Consumption and Life Satisfaction: A Micro Panel Data Study

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Abstract

Many studies have estimated the relationship between income and well-being. However, economic theory predicts that well-being derives from consumption, not income. Using newly available US micro-level panel data, we show that consumption has much larger effects on life satisfaction than does income. We find no evidence for life satisfaction satiating in consumption. We also show that spending on conspicuous consumption, such as clothing and vacations, affects life satisfaction more than does spending on non-conspicuous consumption. These results suggest that social comparison may underlie the relationship between consumption and life satisfaction.

Keywords: life satisfaction; consumption; conspicuous consumption

JEL Codes: D03, D12, D60

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1 Introduction

What determines individual well-being? A large literature examines the economic determinants of well-being, focusing on the relationship between income and well-being (for a broad review, see Deaton 2008). Studies find that higher income typically leads to greater well-being for individuals within a country at a given time, although some results suggest that the effects on well-being are small in comparison to the effects of life events (Diener and Biswas-Diener 2002; Kahneman and Deaton 2010; but see Oswald and Wu 2011). Further debate exists over whether the marginal benefits of income satiate at higher levels (Clark et al. 2008; Diener and Seligman 2004; Lien et al. 2016; Proto and Rustichini 2013; Stevenson and Wolfers 2013).

However, in economic models, individual utility (which well-being surveys attempt to measure indirectly) is determined not by current income but by current consumption (Ando and Modigliani 1963; Friedman 1957). While consumption is ultimately derived from income, at any given point in time a person's current consumption level may differ greatly from their current income level due to consumption smoothing over the lifetime, expectations and uncertainty, and other factors (Meghir and Pistaferri 2011). Income may under-predict consumption (e.g., for poor households that receive food stamps) or overpredict consumption (e.g., for wealthier households, which typically save more).

To the extent that current income and current consumption differ, current income is a poor proxy for an individual's consumption of the goods and services which contribute to their well-being (Attanasio and Pistaferri 2016)[1]. Because previous studies have related only income, not consumption, to well-being, the relation between economic resources and well-being has been inappropriately specified[2]. However, until now,

[1] Figure 1 shows that current income and current consumption differ substantially for our sample of US individuals

[2] A few studies have examined how well-being is affected by elements of consumption. Noll and Weick (2015) study the relationship between life satisfaction and categories of consumption in a single cross-section of the German Socio-Economic Panel. The categories of consumption available in their data sum to approximately half household total consumption (as measured in the German expenditure survey) and are

large-scale panel data studies have been restricted to studying the relationship between current income and well-being due to limited data availability[3].

New consumption, income and life satisfaction data in a household panel survey offer us the opportunity to address this problem. The long-running Panel Study of Income Dynamics (PSID) has, since the early 2000s, incorporated a growing set of consumption questions, and since 2009 has included a standard measure of self-reported life satisfaction. Andreski et al. (2014) show that the PSID consumption data are largely consistent with much more detailed consumption data in the Consumer Expenditure Survey (CE).

Here, using these new data, we present the first large-scale panel study of consumption and subjective well-being. With panel data we are able to use fixed-effects specifications, controlling for potentially confounding individual differences in subjective scaling of life satisfaction responses or other characteristics such as personality (e.g., individuals high in extraversion might both consume more and experience higher well-being). Detailed consumption data also allow us to examine the effects of different types of consumption on life-satisfaction.

We establish three central results. First, we find a positive effect of consumption on life satisfaction that is at least five times larger than that of income (the coefficient on which is not statistically significant in regressions that incorporate consumption). Using the panel structure of the data to control for individual fixed effects, which we show are particularly important in the present context, together with a broad range of other controls plus state and year effects, we show that a one standard deviation increase in consumption raises self-reported life satisfaction by approximately 5% of a standard deviation. The fact that

available in only one wave of data only, their econometric analysis does not include individual fixed effects. DeLeire and Kalil (2010) examine the limited consumption data available in early waves of the Health and Retirement Study.

[3]Among the large scale household survey datasets containing measures of life satisfaction, none contain detailed consumption data, with available consumption data typically limited to food expenditure and measures of home improvement. Consumption surveys, such as the Consumer Expenditure Survey, do not contain measures of life satisfaction or other measures of well-being. Some studies exist in psychology which use specific consumption types (see below for further discussion).

the coefficient on consumption is substantially larger than that on income implies that the consumption-equivalent value of any given "life event" is much lower than the income-equivalent value emphasised by some prior studies.

Second, we test for satiation in the relationship between consumption and life satisfaction. Some prior studies using income data find evidence of satiation at high levels of income. However, such satiation could reflect the difference between income and consumption. If high current income is temporary and associated with high savings rates, life satisfaction would plateau at high income as additional income is saved, not consumed.

We estimate models in which life satisfaction is regressed against quintile dummies for consumption and find no evidence for satiation at higher quintiles. We also find little or no evidence of satiation when using polynomial fits of the consumption variable. In some specifications the quadratic term is negative, but the satiation point is more than two standard deviations above the mean of consumption in the data and hence falls outside the range of reasonable inference.

Third, using the detailed category-level consumption data available in the survey, we investigate the effect of different types of consumption on life satisfaction. In particular, we estimate the separate effects of conspicuous consumption and non-conspicuous consumption (consumption which is more, or less, visible to others) on life satisfaction (Bagwell and Bernheim 1996; Hirsch 1977; Veblen 1899). To our knowledge, this is the first study to do so using broad, detailed consumption microdata for a large sample of he population.

We classify individual consumption categories in terms of their visibility to others, using an approach pioneered by Heffetz (2011), and show that the effect of conspicuous consumption is at least double that of non-conspicuous consumption. Indeed, in most specifications in which life satisfaction is modelled as a function of both conspicuous and non-conspicuous consumption, we find no evidence for non-conspicuous consumption

raising life satisfaction at all. These results are consistent with the suggestion that consumption raises well-being through its effects on perceived social status.

Our study also relates to a large existing literature (much of which lies outside conventional economic theory) that questions whether economic resources are beneficial to well-being. It has often been suggested that increased consumption may actually reduce well-being (Frank 2004; Scitovsky 1976) and, empirically, materialistic attitudes are associated with reduced well-being on a number of dimensions (Kashdan and Breen 2007; Kasser 2002). Studies in psychology also suggest people are typically subject to "affective forecasting errors" and hence, due to cognitive biases such as impact bias and underestimation of adaptation effects, may not spend money on things that will maximise their happiness (Hsee and Hastie 2006)[4].

Our results on conspicuous consumption also relate to a broader psychological literature on how consumption types affect well-being. Pro-social expenditure leads to increased well-being (Dunn et al. 2008) and reduces blood pressure (Whillans et al. 2016), and many studies suggest that only expenditure on experiential, rather than material, goods leads to increased well-being (Gilovich and Kumar 2015; Van Boven and Gilovich 2003 (although see Schmitt et al. 2015)).

The remainder of the paper proceeds as follows. In the next section we introduce the panel data set used in our analysis and describe summary statistics. The following section contains our results and extensions of the analysis. A brief conclusion follows.

[4] Although some early studies in consumer psychology focused on the multifaceted nature of consumers' hedonic experiences (Holbrook and Hirschman 1982) few have examined the relation between consumption and well-being directly. Masferrer-Dodas et al. (2012) found no relation between consumption of market goods and well-being in a small-scale foraging society, although one measure of well-being (smile frequency) was associated with higher luxury consumption. Hudders and Pandelaere (2012) founds that greater spending on status goods was associated with improved affect, particularly for more materialistic individuals (see also Hudders and Pandelaere 2015). Headey et al. (2008) show no relation between life satisfaction and limited categories of consumption (food, groceries and leisure) using UK data, but a positive relation between consumption and well-being in Hungarian data.

2 Data

2.1 PSID Life Satisfaction and Consumption Data

We use the new consumption and life satisfaction data available in the US Panel Study of Income Dynamics (PSID). To our knowledge the PSID is the only large scale household panel survey that includes both measures of life satisfaction and detailed consumption data. The PSID is a long-running panel survey of a representative sample of US households, beginning in 1968. We use the three most recently available waves - 2009, 2011 and 2013, which include information on life satisfaction and consumption for approximately 8,000 households per wave.

From 2009 the PSID has included a standard self-reported life satisfaction question phrased as follows: "Please think about your life as a whole. How satisfied are you with it? Are you completely satisfied, very satisfied, somewhat satisfied, not very satisfied, or not at all satisfied?" This question is asked only of the main respondent, who also answers the household questionnaire. Consequently, we use data on only one respondent per household. Our sample is therefore not fully representative of the US adult population as it under-represents second and third adult members of household units (typically spouses), with 74% of the respondents in our sample being male. We restrict the sample to a balanced panel of households, using individual fixed effects in our econometric analysis. We also omit observations which fall into the top 1% or bottom 1% of the distribution of consumption or income. This resulting data includes 16,992 observations for 5,664 individuals.

The PSID now contains a wide range of consumption data[5]. Historically, the PSID asked only limited questions (on food consumption). Given the high quality income and labor market data available in the survey, previously researchers used a variety of

[5]The PSID measure of consumption is based upon expenditure. Recent studies emphasize that, for some groups in the population in particular, consumption of goods and services maybe be underestimated by measures of expenditure due to home production and shopping behaviours (Aguiar and Hurst 2005).

imputation methods to impute total consumption from these limited data (Blundell et al. 2008, 2016; Skinner 1987). However, the set of consumption categories included in the PSID was expanded in 1999, with further expansion in 2005. Since 2005 the PSID has included nearly all the consumption categories found in the main US consumption survey, the CE, though using broader catch-all questions[6]. Andreski et al. (2014) compare PSID and CE expenditure values, finding that mean household expenditures are very closely matched with mean CE expenditures (between 96% and 102% of mean PSID expenditure over the survey waves), though some sub-category differences exist between the surveys[7]. They also find that the life-cycle profiles of consumption match closely across the two surveys and that coefficient values from regressions of consumption spending against socio-economic characteristics are very similar across the two surveys.

Consumption data in the PSID are provided as annualized equivalent values in 12 main categories and 34 sub-categories. Tables A1 and A2 list the full set of 34 consumption sub-categories available. In our main analysis we aggregate the categories to total household annual consumption. As income and consumption are measured in the PSID at the household level we adjust both variables using an equivalence adjustment, dividing by the square root of household size.

We add a variety of demographic and socio-economic variables as controls in our econometric analyses. These are: age of household head (in years), gender of the respondent, marital status (single, married / partner, widowed, divorced, separated), number of dependent children, highest educational qualification (high school, college, GED); employment status (employed, temporarily not working, unemployed, retired

[6]While the catch-all questions in the PSID are less detailed than those found in the CE, they have some positive features not used in the CE survey. For many expenditure categories the PSID interview allows respondents to report expenditures over a time frame of their choosing. Where respondents state they do not know, the survey uses expanding brackets to approximate values. The higher-level questions in the PSID also reduce the likelihood of respondent fatigue.

[7]In particular, the PSID household levels deviate from the CE values in education expenditure, vehicle repairs and maintenance.

and disabled); housing status (owns home, rents home) and health. We use two health measures available in the PSID. First, we use self-reported general health: "Would you say your health in general is excellent, very good, good, fair, or poor?", coded to 1 = poor and 5 = excellent.

We also control for psychological health using the Kessler-6 screening scale for "non-specific psychological distress", which is coded between 0 and 24 on a scale of increasing mental anxiety. The Kessler screening scale, developed by Dr Ronald Kessler is based on answers to six self-reported questions of the form: "In the past 30 days, about how often did you feel.... So sad nothing could cheer you up? / Nervous? / Restless or fidgety? / Hopeless? / That everything was an effort? / Worthless?". Respondents choose between "All of the time", "Most of the time", "Some of the time", "A little of the time" or "None of the time" with scores of 4 - 0 assigned to the responses.

2.2 Summary Data

Summary data for demographics, socio-economic controls and the measure of life satisfaction are shown in Table 1, for the three waves of data pooled together. Among the balanced panel of individual-year observations 74% are for male individuals, with average age of 46. Approximately half of the sample are married or have a partner, two-thirds have high school education or higher, more than two-thirds are employed and a little more than 60% own their home. Average self-reported health is 3.5 (mid-way between "good" and "very good"), and the mean score on the Kessler mental anxiety scale is 3.8 out of a possible 24. The average value of life satisfaction is 3.8, with a standard deviation of 0.83.

Equivalized total consumption and consumption by main PSID category are summarized in Table 2. The table reports the unconditional means and standard deviation (i.e. including zero values), hence the individual row means sum to the mean of total consumption. The largest single consumption category is housing (37% of total

expenditure), followed by transport (20%) and food (15%). Summary data for the sub-categories which together comprise these main categories are shown in Tables A1 and A2, which also report unconditional means and standard deviations.

3 Results

3.1 Consumption, Income and Life Satisfaction

Our main interest is in estimating the relationship between consumption and life satisfaction. We estimate the following equation:

$$LS_{i,s,t} = \alpha + \beta_1 log(C)_{i,s,t} + \beta_2 log(Y)_{i,s,t} + \beta_3 \mathbf{X}_{is,t} + \theta_i + \mu_s + \phi_t + \epsilon_{i,s,t} \quad (1)$$

where individual i lives in state s in time period t, $log(C)$ is the natural log of total equivalized annual consumption, log(Y) is the natural log of equivalized annual income, X is a vector of time-varying demographic and socio-economic control and θ, μ and ϕ are individual, state and time fixed effects. The time dimension of our data covers three waves: 2009, 2011 and 2013. In our baseline specification consumption and income enter as their natural logs. However, this functional form itself implies assumptions about the relationship between consumption, income and life satisfaction. Therefore, we also estimate models in which consumption and income enter in levels ($ values) and compare results.

Our main estimates are shown in Table 3. We first illustrate the importance of individual fixed effects in the econometric model. In Columns 1 and 2 we show univariate models (i.e. without any controls or fixed effects) in which life satisfaction is regressed against log income (Column 1) and log consumption (Column 2). In these models the coefficients on log income and log consumption are both positive and statistically significant, and indicate large effects on life satisfaction. However, with the inclusion of individual fixed effects in Columns 3 and 4 the magnitude of the coefficient

on log consumption reduces by one half and the coefficient on log income reduces to only one fifth of its magnitude. The coefficient on log income is also only weakly statistically significant (at the 5% level) in the fixed effects model. Hence controlling for individual level heterogeneity is very important in life satisfaction estimates and may explain why some studies that do not control for individual level heterogeneity return very strong estimated relationships between income and life satisfaction.

Next we show estimates from a series of multivariate models, all with individual fixed effects. When we include both log consumption and log income together (Column 5) we find that the coefficient on log consumption is positive and statistically significant at the 1% level, whereas the coefficient on log income is not statistically significant. The coefficient on log consumption is five times larger than the coefficient on log income. In subsequent columns we add additional controls. With the addition of socio-economic and demographic controls (Column 6) the coefficient on log consumption falls slightly in magnitude and the coefficient on log income remains statistically not significant (we discuss the coefficients on other covariates below). The coefficient on log consumption increases very slightly when we add state of residence and year fixed effects (Column 7).

The coefficient on the log consumption variable in the fullest specification (in Column 7) is 0.084. To evaluate the magnitude of this coefficient we calculate the increase in life satisfaction that is associated with a one standard deviation increase in consumption. The standard deviation of consumption in the sample is 51% of the mean ($15,623 divided by $30,503). Hence, with a coefficient value of 0.084, a 51% increase in total consumption causes a (51 x (0.084/100) = 0.043-unit increase in life satisfaction, or an increase of approximately 5.2% of a standard deviation. We find very similar results from models estimated with level (not log) specifications in Table 4. Columns 1 - 7 of Table 4 present identical specifications to those in Table 3 but with consumption and income entering in levels, in ten thousand dollar units. Without individual fixed effects the coefficients on the consumption and income variables are both large and statistically

significant. As in the previous analysis, inclusion of individual fixed effects greatly reduces the magnitudes and in the case of income also renders the coefficient no longer statistically significant at the 5% level.

When we include both consumption and income in the specification (Column 4) we again find a positive and statistically significant coefficient for consumption but the coefficient on the income variable is not statistically significant. The inclusion of control variables (Column 6) and state and year fixed effects (Column 7) causes the coefficient on consumption to reduce slightly. The coefficient on the consumption variable in Column 7 is 0.020, implying that a one standard deviation increase in consumption (approximately $16,000) increases life satisfaction by 0.032 units, or an increase of approximately 3.8% of a standard deviation. Hence the economic magnitude of the effect of a standard deviation increase in consumption on life satisfaction is similar in the log- and non-log specifications.

While our findings show that the effect of consumption on life satisfaction is much larger than the effect of income, the absolute size of the consumption effect is nevertheless modest compared with the effects of non-economic control variables. The estimates in Table 4 imply that an individual who separates from their spouse / partner experiences a reduction in life satisfaction of 0.23 points. According to our estimates the consumption reduction which would yield the same reduction in life satisfaction is approximately $115,000. A one-unit increase in self-reported health raises life satisfaction by 0.090 points; the consumption equivalent of this is approximately $50,000.

The larger effect of consumption than income on life satisfaction implies the consumption-equivalents of life events in our estimates will be at least five times smaller than the income equivalents. We note that prior studies (e.g., Blanchflower & Oswald, 2004) have necessarily been confined to calculating income equivalents due the non-availability of appropriate consumption data.

3.2 Consumption and Satiation in Life Satisfaction

Next we explore whether satiation occurs in the relationship between consumption and life satisfaction (as has sometimes, but sometimes not, been observed for income: Clark et al. 2008; Diener and Seligman 2004; Lien et al. 2016; Proto and Rustichini 2013; Stevenson and Wolfers 2013). We investigate satiation in the consumption - life satisfaction relationship in two ways. First, we estimate a series of specifications in which consumption enters in polynomials of increasing order (up to a quartic specification). The specification is based upon Equation 1 but with consumption and income entering in levels. Table 5, Columns 1 - 4 shows the polynomial fit estimates. The first column presents a linear specification identical to Column 7 of Table 3. In Columns 2 - 4 the coefficients on some of the quadratic, cubic and quartic terms are statistically significant. In Column 2 the negative coefficient on the quadratic term implies concavity.

However, in these estimates the negative coefficient on the quadratic term is small, implying that life satisfaction plateaus only past $75,000 of equivalized consumption, more than twice the mean of consumption in the sample and higher than the 97th percentile. The coefficients on the cubic and quartic models imply life satisfaction plateaus at even higher values. Given these satiation points are very close to being outside the sample range, we regard this as little evidence for satiation.

Second, in Column 5 we estimate a model in which observations are grouped into quintiles of the consumption distribution and dummy variables for quintile categories are included in the model, with the lowest consumption quintile omitted. Again the model includes individual fixed effects, controls and also state and year fixed effects. The coefficients on the consumption quintile dummies are positive in all but one case are larger for higher quintile values. The coefficient value on the top quintile is significantly larger than the coefficient on the fourth quintile at the 5% level. Overall, therefore, we conclude that our data present no evidence for satiation in consumption.

3.3 Conspicuous and Non-Conspicuous Consumption

Economists have suggested that consumption has a stronger effect on life satisfaction when it is conspicuous to others, i.e., highly visible (Bagwell and Bernheim 1996; Hirsch 1977; Veblen 1899). We investigate this in our data using the detailed information on expenditure in sub-categories of consumption available in the PSID questionnaire. We classify each sub-category as "conspicuous" or "non-conspicuous". We do not have direct information on the visibility of consumption expenditures of PSID respondents. We therefore draw on survey data used by Heffetz (2011), who commissioned a survey of a representative sample of US consumers who were asked to evaluate the visibility of different consumption types[8] .

Respondents to the survey were asked to evaluate 31 consumption categories (which match the categories used in the CE), with results indicating cigarettes to be most visible category of expenditure and, perhaps unsurprisingly, underwear to be the least visible category. The author uses those data to predict income elasticities of consumption, showing that the income elasticity is increasing in visibility, consistent with a model in which consumers gain additional utility from consumption which is conspicuous.

Specifically, we use the Heffetz (2011) ranking matrix of visibility to assign PSID consumption types into two groups. In our baseline classification we classify conspicuous consumption types in the PSID framing as: food away from home, clothing, holidays, recreation / hobbies and expenditure on telephones. Each of these consumption types is in the top half of the ranking used in Heffetz (2011). In additional classifications we examine the sensitivity of results to including home furnishings and

[8]The survey designed by Heffetz (2011) asked respondents to evaluate the visibility of 31 categories of expenditure using the following questions: "Imagine that you meet a new person who lives in a household similar to yours. Imagine that their household is not different from other similar households, except that they like to, and do, spend more than average on [jewelry and watches]. Would you notice this about them, and if so, for how long would you have to have known them, to notice it? Would you notice it almost immediately upon meeting them for the first time, a short while after, a while after, only a long while after, or never?" Answers are used to code a "visibility index", with the 31 categories ranked from most visible to least visible.

schooling as "conspicuous". Depending upon which classification we use, the share of conspicuous consumption among the PSID sample ranges between one quarter to one third of total consumption at the mean.

Table 6 presents estimates of Equation 1 in which the natural log of total conspicuous and non-conspicuous consumption enter separately. The striking result in Column 1 is that when we include both conspicuous and non-conspicuous consumption in the same specification, only the coefficient on conspicuous consumption is statistically significant. Columns 2 and 3 show that, even when the variables are entered separately, the coefficient on non-conspicuous consumption is half the magnitude of that on conspicuous consumption and is statistically significant at only the 5% level. Coefficients on covariates are very similar to those in the baseline specification in Table 3. The coefficient value on conspicuous consumption in Column 1 (0.058) implies that an increase of one standard deviation in conspicuous consumption, which is 77% of the mean, increases life satisfaction by (77 x (0.058 / 100) = 0.045 points, or 5.4% of a standard deviation.

As a sensitivity test, in Table 7 we show results from the same model specifications but with consumption and income entering in levels (in units of ten thousand dollars), not log values. The pattern in the magnitudes and statistical significance of the coefficient estimates is very similar to that in Table 6, with the exception that the coefficient of non-conspicuous consumption fails to reach statistical significance at the 5% level in either specification in which it enters in Table 7.

We further explore the sensitivity of these estimates to alternative definitions of conspicuous and non-conspicuous consumption. Results are presented in Appendix Table A3 (log specification) and Table A4 (level specification). When we change classifications of sub-categories of consumption across groups we see very similar results to those in the main tables. When we include home furnishings in the conspicuous category the coefficient on the conspicuous consumption variable falls in

magnitude and the coefficient on the non-conspicuous consumption variable increases in magnitude. The same occurs to a lesser extent when we also include school expenses in the conspicuous category. In both joint specifications the coefficient on conspicuous consumption is more precisely estimated and larger in magnitude than the coefficients on the non-conspicuous consumption variable.

3.4 Rank of Consumption Effects

Finally, we examined the possibility that effects of consumption on well-being might be due not to the level (or log level) of consumption, but arise instead from the ranked position of consumption relative to that of others. Several studies have found that the relative ranked position of an individual's income within a social comparison group, rather than their income per se, influences their general life satisfaction (e.g., Boyce et al. 2010) as well as their wage satisfaction (Brown et al. 2008). Such results are consistent with a concern for social status (e.g., Anderson et al. 2015; Becker et al. 2005; Frank 2010; Rablen 2008; Robson 2001), and it is therefore plausible that a similar concern with social status might be reflected in the relation between (particularly conspicuous) consumption and well-being.

In additional specifications (not shown) we therefore attempted to examine the relationship between life satisfaction and overall consumption, conspicuous consumption, non-conspicuous consumption (all in both level and log level), and the relative ranked position of each of these variables within the entire sample. However, the degree of collinearity between these variables rendered meaningful analyses impossible. For example, rank of overall consumption is correlated .978 with log overall consumption, and .938 with overall consumption level. For conspicuous consumption, the correlations are .964 and .836 respectively. It is therefore not possible to separate out the effects of consumption and rank of consumption using present data, and hence we do not report the results in detail.

4 Conclusion

This is the first study to use large scale household panel microdata to address the relationship between consumption and well-being. The effect of consumption on well-being is important because it is consumption, not income (or wealth), that determines utility in nearly all economic models. As we show, the relationship between consumption and life satisfaction is much stronger than that between income and life satisfaction. In models with and without covariates, increases in consumption raise life satisfaction while, conditional upon consumption, increases in income leave life satisfaction unchanged.

Our distinction between conspicuous and non-conspicuous consumption differs from the recent emphasis in psychology on the difference between experiential consumption (expenditure on non-permanent activities expected to enhance pleasure and memories) and material consumption (expenditure on tangible objects expected to increase happiness) with the former, but not the latter, leading (along with prosocial spending) to well-being. However, conspicuous consumption may be more visible, and socially engaging, than many types of non-conspicuous consumption (Caprariello and Reis 2013)[9]. Thus conspicuous consumption - as typically considered by economists - will commonly be consumption that is also experiential and/or relational, and on present data it is difficult to distinguish these categories. Here, we have therefore followed the conventional economic approach of distinguishing between conspicuous and non-conspicuous consumption.

We hope that our study will generate new interest in the economic determinants of subjective well-being, with a focus on consumption. Of course, income and wealth are important determinants of well-being through their effects on consumption, and there

[9] Consistent with this, Bruni and Stanca (2008) found that consumption of "relational goods" - those whose production and consumptions involves cooperative interaction with other individuals, such as volunteering, in contrast to activities such as watching television - was associated with higher well-being.

may be additional well-being to be gained from, for example, holding wealth for precautionary reasons. Studies in psychology suggest consumption types may differ in their effects on well-being, with our results showing strong effects from conspicuous consumption. Further research on the effects of different consumption types, including consumption network effects (De Giorgi et al. 2016), could yield new insights into the economic determinants of subjective well-being.

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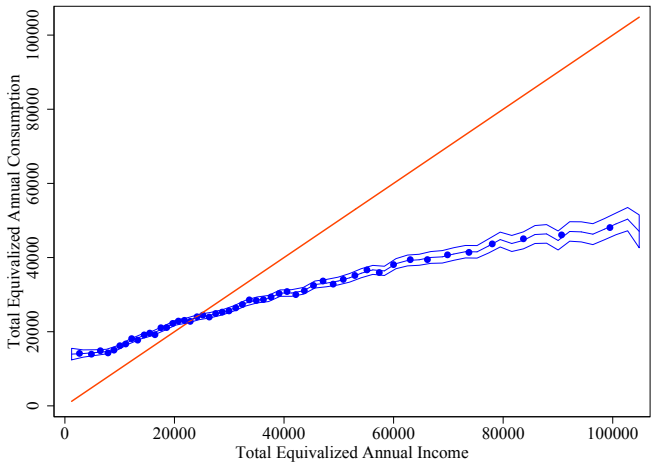
Figure 1: Binned Scatterplot of Consumption and Income, Pooled PSID Sample 2009 - 2013



Notes: Figure illustrates correlation between total equivalized annual consumption (in $) and total equivalised annual income (in $), pooled sample of PSID respondents 2009 - 2013. Blue dots show binned scatterplot (50 equally sized bins) points represent mean income and mean consumption within each bin, joined by local polynomial regression line. Error bars show 95% confidence intervals. 45-degree line in red.

Table 1: Socio-Economic Summary Statistics, Pooled PSID Sample 2009 - 2013

	mean	sd	min	max
Demographics				
Age	46.44	15.12	18	99
Male (= 1)	0.74	0.44	0	1
Single (=1)	0.23	0.42	0	1
Married / Partner (= 1)	0.55	0.50	0	1
Widowed (= 1)	0.04	0.20	0	1
Divorced (= 1)	0.15	0.36	0	1
Separated (= 1)	0.03	0.18	0	1
Number of Dependent Children	0.83	1.16	0	11
Education				
Highschool Graduate (= 1)	0.51	0.50	0	1
College graduate (= 1)	0.25	0.43	0	1
GED (= 1)	0.03	0.18	0	1
Employment				
Employed (= 1)	0.72	0.45	0	1
Temporarily Non-Working (= 1)	0.01	0.07	0	1
Unemployed (= 1)	0.07	0.25	0	1
Retired (= 1)	0.14	0.34	0	1
Disabled (=1)	0.04	0.19	0	1
Housing Status				
Owns Home (=1)	0.61	0.49	0	1
Rents Home (=1)	0.35	0.48	0	1
Health				
Self-Reported Health (1-5)	3.54	1.02	1	5
Mental Anxiety Scale	3.74	3.21	0	24
Life Satisfaction				
Life Satisfaction	3.82	0.83	1	5
Annual Income				
Income	44503.73	32550.29	1298	217369
Observations	16992			

Notes: Table reports summary data for all PSID main respondents, pooled waves 2009 - 2013. Education refers to highest educational qualification obtained by the respondent. Employment refers to current employment status. Self-reported health question in full is: 'Would you say your health in general is excellent, very good, good, fair, or poor?' We code excellent = 5, poor = 1. Mental Anxiety Scale is derived from respones to the Kessler-6 non-specific psychological distress scale.

Table 2: Equivalized Consumption Summary Statistics, Pooled PSID Sample 2009 - 2013

	mean	sd
Consumption	30502.72	15622.62
Food	4612.68	2721.43
Housing	11213.41	6837.04
Utilities	1779.04	1230.47
Transport	5985.58	5404.21
School	1262.40	4769.80
Childcare	603.44	2309.02
Healthcare	1979.53	2553.52
Home Repairs	855.77	2341.88
Home Furnishings	606.11	1331.32
Clothing	866.45	1251.27
Holidays	981.82	1790.16
Hobbies	520.48	1139.12
Observations	16992	

Notes: Tables report summary statistics for categories of consumption based on questions in PSID main questionnaire. Table reports unconditional mean values (including observations taking a value of zero). For details on construction of consumption values see PSID Technical Documentation and User Notes 1999 - 2013.

Table 3: Regression Estimates: Life Satisfaction, Log Income and Log Consumption, PSID Sample 2009 - 2013

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Consumption		0.212***		0.103***	0.098***	0.083***	0.084***
		(0.012)		(0.019)	(0.020)	(0.020)	(0.020)
Log Income	0.176***		0.033*		0.018	0.009	0.015
	(0.008)		(0.015)		(0.015)	(0.015)	(0.015)
Demographics							
Age						0.027	-0.029
						(0.027)	(0.035)
Age Squared						-0.000	0.000
						(0.001)	(0.001)
Age Cubed						0.000	-0.000
						(0.000)	(0.000)
Married / Partner (= 1)						0.103*	0.094
						(0.058)	(0.059)
Widowed (= 1)						0.105	0.071
						(0.126)	(0.127)
Divorced (= 1)						0.015	-0.004
						(0.076)	(0.076)
Separated (= 1)						-0.230***	-0.239***
						(0.079)	(0.079)
Number of Dependent Children						0.037***	0.041***
						(0.013)	(0.013)
Education							
Highschool Graduate (= 1)						0.109*	0.096*
						(0.055)	(0.055)
College graduate (= 1)						0.048	0.059
						(0.064)	(0.064)
GED (= 1)						0.050	0.036
						(0.116)	(0.115)
Employment Status							
Employed (= 1)						0.006	0.003
						(0.027)	(0.027)
Unemployed (= 1)						-0.154***	-0.158***
						(0.034)	(0.034)
Temporarily Non-Working (= 1)						-0.036	-0.035
						(0.085)	(0.085)
Housing Status							
Owns Home (=1)						0.046	0.041
						(0.043)	(0.043)
Rents Home (=1)						0.036	0.033
						(0.038)	(0.039)
Health							
Self-Reported Health (1-5)						0.090***	0.089***
						(0.009)	(0.009)
Mental Anxiety Scale						-0.017***	-0.021***
						(0.002)	(0.002)
R-squared	0.028	0.019	0.000	0.003	0.003	0.035	0.043
Observations	16992	16992	16992	16992	16992	16992	16992
Individual Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	No	No	No	No	No	No	Yes
Year Fixed Effects	No	No	No	No	No	No	Yes

Notes: Table reports regression estimates for balanced sample PSID panel 2009 -2013. Columns 1 and 2 are pooled cross-section regressions, Columns 3 - 7 include individual fixed effects.

Table 4: Regression Estimates: Life Satisfaction, Income and Consumption (in $), PSID Sample 2009 - 2013

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Consumption		0.066***		0.026***	0.025***	0.020***	0.020***
		(0.004)		(0.006)	(0.006)	(0.006)	(0.006)
Income	0.039***		0.006		0.003	0.001	0.003
	(0.002)		(0.004)		(0.004)	(0.004)	(0.004)
Demographics							
Age						0.031	-0.024
						(0.027)	(0.035)
Age Squared						-0.000	-0.000
						(0.001)	(0.001)
Age Cubed						0.000	0.000
						(0.000)	(0.000)
Married / Partner (= 1)						0.102*	0.093
						(0.059)	(0.059)
Widowed (= 1)						0.110	0.076
						(0.126)	(0.127)
Divorced (= 1)						0.015	-0.004
						(0.076)	(0.076)
Separated (= 1)						-0.228***	-0.237***
						(0.079)	(0.079)
Number of Dependent Children						0.033**	0.038***
						(0.013)	(0.013)
Education							
Highschool Graduate (= 1)						0.111*	0.099*
						(0.055)	(0.055)
College graduate (= 1)						0.050	0.060
						(0.064)	(0.065)
GED (= 1)						0.047	0.035
						(0.116)	(0.116)
Employment Status							
Employed (= 1)						0.010	0.007
						(0.027)	(0.027)
Unemployed (= 1)						-0.154***	-0.157***
						(0.034)	(0.034)
Temporarily Non-Working (= 1)						-0.030	-0.030
						(0.085)	(0.085)
Housing Status							
Owns Home (=1)						0.064	0.061
						(0.042)	(0.043)
Rents Home (=1)						0.051	0.048
						(0.038)	(0.038)
Health							
Self-Reported Health (1-5)						0.090***	0.089***
						(0.009)	(0.009)
Mental Anxiety Scale						-0.017***	-0.021***
						(0.002)	(0.002)
R-squared	0.023	0.015	0.000	0.002	0.002	0.034	0.042
Observations	16992	16992	16992	16992	16992	16992	16992
Individual Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	No	No	No	No	No	No	Yes
Year Fixed Effects	No	No	No	No	No	No	Yes

Notes: Table reports regression estimates for balanced sample PSID panel 2009 -2013. Columns 1 and 2 are pooled cross-section regressions, Columns 3 - 7 include individual fixed effects.

Table 5: Fixed Effects Regression Estimates: Life Satisfaction, Polynomial and Categorical Consumption Specifications, PSID Sample 2009 - 2013

	(1)	(2)	(3)	(4)	(5)
Polynomials					
Consumption	0.020***	0.066***	0.116**	0.311***	
	(0.006)	(0.019)	(0.045)	(0.094)	
Consumption ^{2}		-0.005**	-0.019*	-0.103***	
		(0.002)	(0.011)	(0.037)	
Consumption ^{3}			0.001	0.015**	
			(0.001)	(0.006)	
Consumption ^{4}				-0.001**	
				(0.000)	
Quintile Groups					
Consumption Quintile 2					0.054**
					(0.022)
Consumption Quintile 3					0.089***
					(0.024)
Consumption Quintile 4					0.076***
					(0.027)
Consumption Quintile 5					0.099***
					(0.030)
R-squared	0.042	0.043	0.043	0.043	0.042
Observations	16992	16992	16992	16992	16992
Controls	Yes	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes

Notes: Table reports individual fixed effects regression estimates for balanced PSID panel 2009 -2013. Columns (1) to (4) show results from models with linear, quadratic, cubic and quartic specifications of total consumption. Column (5) shows results from a model in which observations are binned into quintiles of the consumption distribution, with a categorical variable indicating each bin (omitted group is lowest quintile). Education refers to highest educational qualification obtained by the respondent. Employment refers to current employment status. Self-reported health question in full is: 'Would you say your health in general is excellent, very good, good, fair, or poor?' We code excellent = 5, poor = 1. Mental Anxiety Scale is derived from responses to the Kessler-6 non-specific psychological distress scale.

Table 6: Fixed Effects Regression Estimates: Life Satisfaction, Conspicuous and Non-Conspicuous Consumption, PSID Sample 2009 - 2013

	(1)	(2)	(3)
Log Conspicuous Consumption	0.058***	0.061***	
	(0.013)	(0.013)	
Log Non-Conspicuous Consumption	0.023		0.033*
	(0.014)		(0.014)
Log Income	0.011	0.014	0.020
	(0.015)	(0.015)	(0.015)
Demographics			
Age	-0.026	-0.025	-0.026
	(0.035)	(0.035)	(0.035)
Age Squared	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)
Age Cubed	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Married / Partner (= 1)	0.093	0.093	0.092
	(0.059)	(0.059)	(0.059)
Widowed (= 1)	0.065	0.067	0.071
	(0.127)	(0.127)	(0.127)
Divorced (= 1)	-0.006	-0.006	-0.005
	(0.076)	(0.076)	(0.076)
Separated (= 1)	-0.240***	-0.239***	-0.238***
	(0.079)	(0.079)	(0.079)
Number of Dependent Children	0.041***	0.040***	0.036***
	(0.013)	(0.013)	(0.013)
Education			
Highschool Graduate (= 1)	0.098*	0.099*	0.097*
	(0.055)	(0.055)	(0.055)
College graduate (= 1)	0.058	0.060	0.060
	(0.064)	(0.064)	(0.065)
GED (= 1)	0.038	0.036	0.033
	(0.115)	(0.115)	(0.116)
Employment Status			
Employed (= 1)	0.002	0.003	0.004
	(0.027)	(0.027)	(0.027)
Unemployed (= 1)	-0.158***	-0.159***	-0.159***
	(0.034)	(0.034)	(0.034)
Temporarily Non-Working (= 1)	-0.032	-0.030	-0.033
	(0.085)	(0.085)	(0.085)
Health			
Self-Reported Health (1-5)	0.088***	0.088***	0.089***
	(0.009)	(0.009)	(0.009)
Mental Anxiety Scale	-0.021***	-0.021***	-0.021***
	(0.002)	(0.002)	(0.002)
R-squared	0.043	0.043	0.042
Observations	16992	16992	16992
Individual Fixed Effects	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes

Notes: Table reports individual fixed effects regression estimates for balanced PSID panel 2009 -2013. For categorisation of consumption components into 'conspicuous' and 'non-conspicuous' consumption groups see main text. Control variables not shown: housing tenure dummies.

Table 7: Fixed Effects Regression Estimates: Life Satisfaction, Conspicuous and Non-Conspicuous Consumption, (in $) PSID Sample 2009 - 2013

	(1)	(2)	(3)
Conspicuous Consumption	0.058***	0.060***	
	(0.022)	(0.022)	
Non-Conspicuous Consumption	0.011		0.013
	(0.009)		(0.009)
Income	0.002	0.003	0.004
	(0.004)	(0.004)	(0.004)
Demographics			
Age	-0.022	-0.022	-0.022
	(0.035)	(0.035)	(0.035)
Age Squared	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)
Age Cubed	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Married / Partner (= 1)	0.093	0.092	0.092
	(0.059)	(0.059)	(0.059)
Widowed (= 1)	0.076	0.077	0.076
	(0.127)	(0.127)	(0.127)
Divorced (= 1)	-0.006	-0.007	-0.005
	(0.076)	(0.076)	(0.076)
Separated (= 1)	-0.239***	-0.239***	-0.237***
	(0.079)	(0.079)	(0.079)
Number of Dependent Children	0.036***	0.036***	0.034**
	(0.013)	(0.013)	(0.013)
Education			
Highschool Graduate (= 1)	0.099*	0.099*	0.098*
	(0.055)	(0.055)	(0.055)
College graduate (= 1)	0.060	0.061	0.062
	(0.065)	(0.065)	(0.065)
GED (= 1)	0.038	0.036	0.033
	(0.116)	(0.116)	(0.116)
Employment Status			
Employed (= 1)	0.006	0.007	0.007
	(0.027)	(0.027)	(0.027)
Unemployed (= 1)	-0.159***	-0.159***	-0.159***
	(0.034)	(0.034)	(0.034)
Temporarily Non-Working (= 1)	-0.029	-0.029	-0.029
	(0.085)	(0.085)	(0.085)
Health			
Self-Reported Health (1-5)	0.089***	0.089***	0.089***
	(0.009)	(0.009)	(0.009)
Mental Anxiety Scale	-0.021***	-0.021***	-0.021***
	(0.002)	(0.002)	(0.002)
R-squared	0.042	0.042	0.041
Observations	16992	16992	16992
Individual Fixed Effects	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes

Notes: Table reports individual fixed effects regression estimates for balanced PSID panel 2009 -2013. For categorisation of consumption components into 'conspicuous' and 'non-conspicuous' consumption groups see main text. Education refers to highest educational qualification obtained by the respondent. Control variables not shown: housing tenure dummies.

Table A1: Detailed Consumption Summary Statistics (1), Pooled PSID Sample 2009 - 2013

	mean	sd
Food		
Food (Total)	4612.68	2721.43
Food at Home	3203.79	1951.93
Food Away From Home	1336.65	1454.85
Food Delivered	74.42	358.49
Housing		
Housing (Total)	11213.41	6837.04
Mortgage Payments	3271.89	4839.36
Rent Payments	2056.56	3557.82
Property Tax	964.31	1543.04
Home Insurance	365.19	492.63
Utilities		
Utilities (Total)	1779.04	1230.47
Heating	454.47	714.87
Electricity	769.82	692.12
Water	315.73	533.79
Other Utilities	19.72	170.45
Telecomms	1465.46	907.01
Transport		
Transport (Total)	5985.58	5404.21
Car Loan Payments	761.72	1551.14
Car Down Payment	628.07	2570.44
Car Lease Payments	106.37	740.82
Car Insurance	930.50	814.03
Car - Other Costs	803.38	1808.16
Gasoline	1563.09	1514.29
Car Repairs	1059.07	2850.26
Parking and Carpool	30.48	294.17
Bus and Train Fares	59.86	275.09
Taxi Fares	21.51	168.45
Transport - Other Costs	62.08	683.67
Observations	16992	

Notes: Tables report summary statistics for sub-categories of consumption based on questions in PSID main questionnaire. Table reports unconditional mean values (including observations taking a value of zero). For details on construction of consumption values see PSID Technical Documentation and User Notes 1999 - 2013.

Table A2: Detailed Consumption Summary Statistics (2), Pooled PSID Sample 2009 - 2013

	mean	sd
School		
School (Total)	1262.40	4769.80
Childcare		
Childcare (Total)	603.44	2309.02
Healthcare		
Healthcare (Total)	1979.53	2553.52
Hospital Fees	202.65	1001.61
Doctor Fees	420.68	887.15
Prescription Fees	268.62	542.62
Health Insurance	1087.76	1620.07
Home Repairs		
Home Repairs (Total)	855.77	2341.88
Home Furnishings		
Home Furnishings (Total)	606.11	1331.32
Clothing		
Clothing (Total)	866.45	1251.27
Holidays		
Trips and Vacations (Total)	981.82	1790.16
Hobbies		
Other Recreation (Total)	520.48	1139.12
Observations	16992	

Notes: Tables report summary statistics for sub-categories of consumption based on questions in PSID main questionnaire. Table reports unconditional mean values (including observations taking a value of zero). For details on construction of consumption values see PSID Technical Documentation and User Notes 1999 - 2013.

Table A3: Fixed Effects Regression Estimates: Life Satisfaction, Log Conspicuous and Log Non-Conspicuous Consumption, Alternative Definitions. PSID Sample 2009 - 2013

	(1)	(2)	(3)	(4)	(5)	(6)
Log Conspicuous Incl Furnishings	0.035***	0.037***				
	(0.009)	(0.009)				
Log Non-Conspicuous Excl Furnishings	0.029*		0.038**			
	(0.015)		(0.015)			
Log Conspicuous Incl Furnishings + School				0.039***	0.042***	
				(0.012)	(0.011)	
Log Non-Conspicuous Excl Furnishings + School				0.024*		0.031*
				(0.014)		(0.014)
R-squared	0.043	0.043	0.042	0.043	0.042	0.042
Observations	16992	16992	16992	16992	16992	16992
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table reports individual fixed effects regression estimates for balanced PSID panel 2009 -2013. For categorisation of consumption components into 'conspicuous' and 'non-conspicuous' consumption groups see main text. Education refers to highest educational qualification obtained by the respondent. Employment refers to current employment status. Self-reported health question in full is: 'Would you say your health in general is excellent, very good, good, fair, or poor?' We code excellent = 5, poor = 1. Mental Anxiety Scale is derived from responses to the Kessler-6 non-specific psychological distress scale.

Table A4: Fixed Effects Regression Estimates: Life Satisfaction, Conspicuous and on-Conspicuous Consumption (in $), Alternative Definitions. PSID Sample 2009 - 2013

	(1)	(2)	(3)	(4)	(5)	(6)
Conspic Incl Furnishings	0.038*	0.040*				
	(0.020)	(0.020)				
Non-Conspic Excl Furnishings	0.013		0.014*			
	(0.008)		(0.008)			
Conspic Incl Furnishings + School				0.024*	0.025*	
				(0.012)	(0.012)	
Non-Conspic Excl Furnishings + School				0.012		0.013
				(0.009)		(0.009)
R-squared	0.042	0.042	0.041	0.042	0.042	0.041
Observations	16992	16992	16992	16992	16992	16992
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table reports individual fixed effects regression estimates for balanced PSID panel 2009 -2013. For categorisation of consumption components into 'conspicuous' and 'non-conspicuous' consumption groups see main text. Education refers to highest educational qualification obtained by the respondent. Employment refers to current employment status. Self-reported health question in full is: 'Would you say your health in general is excellent, very good, good, fair, or poor?' We code excellent = 5, poor = 1. Mental Anxiety Scale is derived from responses to the Kessler-6 non-specific psychological distress scale.