more positive image of their own health conditions.

To have an enduring, intimate relationship is a major goals for most people. To have friends,

companions, and relatives and to be part of a group, be it co-workers or fellow church members, contribute to happiness. The importance of “belonging” is reflected by the experimental findings that even trivial definitions of groups lead to group identification and affect the dividing up of money (Tajfel, 1981). Marriage raises happiness, as has been found in a large number of studies for different countries and periods. Married men and women report similar levels of subjective well-being; that is, marriage does not benefit one gender more than other. These results go well with the observation that marriage brings marked advantages in terms of mortality, morbidity, and mental health (Lee, Seccombe and Shehan, 1991). Couples also positively affect each other’s well-being. The positive relationship between marriage and happiness persists, even when the influence of variables such as income, age, and education is controlled for. Does marriage cause happiness or does happiness promote marriage? A selection effect cannot be ruled out. It seems reasonable to say that dissatisfied and introverted people find it more difficult to find a partner. It is possibly more fun to be with extroverted, trusting, and compassionate people. Happy and confident people are more likely to marry and to stay married (Veenhoven, 1989). But research has led to the conclusion that this selection effect is not strong and the positive association of marriage and happiness is mainly due to the beneficial effects of marriage (Mastekaasa, 1995). There are two reasons why marriage contributes to happiness: First, marriage provides additional source of self-esteem. Second, married people have a better chance to benefit from an enduring and supportive intimate relationship, and they suffer less from loneliness. Economic research on happiness has also found that marriage and happiness are positively correlated, holding other influences constant. Second, third, and fourth marriages turn out to be less happy than first marriages (Blanchflower and Oswald, 2000).

The level of *education* bears little relationship to happiness. Education may indirectly contribute to happiness by allowing a better adaptation to changing environments. But it also tends to raise aspiration levels. It has, for instance been found that highly educated are more distressed than the less educated when they are hit by unemployment (Clark and Oswald, 1994).

3 Data

The U.S. General Social Survey includes an occupational classification of individuals and also a sectoral classification. When the survey is done, every occupational category has been assigned a NAICS level sectoral classification by the U.S. Census Bureau. We match individual data from this survey with sectoral GDP data from the Bureau of Economic Analysis. Data are deflated by the U.S. Consumer Price Index. Our dependent variable is the question “Taking everything all together, how happy are you with the overall life.” In the U.S. General Social Survey, the happiness data consists of categorical variables taking the values 1, 2, and 3 which in order refers to “not too happy,” “pretty happy,” and “very happy” categories. Our dependent variable is the happiness variable taking the values 1, 2, and 3. In order to have a binary variable, we redefine the happiness variables as a binary variable where 1 (“more happy”) refers to “pretty happy” and “very happy” categories and 0 refers to “not too happy” category.

In the U.S. General Social Survey, income is a categorical variable taking values 1–13 where 13 is the highest income level. In order to calculate relative income, we use the midpoint method. Since, we know the lowest and highest income values in a category, we calculate individual income as the midpoint income of their category. We calculate relative income by subtracting own income from the reference point income. The reference point income is the average (within the U.S. General Social Survey) income of an individual’s cohort who lives in the same region and works in the same occupational group during the relevant year. Perceptions about relative income are taken from the data as the answer to the question ‘What is your opinion about your income relative to an average American.’ This is a categorical variable taking the values 1-5 which in order refers to “far below average,” “below average,” “average,” “above average,” and “far above the average.”

4 Empirical Framework

We estimate logistic probability models for self-reported happiness. We consider the case of two categories, without and with individual specific constants (“fixed effects”). We allow the probability of being happy to be a function of demographic variables, income, actual relative income, perceived relative income, and lagged happiness (self-reported happiness the previous

year). We assume that the level of (perceived) happiness can be modelled as an unobserved (latent) continuous variable

$$Happy_{it}^* = \phi X_{it} + \xi_{it} \quad , \quad (1)$$

where X_{it} (column vector) includes individual specific variables and the unobserved component ξ_{it} follows a Type 1 extreme value distribution. ϕ is a row vector of coefficients.

If we denote the observed level of happiness $Happy_{it}$ with the highest level of happiness labelled 1 and the lower level of happiness labelled 0, we have

$$Happy_{it} = 1 \quad \text{if} \quad Happy_{it}^* > -\lambda_1 \quad (2)$$

$$Happy_{it} = 0 \quad \text{if} \quad Happy_{it}^* < -\lambda_1 \quad , \quad (3)$$

where the parameter $-\lambda_1$ is the unobserved threshold such that the respondent will report being in the highest category of happiness.

The probabilities will be:

$$Pr(Happy_{it} = 1) = \frac{\exp(\phi X_{it} + \lambda)}{1 + \exp(\phi X_{it} + \lambda)} \quad \text{and} \quad Pr(Happy_{it} = 0) = \frac{1}{1 + \exp(\phi X_{it} + \lambda)} \quad (4)$$

Allowing for individual specific fixed effects: We, alternatively, include individual-specific dummy variables (fixed effects) which captures any permanent attitudes or attributes of individuals. If the unobserved fixed dummy variable is denoted α_i the continuous level of happiness is

$$Happy_{it}^* = \alpha_i + \phi X_{it} + \xi_{it} \quad , \quad (5)$$

In order to estimate the model we use the approach suggested by Andersen (1970) and Chamberlain (1980). The key point in this framework is to maximize the likelihood function on the conditional distribution of the data. Since $\sum_t y_{it}$ is a sufficient statistic to estimate α_i , we can write the conditional density for $y_{i1}, y_{i2}, \dots, y_{iT}$ conditional on $\sum_t y_{it}$. This conditional density function does not depend upon α_i ; Hence, the conditional log-likelihood function depends only on ϕ and maximum likelihood estimation will give consistent estimates provided the usual regularity conditions are satisfied. All the individuals whose satisfaction scores vary over time are

included in the estimation procedure.

Ordered Logit: For the case with 3 outcomes The ordered logit model builds upon the idea of the cumulative logit which depends on the probability that the happiness of the i th individual will be in one the three categories. We have three categories for the latent variable $Happy_{it}^*$ and the observed level of happiness is denoted as $Happy_{it}$:

$$Category (1) : Happy_{it} = 1 \quad \text{if} \quad Happy_{it}^* < -\lambda_1 \quad (6)$$

$$Category (2) : Happy_{it} = 2 \quad \text{if} \quad -\lambda_1 < Happy_{it}^* < -\lambda_2 \quad (7)$$

$$Category (3) : Happy_{it} = 3 \quad \text{if} \quad Happy_{it}^* > -\lambda_2 , \quad (8)$$

where λ_1 and λ_2 are the cut-off levels. Then, it follows that we can write the cumulative probability function of the latent variable as the sum of the probabilities of different categories. We can write the probabilities of different categories as follows:

$$Category (1) : Pr(Happy_{it} = 1) = \frac{1}{1 + \exp(\phi X_{it} + \lambda_1)} \quad (9)$$

$$(10)$$

$$Category (2) : Pr(Happy_{it} = 2) = \frac{1}{1 + \exp(\phi X_{it} + \lambda_2)} - \frac{1}{1 + \exp(\phi X_{it} + \lambda_1)} \quad (11)$$

$$(12)$$

$$Category (3) : Pr(Happy_{it} = 3) = \frac{\exp(\phi X_{it} + \lambda_2)}{1 + \exp(\phi X_{it} + \lambda_2)} \quad (13)$$

$$(14)$$

We can then turn the cumulative probability into the cumulative logit and we can write the cumulative logit as a function of independent variables.

Transition Probability: We show simple transition probabilities for self-reported happiness. The transition probability from state i (say, “very happy”) to state j is calculated as the number of individuals who in year $t - 1$ report happiness state i and in year t reports happiness in state j , divided by the total number of individuals who report happiness state i in year $t - 1$, averaged over the time-periods of panel. In symbols the transition probability is calculated as follows:

$$p_{ij} = \frac{\sum_t N_{ij}^t}{\sum_t N_i^t}, \quad (15)$$

where p_{ij} is the transition probability from state i to state j . N_{ij} is the number of individuals who report state i in year $t - 1$ and report state j in year t and N_i is the total number of individuals who report state i in year $t - 1$.

Marginal Probabilities: Since the coefficients from logit models for categorical variables are not easily interpretable, we also report marginal probabilities. In this paper, the marginal probability is defined as the effect on the predicted probability of being very happy of a one unit decline in variable k . If θ represents the marginal change in variable k (we report the results for $\theta = 1$), the marginal probability takes the form:

$$\frac{\exp(\hat{\phi}\bar{X} + \hat{\lambda}_2 - \hat{\phi}_k \theta)}{1 + \exp(\hat{\phi}\bar{X} + \hat{\lambda}_2 - \hat{\phi}_k \theta)} - \frac{\exp(\hat{\phi}\bar{X} + \hat{\lambda}_2)}{1 + \exp(\hat{\phi}\bar{X} + \hat{\lambda}_2)}, \quad (16)$$

where $\hat{\phi}_i$ is the estimated coefficient to the variable (k) of interest.

5 Empirical Results

Table 1 displays summary statistics, cross-tabulating indicators of work status with self-reported happiness. We observe that retired individuals and home makers report the largest fraction of very happy individuals although these groups also have somewhat higher numbers of less happy individuals compared to full time employed. Unemployed people are the least happy in the survey. Table 1 also shows the relationship between education and happiness. The education categories are less than high school, high school, junior college, bachelor and graduate. When we compare the education categories, we see that graduates are the happiest and as the

degree of education decreases the happiest category decreases and less than high school is the category displaying the least happiness. Marital and health status are also cross-tabulated with happiness in Table 1. Married people are happier than others and widowed and single people are pretty happy, while separated and divorced people represent the lowest category of happiness. Health is strongly correlated with happiness. People who are healthiest are also happiest and there is overall a strong correlation between happiness and health status.

Table 2 cross-tabulates perceived income rankings and happiness and we see a positive relationship between perception about relative income and happiness.

Perceived relative income is, not surprisingly, closely related to actual relative income. Table 3 shows that perceived income ranking and actual income ranking of individuals are positively correlated but the correlation coefficient is clearly far from unity. This lack of perfect correlation allows us to estimate the impact of perceived as well as actual income ranking simultaneously and evaluate if both matters for happiness and which one is more important.

Table 4 shows conditional probabilities for happiness. Each row corresponds to the state of happiness in the previous period and the table then reports the conditional probability of switching to the level of happiness indicated in the column heading. It appears from Table 4 that the conditional probability of being, e.g., “not too happy” depends very little on the reported level of happiness in the previous period and the same is true for the other current levels of happiness. In other words, the self-reported state of happiness shows little persistence from year to year.

Table 5 reports the coefficients from the estimation of the ordered logit model and, for interpretation, the increase in the marginal probability of being “very happy” for a unit decrease in the corresponding right-hand side variable. Lagged happiness is only marginally significant at the 10 percent corresponding to the lack of persistence found in Table 4. We find that “high income” but not “middle income” has a significant effect on happiness.

Consider employment status. The omitted category is the full time working category and we see that individuals working part time have a probability of being in the “very happy” category that is 1 percentage lower than that of individuals working full time. Unemployed individuals are the least happy with a probability of being very happy that is 4.3 percentage points lower than that of full time employed. The impact of being temporarily unemployed, student, or

homemaker is insignificant.

Marital status is a very strong predictor of happiness. For marital status the omitted category is being married. Separated have a probability of being very happy that is 0.03 percentage points lower than that of married individuals. Widowed, single, and divorced are even less likely to be very happy. Regarding number of children in the family, the omitted category is having zero or one child. The regression results show that people who have more than 2 children are more likely to be very happy than individuals with 2 children, who are more likely to be very happy than individuals with only one child. The probability of being very happy is U-shaped in age with a minimum around 30 years of age.

We have five categories for education and the omitted category is the “less than high school” category. We see that having a graduate degree significantly improves the probability of being very happy. Considering gender, females are more likely to be “very happy” than males. Blacks and other races are less happy than whites and blacks are the least happy category.

Health status is the single most important determinant of happiness. There are four categories of health with “poor health” the left-out category. Happiness is strongly increasing in health and people with excellent health are much more likely to be happy than other people.

Last, Table 5 reports the impact of income on happiness and we recode the income variables in to 3 categories. We find that people who earn more than the 25th percentile are significantly happier than others. However, the direction of causality for these results are not necessarily unidirectional from happiness to income.

Although we find that income and happiness are correlated, the direction of causality may go in both directions. We, therefore, use sector specific income shocks as an exogenous determinant of individual-level income, see Table 11. We find that income shocks increase happiness when these are measured as exogenous sector level shocks. When we control for individual fixed effects we find that the coefficient to the income shock variable becomes bigger in absolute value and more significant. The interpretation of the coefficients in the regressions with fixed effects is that the impact of the regressors now are determined by the deviation of each regressor from its own average. Therefore, the higher coefficient to income in the right-most columns of Table 11 implies that high income results in relatively higher happiness for individuals who are not permanently having high income than for individuals with a constant high income. These results suggest that

following an unexpected increase in the output of a sector, people working in this sector gains from this shock and become happier.

Tables 7 and 8 present the coefficients and marginal probabilities, respectively, for the impact of relative income on happiness. We performed a series of regressions in order to identify the reference group which had the strongest effect on happiness. We do not report the details but our results indicate that individuals compare themselves to other individuals from their own cohort who work in the same occupation and live in the same region. We report the results of regressions using income relative to the reference group. Individuals may only obtain information about others' income with a time lag and we therefore also consider "lagged" relative income (current income relative to the previous year average income of the reference group). Finally, we use the perceived relative income as a regressor and examine if perceived income matters when actual relative income is also included. We find in Table 7, which uses continuous variables that, with or without fixed effects, own income is significant while measured relative income is not significant. What *is* strongly significant is the perceived relative income. Table 8 uses dummy variables and the results are that own income isn't significant, relative income is barely significant while, again, perceived relative income has a strong effect on happiness.

Next, in Table 9, we investigate the importance of perceptions for males and females. For males, income is clearly insignificant while actual relative income is marginally significant at the 10 percent level. Perceived relative income is clearly significant. However, this effect is larger and even more significant for females for whom we also find a significant effect of own income. It appears that female well-being is more depending on income and, in particular, perceived income status. Marital status has a bigger impact on happiness for females and unemployment has a higher impact on happiness for women. Having two children relative to fewer children makes males happier but does not effect females—maybe because they shoulder a higher burden of child care.

Table 10 reports the results of instrumental variable probit regressions. We again recode happiness as a binary variable. Low happiness category takes the value 0 while middle and high happiness categories take the value 1. We instrument own income with average sector-level wages and, alternatively, average sector-level compensation.¹ Log own income instrumented by

¹We do not report that first-stage regressions in tables, but for sector level wage in the first stage, the estimated

sector level wage or compensation is insignificant and the IV-regressions confirm the result that perceived relative income is more important than actual relative income.

6 Conclusion

To come

coefficient is 1.26 with a t -stat of 60.11 and an R-square of 0.55. The coefficient for compensation in the first stage is 1.43 with a t -statistic 70.04 and an R-square of 0.57.

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Data Appendix

The General Social Surveys have been conducted by the National Opinion Research Center annually since 1972, except for the years 1979, 1981, and 1992 (a supplement was added in 1992), and biennially beginning in 1994. For each round of surveys, the Roper Center for Public Opinion Research prepares a cumulative dataset that merges previous years of the General Social Survey into a single file, with each year or survey constituting a subfile. The content of each survey changes slightly as some items are added to or deleted from the interview schedule. Main areas covered in the General Social Survey include socioeconomic status, social mobility, social control, the family, race relations, sex relations, civil liberties, and morality. Topical modules designed to investigate new issues or to expand the coverage of an existing subject have been part of the General Social Survey since 1977, when the first module on race, abortion, and feminism appeared. The topical modules for 1998 focused on the themes of medical care, medical ethics, religion, religion and health, culture, job experiences, and interracial friendships. Other topics covered have included gender, emotions, market exchange, giving and volunteering, and mental health (1996), family mobility and multiculturalism (1994), cultural issues (1993), work organizations (1991), intergroup relations (1990), occupational prestige (1989), religious socialization, behaviors, and beliefs (1988), sociopolitical participation (1987), the feminization of poverty (1986), social networks (1985), and the role of the military (1982 and 1984). The General Social Survey also added a crossnational component in 1985, through participation in a multinational collaborative group called the International Social Survey Program (ISSP). Topics addressed have included the role of government (1985, 1990, 1996, and 1998), social support (1986), social inequality (1987), family and gender issues (1988 and 1994), work orientation (1989 and 1998), the impact of religious background, behavior, and beliefs on social and political preferences (1991 and 1998), environmental issues (1993), and national identity (1996 and 1998). In 1994, two major innovations were introduced to the General Social Survey. First, the traditional core set of questions was substantially reduced to allow for the creation of mini-modules (small- to medium-sized supplements). The mini-modules permit greater flexibility to incorporate innovations and to include important items proposed by the social science community. Second, a new biennial, split-sample design was instituted, consisting of two parallel subsamples of approximately 1,500 cases each. The two subsamples contain identical cores

and different topical ISSP modules. Regions are as follows. New England: Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island. Middle Atlantic: New York, New Jersey, Pennsylvania. East North Central: Wisconsin, Illinois, Indiana, Michigan, Ohio. West North Central: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas. South Atlantic: Delaware, Maryland, West Virginia, Virginia, North Carolina, South Carolina, Georgia, Florida, District of Columbia. East South Central: Kentucky, Tennessee, Alabama, Mississippi. West South Central: Arkansas, Oklahoma, Louisiana, Texas. Mountain: Montana, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico. Pacific = Washington, Oregon, California, Alaska, Hawaii.

VARIABLES USED IN THE PAPER:

Happiness: Happiness is the answer to the questions in U.S. General Social Survey “Taken all together, how would you say things are these days-would you say you are very happy, pretty happy or not too happy?” Happiness is a categorical variable where 1, 2, 3 in order refers to the answers not too happy, pretty happy and happy. In the ordered logit regressions happiness takes three values. However, because of the properties of fixed effects ordered logit regression (explained in detail above), happiness is recoded as a binary variable.

Financial Satisfaction: Financial Satisfaction is the answer to the question in U.S General Social Survey, “We are interested in how people are getting along financially these days. So far as you and your family are concerned, would you say that you are pretty well satisfied with your present financial situation, more or less satisfied, or not satisfied at all?” In the ordered logit regressions financial satisfaction takes three values. However, because of the properties of fixed effects ordered logit regression (explained in detail above), happiness is recoded as a binary variable.

Actual income: This is the actual family income first coded as intervals in the dataset and then computed with the midpoint method. Every individual is assigned to the average of the lowest and highest income level of the interval they reported. We use the real family income from the U.S General Social Survey which is corrected for CPI inflation. In the regressions we use actual income as a continuous variable but since perceived relative income is a categorical variable, we also recode the actual income in to 5 categories in order to make it comparable in

the regressions.

Actual relative income: Relative income is calculated as the difference of the actual income from the average income of the reference point. We try different combinations of reference groups with age, region, sector, occupation (one digit and three digit sectors and occupations). The reference group we use in these paper is the individuals' cohort, working in the same occupation group (one digit) and living in the same region (as explained above). In the regressions we use actual relative income as a continuous variable but since perceived relative income is a categorical variable, we also recode the actual income in to 5 categories in order to make it comparable in the regressions.

Perceived Relative income: Perceived relative income is the answer to the question in the U.S. General Social Survey, "Compared to an average American family, what is your opinion about your family income." This variable has 5 categories: Far below than average, below average, average, above average, far above average. In the regressions we use perceived relative income as a categorical variable but since actual relative income is a continuous variable, we also use perceived relative income as a continuous variable taking values from 1 through 5 to make it comparable in the regressions.

Lagged Relative Income: People know their own actual income this year but they may not have information about others' income this year. They will just use the last period's income about others for their comparison. Lagged relative income is then the difference of current actual income from the reference group income in the last period.

Health status: Excellent, good, fair and poor are the categories for health. Poor is the omitted category in the regressions.

Marital Status: Married, widowed, divorced, separated and never married are the categories for marital status. Married is the omitted category in the regressions.

Work Status: Working full-time, working part-time, temporarily not working, unemployed, retired, school, keeping house and others are the categories for work status. Working full-time is the omitted category.

Sex: Male and Female are the categories. Male is the omitted category in the regressions.

Race: White, black, and others are the categories for race. White is the omitted category in the regressions.

Education: We use number of years of schooling as a dependent variable and also use the highest education as a categorical variable which has the values: less than high school, high school, junior college, bachelor and graduate. Less than high school is the omitted category in the regressions.

Children: We use the number of children as a dependent variable and also recode as a categorical variables as having children less than 1, having 2 children and having children more than 2. In the regressions, children less than 1 is the omitted category in the regressions.

Sectoral Wage: The variable is taken from Bureau of Economic Analysis. The monetary remuneration of employees, including the compensation of corporate officers, commissions, tips, and bonuses, voluntary employee contributions to certain deferred compensation plans, such as 401(k) plans, and receipts in kind that represent income. Accruals and disbursements differ in the treatment of retroactive payments. In the national income and product accounts (NIPAs), wage and salary accruals is the appropriate measure for gross domestic income (GDI) and wage and salary disbursements is the appropriate measure for personal income.

Sectoral Compensation: The variable is taken from Bureau of Economic Analysis. Income accruing to employees as remuneration for their work for domestic production. It is the sum of wage and salary accruals and of supplements to wages and salaries. It includes compensation paid to the rest of the world and excludes compensation received from the rest of the world.

Table 1: **Descriptive Statistics: Individual Characteristics and Happiness**

happiness:	low	middle	high	total
labor force status:				
working fulltime	0.10	0.58	0.32	21429
working parttime	0.11	0.58	0.31	4364
temp not working	0.16	0.55	0.29	923
unemployed	0.29	0.53	0.17	1286
retired	0.13	0.52	0.36	5436
school	0.13	0.57	0.30	1297
keeping house	0.14	0.52	0.35	7867
other	0.29	0.49	0.22	714
total	5239	24197	13880	43316
highest degree:				
less than high school	0.18	0.53	0.30	10613
high school	0.11	0.58	0.31	22396
junior college	0.09	0.58	0.33	1984
bachelor	0.08	0.56	0.37	5611
graduate	0.07	0.54	0.39	2569
total	5220	24116	13837	43173
marital status:				
married	0.08	0.52	0.42	4249
widowed	0.19	0.56	0.24	4396
divorced	0.18	0.62	0.19	4900
separated	0.28	0.56	0.16	1517
never married	0.15	0.63	0.22	8249
total	5239	24193	13879	43311
health status:				
excellent	0.07	0.47	0.46	10471
good	0.10	0.61	0.29	14860
fair	0.21	0.58	0.21	6180
poor	0.35	0.48	0.17	1887
total	4179	18506	10713	33398

Notes: This table shows the summary statistics of happiness categories (low, middle and high) by work status, highest degree earned, marital status and health status. The numbers are the row frequencies shown as ratios.

Table 2: **Descriptive Statistics: Perceptions about Relative Income and Happiness**

happiness:	low	middle	high	total
perceived relative income:				
far below average	31.41	49.55	19.04	2222
below average	18.83	58.49	22.68	10090
average	9.17	56.96	33.86	21821
above average	6.22	52.39	41.39	7920
far above average	10.79	46.16	43.05	834

Notes: This table shows the happiness of individuals by perception category. The numbers show the row percentages. 22.68 means that 22.68 percent of people with “below average” (corresponds to 10090 individuals in the sample) perceived relative income are in the “low happy” category.

Table 3: Descriptive Statistics: Relation between Own Income and Perceptions about Relative Income

perceived relative income:	far below	below	average	above	far above	total
own income:						
low	17.32	42.99	34.15	3.88	1.67	17787
middle	7.75	36.27	49.40	5.62	0.97	20868
high	2.03	15.27	53.31	26.85	2.53	7855

Notes: The numbers are the row percentages. Own income is recoded in to three categories from the original dataset which was originally 13. Perceived Relative Income is 5 categories: Far below average, below average, average, above average, far above average.

Table 4: **Transition Matrix of Happiness**

Current Happiness:		low	middle	high	total
Happiness in:	low	11.97	55.86	32.17	5239
previous:	middle	11.74	55.99	32.27	24198
year:	high	11.72	55.91	32.37	13880
	total	11.76	55.95	32.29	43317

Notes: This table shows the probabilities of current happiness conditional on the happiness in the previous year. Low, middle and high are happiness categories. We compute the transition matrix for yearly individual happiness categories for the people who appear in the sample in all 25 years. 55.86 means that the probability of having middle happiness conditional on having low happiness in the previous period is 55.86 or 11.72 means that the probability of having low happiness conditional on having high happiness in the previous period is 11.72.

Table 5: **Happiness and Individual Characteristics**

Dependent Variable: Self-reported Happiness

Ordered Logit			
	Coef	<i>t</i> -stat	Marginal Prob.
lagged happiness	0.04	1.68	-0.03
middle income	0.02	0.3	-0.01
high income	0.18	4.2	-0.02
parttime work	-0.11	2.5	0.01
tempunempl	-0.10	1.3	0.01
unempl	-0.73	9.9	0.04
retired	0.12	2.2	-0.01
school	0.14	1.9	-0.02
homemaker	0.02	0.5	-0.01
otherwrk	-0.04	0.4	0.01
widowed	-1.08	21.3	0.04
divorced	-0.95	24.1	0.05
separated	-1.16	17.2	0.03
single	-0.72	19.2	0.06
2 children	0.08	2.2	-0.01
more than 2 children	0.13	3.8	-0.02
age	-0.02	4.2	0.01
agesq	0.01	6.9	-0.01
highsch	0.01	0.2	-0.01
juniorcol	0.08	1.3	-0.01
bachelor	0.07	1.6	-0.01
graduate	0.17	2.9	-0.02
female	0.19	6.9	-0.02
black	-0.38	10.2	0.04
other race	-0.08	1.2	0.01
health fair	0.62	10.1	-0.09
health good	1.24	20.6	-0.15
health excellent	1.92	30.7	-0.28
R-squared	0.07		
No. of obs.	28712		

Notes: The marginal probability is defined as the effect on the predicted probability of being very happy of a one unit decline in variable *k*. *t*-statistics are in absolute values.

Table 6: **Happiness and Income Shocks**

Dependent Variable: Self-reported Happiness

Bivariate Logit				
	Marg. Prob.	<i>t</i> -stat	Marg. Prob.	<i>t</i> -stat
individual fixed effects:	No		Yes	
individual income	-21.02	7.7	-45.01	3.9
income shock	-0.02	2.1	-0.04	4.1
parttime work	0.01	2.5	0.01	0.4
tempunempl	0.01	1.4	0.01	0.2
unemployed	0.05	27.9	0.08	3.8
retired	-0.02	2.7	-0.09	10.5
school	-0.03	1.8	-0.02	1.2
homemaker	-0.01	0.8	-0.04	6.4
otherwrk	-0.01	0.2	-0.04	2.3
divorced	0.05	15.6	0.14	8.4
widowed	0.06	27.1	0.15	9.7
separated	0.04	7.1	0.20	8.1
single	0.06	24.6	0.12	9.3
2 children	-0.01	2.5	-0.02	2.8
more than 2 children	-0.02	3.7	-0.02	3.4
school	-0.01	2.6	-0.01	3.1
age	0.01	4.8		
agesq	-0.01	7.4		
female	-0.02	6.9		
black	0.04	11.5		
other race	0.01	0.6		
health fair	-0.09	8.1	-0.04	3.8
health good	-0.15	18.9	-0.11	9.5
health excellent	-0.28	27.4	-0.21	12.4
R-squared	0.08			
No. of obs.	27399		27009	

Notes: The first regression is estimated with logit and the second regression with fixed effects logit. The marginal probability is defined as the effect on the predicted probability of being very happy of a one unit decline in the independent variable k . Region and industry dummies are included. Sectors: Agriculture, Construction, Mining, Manufacturing, Transportation, Retail Trade, Wholesale, Finance, Entertainment, Public Administration. Regions: New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, Pacific, Foreign. t -statistics are in absolute values. Income shock is defined as the unexpected part of the sector-level GDP at time t . Every individual is assigned to a 1-digit sector in he or she works. Income is in thousands of dollars.

Table 7: **Happiness, Relative Income, and Perceptions about Relative Income**

Dependent Variable: Self-reported Happiness

Bivariate Logit

	Coef	<i>t</i> -stat	Coef	<i>t</i> -stat
individual fixed effects:	No		Yes	
actual income	0.09	2.5	0.05	1.3
perceived relative income	0.61	8.7	0.51	6.5
lagged relative income	-0.02	1.2	-0.01	0.6
actual relative income	0.15	2.6	0.13	2.2

R-squared	0.09			
No. of obs.	12677		12465	

Notes: Coefficients are estimated with logit and fixed effects logit. We show the main variables of interest here. Income variables are in logs. “Relative income” is calculated as the income of an individual relative to a reference group defined as the people who are at the same age, work in the same occupation group and live in the same region with the individual. Lagged relative income is the income of an individual relative to the reference group lived in the previous period. All variables are continuous variables where perceived relative income takes the values 1-5. *t*-statistics are in absolute values.

Table 8: **Happiness, Relative Income, and Perceptions about Relative Income**

Dependent Variable: Self-reported Happiness

		Bivariate Logit			
		Marg. Prob.	<i>t</i> -stat	Marg. Prob.	<i>t</i> -stat
individual fixed effects:		No		Yes	
actual income:	below average	-0.01	0.3	0.02	0.3
	average	-0.02	1.5	-0.04	-0.5
	above average	0.02	0.7	0.25	1.3
	far above average	-0.02	1.3	0.02	0.3
actual relative income:	below average	0.05	0.5	0.45	0.8
	average	0.03	0.4	0.40	0.7
	above average	0.06	0.5	0.45	0.8
	far above average	0.12	0.8	0.59	0.8
lagged actual relative income:	below average	0.02	2.1	0.09	1.6
	average	0.02	0.3	0.13	0.8
	above average	-0.09	0.9	-0.33	0.6
	far above average	-0.02	0.3	0.02	0.1
perceived relative income:	below average	0.01	0.5	0.04	0.4
	average	0.07	3.7	0.45	4.0
	above average	0.14	5.4	0.68	5.7
	far above average	0.14	3.5	0.56	3.2
R-squared		0.08			
No. of obs.		15904		14234	

Notes: We show the main variables of interest here. Actual income, actual relative income and lagged actual relative income is recoded in to 5 categories to make them comparable to the perceived relative income. In all categories “far below average” is the omitted category. Perceived relative income is 5 categories in the General Social Survey. People tell what they think about their relative income: “far below average,” “below average,” “average,” “above average,” or “far above the average.” Happiness is a bivariate variable taking values 1 (“very happy”) and 0 (“not too happy” and “pretty happy”). “Relative income” is calculated as the income of an individual relative to a reference group defined as the people who are at the same age, work in the same occupation group and live in the same region with the individual. Own actual income is absolute income which is calculated by the midpoint method and lagged relative income is the income of an individual relative to the reference group lived in the previous period. The marginal probability is defined as the effect on the predicted probability of being very happy of a one unit decline in variable *k*. *t*-statistics are in absolute values.

Table 9: Happiness, Relative Income, and Perceptions by Gender

Dependent Variable: Self-reported Happiness

Bivariate Logit				
	Males		Females	
	Marginal Prob.	<i>t</i> -stat	Marginal Prob.	<i>t</i> -stat
own actual income	-11.1	0.3	-85.01	1.9
lagged actual relative income	20.1	0.7	48.01	0.5
actual relative income	-24.6	1.7	-23.09	0.9
perceived relative inc. (below av)	-0.03	1.6	-0.03	1.8
perceived relative inc. (average)	-0.07	3.9	-0.09	5.2
perceived relative inc. (above av)	-0.09	3.5	-0.15	4.8
perceived relative inc. (far above av)	-0.09	2.2	-0.16	2.2
parttime work	0.02	1.3	-0.01	0.5
tempunemp	-0.02	0.6	0.03	2.1
unemployed	0.05	13.1	0.05	13.4
retired	-0.04	2.1	-0.02	0.9
school	-0.01	0.4	-0.04	1.5
homemaker	-0.01	0.1	-0.03	1.1
otherwrk	-0.12	2.4	0.01	0.3
2 children	-0.03	2.1	0.01	0.1
more than 2 children	-0.02	2.3	-0.01	0.4
widowed	0.03	1.9	0.07	16.8
divorced	0.05	10.2	0.06	14.4
separated	0.04	3.7	0.05	5.7
single	0.06	10.4	0.06	10.6
health good	-0.12	4.8	-0.16	10.1
health fair	-0.17	9.4	-0.09	4.7
health excellent	-0.28	13.3	-0.31	15.5
R-squared	0.08		0.09	
No. of obs.	6072		7385	

Notes: The regression is estimated with ordered logit. The marginal probability is defined as the effect on the predicted probability of being very happy of a one unit decline in variable k . The first column shows the results for ordered logit regression and second column shows the results for fixed effects regression. Income is scaled by a thousand. There are 5 categories for perceived relative income and “far below average” is the omitted category. “Relative income” is calculated as the income of an individual relative to a reference group defined as the people who are at the same age, work in the same occupation group and live in the same region with the individual. Lagged relative income is the income of an individual relative to the reference group lived in the previous period. t -statistics are in absolute values. Income is in thousands of dollars.

Table 10: **Happiness, Income, and Income Perceptions: IV Regressions**

Dependent Variable: Self-reported Happiness

IV Probit				
instrument (sectoral):	wage		compensation	
	Coef	<i>t</i> -stat	Coef	<i>t</i> -stat
own income	-0.02	0.5	-0.02	0.6
perceived relative income	0.14	7.5	0.14	7.7
actual relative income	0.10	2.5	0.10	2.6
No. of obs.	20104		20104	

Notes: Instrumental variable probit regression. We instrument for own income by sector level wage and sector level compensation. We show the main variables of interest here. Income variables are in logs. “Relative income” is calculated as the income of an individual relative to a reference group defined as the people who are at the same age, work in the same occupation group and live in the same region with the individual. All variables are continuous variables where perceived relative income takes the values 1-5. *t*-statistics are in absolute values.

Table 11: **Happiness and Income Shocks**

Dependent Variable: Self-reported Happiness

Bivariate Logit				
	Marg. Prob.	<i>t</i> -stat	Marg. Prob.	<i>t</i> -stat
individual fixed effects:		No		Yes
individual income	-21.02	7.7	-45.01	3.9
income shock	-0.02	2.1	-0.04	4.1
R-squared	0.08			
No. of obs.	27399		27009	

Notes: The first regression is estimated with logit and the second regression with fixed effects logit. The marginal probability is defined as the effect on the predicted probability of being very happy of a one unit decline in the independent variable k . Region and industry dummies are included. Sectors: Agriculture, Construction, Mining, Manufacturing, Transportation, Retail Trade, Wholesale, Finance, Entertainment, Public Administration. Regions: New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, Pacific, Foreign. t -statistics are in absolute values. Income shock is defined as the unexpected part of the sector-level GDP at time t . Every individual is assigned to a 1-digit sector in he or she works. Income is in thousands of dollars.