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RÉSUMÉ

of

Tamás Hajdu

Essays on the Relationship of Subjective Well-Being and Material Welfare: Income, Consumption and Inequality

Ph.D. dissertation

Supervisor:

Dr. Éva Berde

associate professor

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Department of Microeconomics

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Contents

1. Introduction

This dissertation is a collection of essays that address the relationship of experienced utility and material welfare.

Chapter 2 reviews the notion of subjective well-being and the methods are used to measure subjective well-being.

In Chapter 3 I analyze the association between subjective well-being and income. I examine whether quantile regression and generalized ordered probit model yield different results and conclusion as compared to standard OLS regression and ordered probit model. I demonstrate that these more flexible techniques provide a more complete picture of the income-satisfaction relationship than standard models.

In Chapter 4 I analyze the association of experiential and material expenditures with subjective well-being. The conventional method to measure the effect of experiences and material things on subjective well-being is the laboratory experiment. It has several limitations (small sample; underrating the effect of material purchases because of the stigmatizing effect of materialism; direct question; all experiments in the US). I try to avoid the drawbacks of the usual experimental procedure, so I use survey data and separate questions about life satisfaction and expenditures. I estimate the association of expenditures with life satisfaction using linear and non-linear models. I show that marginal effect of material expenditures is diminishing, whereas marginal effect of experiential expenditures is constant. It means that, ceteris paribus, a reallocation of the expenditures might increase individuals' well-being.

In Chapter 5 using four waves of the European Social Survey, I analyze the association of reduction of income inequality by governmental taxes and transfers (redistribution) with subjective well-being. The novelty of this chapter is that it is the first to estimate the effect of inequality and the reduction of inequality simultaneously, not limited to an individual country, but using data from several European countries. My results corroborate the findings of previous literature that – controlling for personal characteristics of the respondents, GDP, unemployment and inflation rate, country fixed effects and year fixed effects – people in Europe are negatively affected by income inequality, whereas provide new evidence that inequality reduction has a positive impact on well-being.

2. The Indicators of Subjective Well-Being

2.1. Subjective Well-being

There are several indicators of individual and societal well-being. Beside objective social and economic measures subjective well-being indicators provide useful information about quality of life. These indicators reflect people own evaluations, preferences, norms, and values [Diener et al., 2009]. The recent OECD guidelines on measuring subjective well-being defines subjective well-being as "good mental states, including all of the various evaluations, positive and negative, that people make of their lives, and the affective reactions of people to their experiences" [OECD, 2013, p. 29.].

In the literature subjective well-being indicators are often viewed as measures of experienced utility. Jeremy Bentham [1988] in The Principles of Morals and Legislation (originally published in 1789) stated that choices and acts of people are determined by pleasure and pain. As used by Bentham, utility was the property of an object or action to increase happiness and pleasure or decrease pain and unhappiness. Bentham and his "followers" thought that utility is measurable (see e.g. Edgeworth's hedonimeter [Colander, 2007]). This notion of utility is called experienced utility by Kahneman, Wakker and Sarin [1997]. In contrast to this interpretation other scholars argue that subjective well-being is only one (although primarily important) argument in the utility function [Becker & Rayo, 2008; Benjamin et al., 2012; Clark et al., 2008; Loewenstein & Ubel, 2008].

2.2. Measurement, Validity, and Reliability

Several methods are used to measure subjective well-being. The Experience Sampling Method (ESM) collects information on the subjective experiences of individuals in real time using an electronic device [Csikszentmihalyi & Larson, 1987; Csikszentmihalyi et al., 1977]. A less costly form of this type of data collection is the Day Reconstruction Method (DRM) vezet [Kahneman et al., 2004]. In DRM respondents fill out a diary of the previous day that summarizes the episodes that occurred in that day. Then they describe how they felt during each episode on various affect dimensions. The Satisfaction With Life Scale (SWLS) focused to assess global life satisfaction [Diener et al., 1985]. SWLS is a five-item scale, each item is scored from 1 to 7, so the range of the scale is from 5 (low satisfaction level) to 35 (high satisfaction level). Single-item indicators are the most popular ones in the empirical well-

being literature.[1] In these questions individuals are asked about their life satisfaction or happiness in general. The former one is an evaluative judgement about one's life, whereas the latter one is more affective.

Several empirical studies pointed out that the subjective well-being indicators are valid and reliable enough to provide information about individual's well-being. Self-reported well-being indicators are correlated moderately with ratings of one's happiness/satisfaction made by friends and relatives [Sandvik et al., 1993; Schneider & Schimmack, 2009]. Subjective well-being indicators are associated with other measures of well-being that are not based on self-report (e.g. smiling, sleep quality, health, suicide) [Frey & Stutzer, 2002a; Kahneman & Krueger, 2006]. In an interesting study participants were exposed to common cold virus [Cohen et al., 2003]. The researcher found that happier individuals had greater resistance to developing a common cold. Moreover, subjective well-being indicators seem to be sufficiently reliable [Diener et al., 2009; Krueger & Schkade, 2008].

[1] For example in European Social Survey the subjective well-being question runs as follows: "All things considered, how satisfied are you with your life as a whole nowadays? Please answer using this card, where 0 means extremely dissatisfied and 10 means extremely satisfied."

3. Income and Subjective Well-Being: How Important is the Methodology?

One of the most important topics of papers on subjective well-being is the relationship between satisfaction and income. Since in subjective well-being research people are often asked about their life satisfaction on a scale with limited answer categories, the most frequently used methods to assess the income-satisfaction relationship are either OLS regression or ordered logit/probit models depending on the well-being measure is assumed to be cardinal or ordinal. The overall conclusion of the literature is that material welfare has a positive but moderate effect on subjective well-being. In this chapter I compare the results of the various models, and I examine whether different methods lead to different conclusions on the association between life satisfaction and income. Specifically, I compare the results of OLS regression with quantile regression, and ordered probit model with generalized ordered probit model.

3.1. Literature review

Papers on income and subjective well-being using cross-sectional data have found positive, but mostly moderate correlation at individual level. Pioneering studies showed that individuals with higher income report higher level of happiness than those with lower income [Easterlin, 1974] and more recent papers found similar results as well; e.g. in the USA those with high family income (over 90,000 USD) were almost twice as likely to be "very happy" than those with low household income (below 20,000 USD) [Kahneman et al., 2006].

Despite the positive association between income and well-being, moving up on the income ladder the effect of income seems to weaken. In other words, the relationship between well-being and income is non-linear; the marginal utility of income is declining [Layard et al., 2008]. A survey from the USA showed that between 1994 and 1996 within the bottom five income deciles doubling income had twice as strong impact on happiness than within the top five deciles [Frey & Stutzer, 2002b]. However, recent papers usign richer data sets from several countries conclude that the positive association between income and happiness is constat: income increases happiness about the same amount among the poor and among the rich as well [Stevenson & Wolfers, 2008, 2013].

There are only a few papers that use quantile regression or generalized ordered probit/logit models. Binder and Coad [2011] on data from the British Household Panel Survey for the year 2006 applied quantile regressions to show that income is positively associated with life satisfaction, however, the effect was stronger at the lower end of the satisfaction

distribution, but was insignificant for the most satisfied. Mentzakis and Moro [2009] analysed data from eight waves of the BHPS using a generalised ordered probit model. They found that income buys-off unhappiness, but paradoxically, high income decreases the probability of reporting the highest level of well-being. Using data from the German Socio-Economic Panel for the years 1984–2004, and applying standard ordered probit and generalized ordered probit model, Boes and Winkelmann [2010] investigated the relationship between income and life satisfaction. They found that , contrary to the standard ordered probit model, the generalized ordered probit model suggests that income has no effect on high satisfaction but significantly reduces dissatisfaction for men –, whereas for women the effect of income is even weaker.

3.2. OLS- versus quantile regression

In the OLS regression the estimated linear relationship fits the conditional mean of the dependent variable. In this way we obtain the average effects of the independent variables. However, this means also that we get an incomplete picture about the relationship between the dependent variable and the independent variables, since OLS focuses on the conditional mean of the dependent variable.

Quantile regression provides a more complete picture: we can estimate the effects of the explanatory variables at different quantiles of the conditional distribution of the dependent variable. Comparing the estimated coefficients we can answer the question whether the relationship estimated by OLS regression prevails at other parts of the conditional distribution of the dependent variable.

Just as OLS, quantile regression fits a linear model, but the estimated coefficient vector minimizes the asymmetric weighted sum of absolute deviations, instead of the sum of squared residuals. The weights are determined by the given quantile ($0 \leq \tau \leq 1$).

$$\min \sum_{i=1}^{n} \rho_\tau \left| \hat{\varepsilon}_i \right| = \sum_{i=1}^{n} \rho_\tau \left| y_i - \hat{y}_i \right| = \sum_{i=1}^{n} \rho_\tau \left| y_i - \hat{\beta} x_i \right| =$$

$$= \tau \cdot \sum_{y_i \geq \hat{\beta}_\tau x_i} \left| y_i - \hat{\beta}_\tau x_i \right| + (1-\tau) \cdot \sum_{y_i < \hat{\beta}_\tau x_i} \left| y_i - \hat{\beta}_\tau x_i \right|$$

In this way, we get the slopes (β_τ) of the linear relationship between the dependent variable and the independent variables along the entire conditional distribution [Angrist & Pischke, 2009; Koenker & Hallock, 2001].

3.3. Ordered probit versus generalized ordered probit

Ordered probit assumes an underlying continuous dependent variable (y^*) which is related linearly to the independent variables (x). This latent dependent variable – in our case subjective well-being – cannot be observed, instead well-being data are available in ordinal categories ($y = 1, 2, \ldots, J$), since respondents answer the question about their satisfaction on a J-point scale. Assuming J answer categories the observed satisfactions are the following:

$$y_i = j \quad if \quad \gamma_{j-1} \le y_i^* < \gamma_j$$

where j runs from 1 to J, $\gamma_{j-1} < \gamma_j$, $\gamma_0 = -\infty$ and $\gamma_J = \infty$.

The probability of observing $y = j$ for given values of the independent variables is the following:

$$\Pr(y_i = j|x_i) = \Pr(\gamma_{j-1} \le y_i^* < \gamma_j|x_i) = \Pr(y_i^* < \gamma_j|x_i) - \Pr(y_i^* < \gamma_{j-1}|x_i) =$$
$$= F(\gamma_j - \beta x_i) - F(\gamma_{j-1} - \beta x_i)$$

where F is standard normal cdf.

Merely knowing the magnitude of β is not informative about the effect of the independent variables on the change of the probabilities of observing $y = j$. Assuming that β is positive, we only know that an increase in variable x decreases the probability of being in the lowest category, while the probability of being in the highest category must increase [Greene & Hensher, 2010]. We need further calculation to get the predicted change of the probabilities being in a particular category. Marginal probability effects (MPE) are the partial effects of the independent variables on the outcome probability.

$$MPE_j(x_i) = \frac{\partial \Pr(y_i = j|x_i)}{\partial x_i} = \left[f(\gamma_{j-1} - \beta x_i) - f(\gamma_j - \beta x_i)\right] \cdot \beta$$

where f normal probability density function.

In the ordered probit model there is an implicit assumption called parallel regression assumption [Greene & Hensher, 2010; Winkelmann & Boes, 2006]. Using the probabilities of the particular outcomes we can compute cumulative probabilities, i.e. the probabilities of $y \le j$:

$$\Pr(y_i \le j|x_i) = \Pr(y_i = 1|x_i) + \ldots + \Pr(y_i = j|x_i) = F(\gamma_j - \beta x_i)$$

In this way we can define $J - 1$ cumulative probabilities[2], and we can define $J - 1$ binary probit model. If we look at these probit models we can see that the slope coefficients (β) are identical across each regression. This means that the ordered probit model is equivalent to $J - 1$ binary probit regressions where the β coefficients are equal for each equation, and only the constants are different.

The second interesting feature of the ordered probit model is that marginal probability effects change sign exactly once moving stepwise from the first to the last outcome (single crossing property) [Boes & Winkelmann, 2006; Winkelmann & Boes, 2006].

Boes–Winkelmann [2006] and Winkelmann–Boes [2006] also note that for any two explanatory variables (x_i^a and x_i^b) the ratio of the marginal probability effects are constant irrespectively of the outcome category (j):

$$\frac{MPE_j\left(x_i^a\right)}{MPE_j\left(x_i^b\right)} = \frac{\left[f\left(\gamma_{j-1} - \beta x_i\right) - f\left(\gamma_j - \beta x_i\right)\right] \cdot \beta^a}{\left[f\left(\gamma_{j-1} - \beta x_i\right) - f\left(\gamma_j - \beta x_i\right)\right] \cdot \beta^b} = \frac{\beta^a}{\beta^b}$$

where β is the coefficient vector of the covariates, whereas β^a and β^b are the coefficients of the variables x^a and x^b.

These limitations of the standard ordered probit model (parallel regression assumption, single crossing property, constant relative marginal probability effects) can be relaxed using generalized ordered probit model [Boes & Winkelmann, 2006; Greene & Hensher, 2010; Winkelmann & Boes, 2006], which allows for different coefficients across outcomes. For some explanatory variables (z) we can estimate $J - 1$ parameters (α), while we can maintain the assumptions of the standard model for other explanatory variables (x). In this case the probabilities of observing the outcomes $y = j$ are the following:

$$\Pr\left(y = j | x, z\right) = F\left(\gamma_j - \alpha_j z - \beta x\right) - F\left(\gamma_{j-1} - \alpha_{j-1} z - \beta x\right)$$

Since α_j varies across outcomes, the generalized model is much more flexible than the standard model, and relaxes the parallel regression assumption. Moreover, the relative marginal probability effects no longer needs to be constant and the sign of the marginal probability effects can change more than once moving from the lowest outcome category to the highest.

[2] Since $\Pr\left(y_i \le J | x_i\right) = 1$.

3.4. Data

I use data from the TÁRKI Household Monitor for the year 2007. The database contains 3 653 individual questionnaires from 2 024 households and it is representative for the 16 years old or older population with respect to socio-demographic characteristics such as age, sex, types of settlement and education.

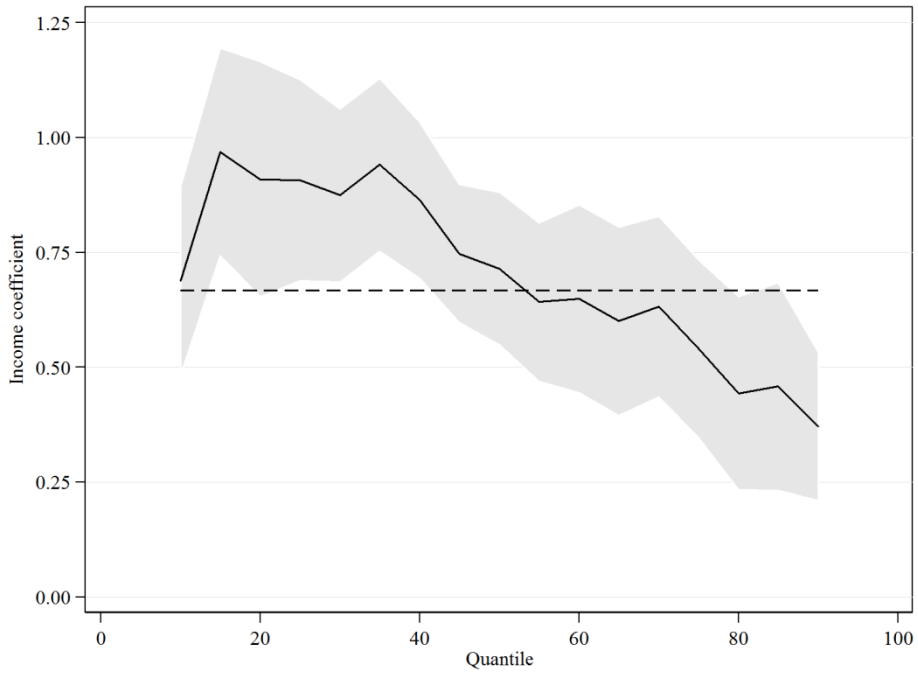
Subjective well-being is measured with a single-item question on an 11-point scale (0 – not satisfied at all, 10 – fully satisfied): "All things together, how satisfied are you with your life?" Scores of 0–2 were collapsed into a single score due to the small number of observations, thus our satisfaction variable has nine categories (on a scale from 0 to 8). Income is measured as equivalent income (using the original OECD equivalence scale), and included in the models in logarithmic form. Individuals in the lowest and highest 1 percent of the equivalent income distribution are excluded from the analysis, since their income data are considered as unreliable.

3.5. Results

First I analyze the association between income and life satisfaction using OLS regression. Equivalent household income has a positive and highly significant association with life satisfaction (0.668; se=0.099). Individuals with higher income tend to report higher satisfaction. A 10 percent increase in income would be associated with a 0.06 point increase in life satisfaction.

To assess the relationship at different part of the conditional distribution we need to look at the results of quantile regressions. In Figure 1 I plot the income coefficients and their confidence intervals for every 5th percentile from 10 to 90. The solid line depicts the quantile regression coefficients, the grey-shaded area depicts the 95 percent confidence intervals, whereas the dashed line shows the OLS estimate. In the upper part of the conditional life satisfaction distribution the quantile regression coefficients tend to be lower than the OLS coefficient, whereas in the lower quantiles the quantile coefficients tend to be higher.

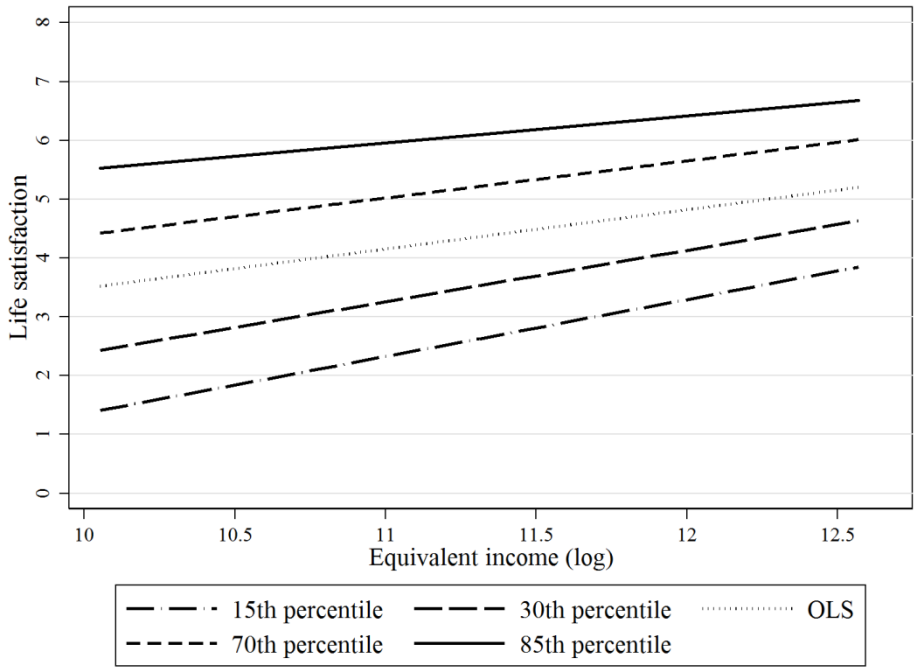
Figure 1.
The estimated income coefficients



Note: The solid line depicts the quantile regression coefficients of income. The grey-shaded area depicts the 95 percent confidence intervals of the quantile coefficients. The dashed line depicts the OLS estimate.

As Angrist and Pischke [2009] emphasize, the results of quantile regressions tell us about the effects on distribution, not on individuals. This means that the result can be illustrated in the most effective way by Figure 2, where I depict how life satisfaction changes as we move from the lowest up to the highest income. Figure 2 shows the estimated association of income and life satisfaction at the 15^{th}, 30^{th}, 70^{th}, 85^{th} quantiles, and at the mean (OLS). The graph gives a good illustration of how the distribution of life satisfaction changes as income increases. We can see that the slopes at the lower quantiles are steeper than at the higher quantiles. It results in a less wide satisfaction distribution at the higher income levels, and the average satisfaction increases with higher income.

Figure 2.
The association of income and life satisfaction at different parts of the conditional life satisfaction distribution



Summing up, OLS regression predicts a positive association between income and life satisfaction, however, quantile regressions show that this relationship is more complex, not uniform along the entire conditional satisfaction distribution. The least satisfied individuals among the rich are more satisfied than the least satisfied individuals among the poor, while the satisfaction level of the most satisfied individuals among the rich and among the poor is fairly similar. In other words, higher income reduces unhappiness but one can be fairly satisfied without high income as well.

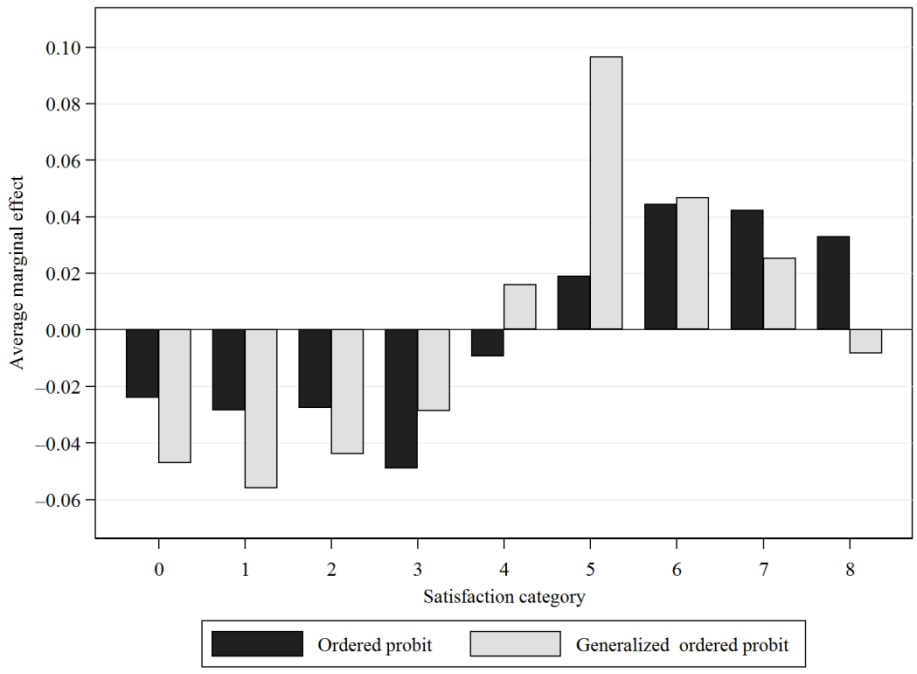
Running a standard ordered probit model I find a positive and strongly significant parameter (0.404, se=0.062) as in the OLS regression. The positive coefficient means that an increase in income decreases the probability of being in the lowest satisfaction category, while the probability of being in the highest satisfaction category increases. In the generalized ordered probit model I allow for different income coefficients across outcomes, but I maintain the assumptions of the standard model for the other explanatory variables. Since life satisfaction has nine categories, I get eight separate income parameters. The estimated coefficients considerably differ across the satisfaction categories, which means that I can reject the hypothesis of equal income coefficients. The income coefficients are higher for the lowest satisfaction categories than the estimate in the standard model (e.g. for the first category the income coefficient is 0.797, se=0.137), while are lower for the highest

categories. Moving toward the highest satisfaction categories the estimated coefficient decreases and finally turns negative (for the last category the income coefficient is −0.105, se=0.112); for the two highest categories they become statistically insignificant.

Since the estimated coefficients in themselves provide limited information about the income-satisfaction relationship, we need to look at the average marginal probability effects. Figure 3 shows the estimated average marginal probability effects of the standard ordered probit model and the generalized ordered probit model. Each column show the effect of 1 percent increase in income on the probability of reporting a given satisfaction category.

We can see that the result of the generalized model differs considerably from the result of the standard model. For the lowest satisfaction categories the generalized model predicts a more negative income effect than the standard model, and for the upper middle response categories (5 and 6) the generalized model predicts a stronger positive effect. At the same time, for the highest satisfaction category the generalized model predicts a negative (but insignificant) income effect, whereas the standard model predicts a significant positive effect.

Figure 3.
The effect of a 1 percent increase in income on the outcome probabilities (percentage point)



Summing up, the standard ordered probit model predicts a moderate positive income effect: higher income decreases the probability of dissatisfaction and increases the probability of satisfaction. Contrary to this result, the generalized ordered probit model shows a more

negative effect on the lower satisfaction categories, but finds that income does not affect the probability of the highest satisfaction.

3.6. Summary

In this chapter I have analyzed the association between subjective well-being and income. I have examined whether quantile regression and generalized ordered probit model yield different results and conclusion as compared to standard OLS regression and ordered probit model. My results have demonstrated that these more flexible techniques provide a more complete picture of the income-satisfaction relationship than standard models. I have shown that in the OLS regression income has a positive impact on satisfaction, but the quantile regressions show that this association is less strong at the upper end of the conditional distribution of life satisfaction and stronger at the lower end. Comparing the standard ordered probit model with the generalized ordered probit model I have found that the standard model predicts a significant positive income effect for the highest satisfaction category, whereas the generalized model finds that income does not affect the probability of being extremely satisfied. Moreover, the generalized ordered probit model shows a more negative effect on the lower response categories of satisfaction than the standard ordered probit model.

4. The Association of Experiential and Material Expenditures with Subjective Well-Being

4.1. Literature review

Recent researches on the relationship of material welfare and subjective well-being deals with the ways of consumption that can lead to more happiness. These papers claim that money can buy happiness, if we spend it right [Dunn et al., 2011]. One of the main findings of these researches are that spending money on experiences rather than material things makes people happier [Van Boven & Gilovich, 2003; Van Boven, 2005]. In the literature experiential and material purchases are distinguished based on the main intention of the buying. The intention of buying material things is to possess something, whereas the goal of experiential purchases is to gain experiences. Van Boven, Cambell and Gilovich [2010] report that clothing, electronics and jewelry are the most frequently listed examples of material purchases, whereas travel, various events/concerts and outdoor sport activities are considered the most typical examples of experiential purchases. The study of Van Boven and Gilovich [2003] also shows that when people are asked to think of an experiential purchase they made they usually mention travel or fees and admissions (e.g. to a concert). The most frequently described category of material purchases are clothing and jewelry, and electronics.

In the experiments of Van Boven and Gilovich [2003] participants were asked to describe a material or experiential purchase and rate their happiness with it. They showed that thinking about experiences made people happier and contributed more to their overall happiness than thinking about material purchases. This result was confirmed by numerous studies [Caprariello & Reis, 2010; Carter & Gilovich, 2010a; Nicolao et al., 2009; Thomas & Millar, 2013].

There are several reasons why experiential purchases can make people more satisfied. Material things tend to be more comparative than experiences [Carter & Gilovich, 2010b; Howell & Hill, 2009; Rosenzweig & Gilovich, 2012]: they are more interchangeable so it is easier to find the competing alternatives. Another reason of the greater impact of experiences on happiness is that they are more closely connected to the self and identity [Carter & Gilovich, 2012; Thomas & Millar, 2013]. In a series of experiments Carter and Gilovich [2012] showed that people plotted their experiences physically closer to their self, mentioned their experiences more often in their life stories, were more reluctant exchange their experiential memories. Experiences also have inherent social nature [Van Boven & Gilovich,

2003]. Usually we experience them together with others, while material things are more often enjoyed alone. Not only living through an experience increase our well-being but also it is a pleasure to tell the story to our friends, hereby they can foster and improve our social relationships [Howell & Hill, 2009; Van Boven & Gilovich, 2003]. Finally, we adapt more quickly to material things than experiences [Nicolao et al., 2009].

4.2. The usual experimental method

The conventional method to measure the effect of experiences and material things on happiness is the laboratory experiment. The usual procedure is as follows: the 50-200 participants, who are university students, are randomly assigned into two groups. One of these groups is asked to think of the most recent experiential purchase they made and had cost at least $100-300, the other group is asked to think of the most recent material purchase they made for more than $100-300. Then they rate how happy this remembered purchase made them or contributed to their happiness.

Although this procedure is widely used in the literature it has some limitations. First of all, it uses a homogeneous sample and the number of participants is small. The second limitation roots in the fact that materialistic individuals are considered selfish and self-centered; people think that they have negative personality traits. Because of this stigmatizing effect of materialism participants might (consciously or unconsciously) underrate the satisfaction that stems from material purchases. Thirdly, people are asked directly how happy experiences or material objects made them, which can be an unfamiliar question. This direct method may entail superficial and less reliable answers. The last limitation of the previous literature is that all of the experiments were carried out in the United States. We don't know whether or not we would see the same effects in other countries, in others culture?

4.3. The survey method applied in this study

I try to avoid the drawbacks of the usual procedure, so I follow a different method. I do not perform experiments, but use survey data to examine the relationship between experiential/material expenditures and well-being. One of the main advantages of survey data is the large sample size. The socio-demographically heterogeneous respondents are representative sample of the population, thus the external validity (generalizability) of the results are high. The data comes from Hungary which means that the previous findings can be tested in a different culture.

The database contain a series of questions on expenditures and separate question about life satisfaction in general, so I don't ask people directly about the effect of experiences and material things on their well-being. One member of the household has reported detailed information on their expenditures, whereas every single person answered a global life evaluation question. In this way I made an ex post connection between well-being and purchases and could avoid the bias comes from the stigmatizing effect of materialism.

Another novelty of my analysis that I do not expect a linear relationship between expenditures and satisfaction; I do not suppose that the effect of every subsequent dollar spent on experiences or material things are the same. This is an implicit assumption of previous experimental analysis, since it was not examined how does the effect of expenditures changes with a change in amount spent on material things or experiences. In this study I perform both linear and non-linear analysis as well. With the latter I am able to test whether the effect of expenditures changes with the amount spent on material and experiential purchases. I can also check the differences of marginal effects of material and experiential spending.

4.4. Study 1

4.4.1. Data

I use two pooled cross-sectional surveys from Hungary containing data collected from more than 6000 people in 2005 and 2007 (TÁRKI Household Monitor 2005 and 2007). The surveys contain two 11-point scale global life satisfaction questions: *"How satisfied you are with the way your life's worked out up till now?"* and *"All things considered, how satisfied are you with your life?"* (0 – extremely dissatisfied, 10 – extremely satisfied). I use the average value of the answers to these questions as dependent variable. Participants (the main household earners) reported detailed information on expenditures of the household. They were asked about the amount they spent from food through internet subscription fee and medical expenses to holiday spending (altogether 23 categories). They estimated how much the household spent on different kind of purchases in the last month/last 3 months/last 12 months.

I construct two variables, the first one sum the monthly amount spent on entertainment, sport and holiday to create an indicator of experiential expenditures, and the second one sum the monthly amount spent on clothing and electronics to create an indicator of material expenditures. Both indicators are divided by the total monthly expenditures, so they measure experiential and material expenditures as the % of the total monthly spending

(in 2005 Ft). Former studies showed that people consider these purchase categories as typical example of the two kinds of purchases.

4.4.2. Estimation method

In the first step I estimate a linear relationship between expenditures and life satisfaction using the following specification:

$$S_i = \alpha + \beta_1 \cdot E_i + \beta_2 \cdot M_i + \Gamma \cdot X_i + \varepsilon_i$$

where S_i is the life satisfaction of individual i. E_i is the share of experiential expenditures in the household of individual i, M_i is the share of material expenditures, and X_i are the vector of control variables. Control variables are the following: equivalent total household expenditure (ln), equivalent household income (ln), self-defined social class, gender, age, age squared, education, marital status, labor force status, subjective health status, religiousness, Roma ethnicity, household size, value of the house (ln), domicile, region, year.

In the next step I estimate a model where marginal effects are not considered a priori linear. I use the following specification:

$$S_i = \alpha + \beta_1 \cdot \frac{E_i^{1-\rho_1}}{1-\rho_1} + \beta_2 \cdot \frac{M_i^{1-\rho_2}}{1-\rho_2} + \Gamma \cdot X_i + \varepsilon_i$$

In this case each expenditure variables have two parameters. Parameter ρ shows whether the marginal effect is decreasing, linear or increasing, whereas parameter β indicates the sign of the association. If $\rho>0$ then the marginal effect is decreasing; if $\rho=0$ then the marginal effect is constant; if $\rho<0$ then the marginal effect is increasing.

The standard error estimates are robust to heteroskedasticity and clustered at household level in every model.

4.4.3. Results

Table 1 shows the result of the linear estimate. Estimation reported in Column 2 includes all control variables. Experiential and material expenditures are associated positively with life, but the estimated coefficient of experiential expenditures is twice as high as the coefficient of material expenditures (although they are not significantly different).

Table 2 presents the result of the non-linear specification. Column 2 show the model where all control variables are included. Parameter ρ_1 and ρ_2 indicate that the marginal effect

of experiential expenditures is constant (ρ_1 is 0.035 and not statistically different from zero), but the marginal effect of material expenditures is decreasing (ρ_2=0.576, se=0.255).

Since the relationship between expenditures and satisfaction is determined jointly by parameter ρ and parameter β, it is worth to look at the graph of the estimated marginal effects. Figure 4 shows the marginal effects of experiential and material expenditures. These lines can be considered as marginal utility functions. It is clearly visible that individuals with 1 percentage point higher experiential expenditures are characterized by 0.03 higher satisfactions on average independent from their experiential expenditure level. Contrary to this result, an increase in material expenditures is associated with similar change in satisfaction only at low level of material expenditures (below 2 percent). For individuals with high level of material expenditures (above 5 percent) the effect of an increase in material expenditures is close to zero.

Table 1.
The association of experiential and material expenditures with subjective well-being, OLS (TARKI Household Monitor)

	(1)	(2)
Experiential expenditures (%)	0.077***	0.031***
	(0.008)	(0.007)
Material expenditures (%)	0.045***	0.016***
	(0.007)	(0.006)
Equivalent monthly expenditures (ln)	yes	yes
Control variables		yes
Adjusted R^2	0.115	0.346
N	6080	6080
p-value on test of equal coefficients	0.005	0.136

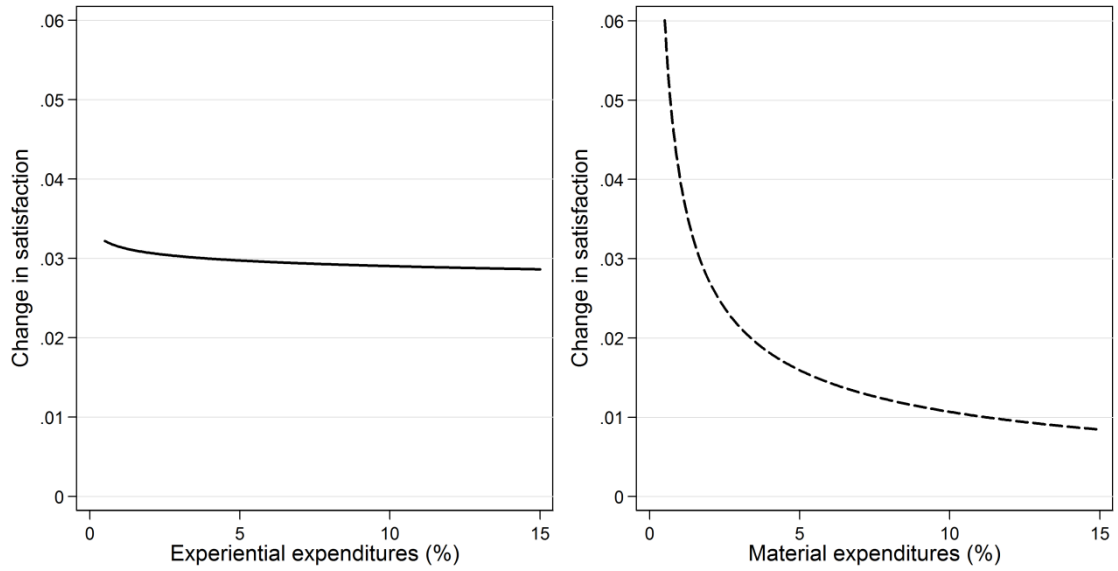
Dependent variable: Life satisfaction
Robust standard errors adjusted for clustering by household are in parentheses
Controls: gender, age, age squared, equivalent income (ln), education, marital status, labor force status, health, minority, self-defined social class, religion, household size, value of the house (ln), domicile, region, year
Dummies are included for missing regressors (except the expenditure variables)
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 2.
The association of experiential and material expenditures with subjective well-being, non-linear least squares (TARKI Household Monitor)

		(1)	(2)
Experiential expenditures (%)	β_1	0.139***	0.031
		(0.015)	(0.020)
	ρ_1	0.573***	0.035
		(0.091)	(0.348)
Material expenditures (%)	β_2	0.097***	0.040***
		(0.015)	(0.013)
	ρ_2	0.670***	0.576**
		(0.105)	(0.255)
Equivalent monthly expenditures (ln)		yes	yes
Control variables			yes
Adjusted R^2		0.127	0.352
N		6080	6080
p-value on test of equal Beta coefficients		0.075	0.730
p-value on test of equal Rho coefficients		0.494	0.211

Dependent variable: Life satisfaction
Robust standard errors adjusted for clustering by household are in parentheses
Controls: gender, age, age squared, equivalent income (ln), education, marital status, labor force status, health, minority, self-defined social class, religion, household size, value of the house (ln), domicile, region, year
Dummies are included for missing regressors (except the expenditure variables)
* p < 0.10, ** p < 0.05, *** p < 0.01

Figure 4.
Marginal effects of experiential and material expenditures (TARKI Household Monitor)



Estimating non-linear marginal effects allows me to calculate the optimal allocation of expenditures. Optimal allocation means that the marginal utilities of last forints spent on experiential and material expenditures are equal. Formally,

$$\beta_1 \cdot E_i^{-\rho_1} = \beta_2 \cdot M_i^{-\rho 2}$$

Using the average total share of experiential and material expenditures (2.22 percent + 4.73 percent = 6.95 percent) we get the result that the optimal share of experiential expenditures is 5.32 percent, whereas the optimal share of material expenditures is 1.63 percent.

4.5. Study 2

4.5.1. Data

In the second study I analyze a subsample of the Hungarian Household Budget Survey (HHBS). I use the last two wave of rotation panel for the years 2000-2002. The HHBS collects detailed data on expenditures. One twelfth of households participating in the HHBS keep an expenditure diary for a one-month period and they record all purchases occurred in that month. This is followed by another survey concerning the whole year. The latter survey provides information on the yearly purchases of the most important and significant expenditures categories (goods and services that are more expensive or purchased infrequently or irregularly).

In a supplementary survey the adult members of the households taking part in HHBS between 2000 and 2002 were asked (among others) about their life satisfaction in 2002. Life satisfaction is measured with the following question on a 5-point scale: *"All things considered how satisfied you are with the way your life's worked out up till now?"* (1 – very dissatisfied, 5 – very satisfied). Categories 4 and 5 were collapsed into a single score due to the small number of observations.

I calculate equivalent experiential and material expenditures using the yearly expenditures data if they are available. In the absence of the yearly data I use the monthly records. The variable of experiential expenditures is constructed as the yearly amount spent on travel, entertainment (theater, cinema, museum, sport), and food consumption in restaurants and other catering businesses. The variable of material expenditures is constructed as the yearly amount spent on clothing, jewelry, artwork, and electronics. Both variables are

divided by the total yearly expenditures, so they measure experiential and material expenditures as the % of the total yearly spending (in 2002 Ft).

Households with missing information from the expenditures diary or the yearly survey are excluded. Households reported that their monthly expenditures are unusually high or low are also excluded. The final sample size is 3013.

4.5.2. Estimation method

I estimate the same linear and non-linear relationship between expenditures and life satisfaction as in Study 1. In the linear specification I use data for the year 2002:

$$S_{i(2002)} = \alpha + \beta_1 \cdot E_{i(2002)} + \beta_2 \cdot M_{i(2002)} + \Gamma \cdot X_{i(2002)} + \varepsilon_i$$

where $S_{i(2002)}$ is the life satisfaction of individual i, $E_{i(2002)}$ is the share of experiential expenditures in the household of individual i, $M_{i(2002)}$ is the share of material expenditures, $X_{i(2002)}$ are the vector of control variables. Control variables are the following: equivalent total household expenditure (ln), equivalent household income (ln), gender, age, age squared, education, marital status, labor force status, smoking, regular medication, somebody in the household is sick/needing nursing, feeling about household's income, household size, children in the household, value of the house (ln), number of small/large rooms of the house, type of the house, domicile, region, diary month.

The non-linear specification is the following:

$$S_{i(2002)} = \alpha + \beta_1 \cdot \frac{E_{i(2002)}^{1-\rho_1}}{1-\rho_1} + \beta_2 \cdot \frac{M_{i(2002)}^{1-\rho_2}}{1-\rho_2} + \Gamma \cdot X_{i(2002)} + \varepsilon_i$$

The standard error estimates are robust to heteroskedasticity and clustered at household level in every model.

4.5.3. Results

Table 3 shows the result of the linear estimate. Estimation reported in Column 2 includes all control variables. Experiential and material expenditures are associated positively with life, but the estimated coefficient of experiential expenditures is almost twice as high as the coefficient of material expenditures (although they are not significantly different).

Table 4 presents the result of the non-linear specification. Column 2 show the model where all control variables are included. The qualitative results are similar to the previous

ones. Parameter ρ_1 indicate that the marginal effect of experiential expenditures is statistically not different from zero (ρ_1=0.228, se=0.430). Parameter ρ_2 shows that the marginal effect of material expenditures is decreasing (ρ_2=0.711, se=0.229). Figure 5 depicts the marginal effects of experiential and material expenditures determined jointly by parameter ρ and parameter β.

Table 3.
The association of experiential and material expenditures with subjective well-being, OLS (Hungarian Household Budget Survey)

	(1)	(2)
Experiential expenditures (%), 2002	0.030***	0.020***
	(0.008)	(0.007)
Material expenditures (%), 2002	0.019***	0.012**
	(0.006)	(0.006)
Equivalent monthly expenditures (ln) , 2002	yes	yes
Control variables		yes
Adjusted R2	0.102	0.235
N	3013	3013
p-value on test of equal coefficients	0.297	0.390

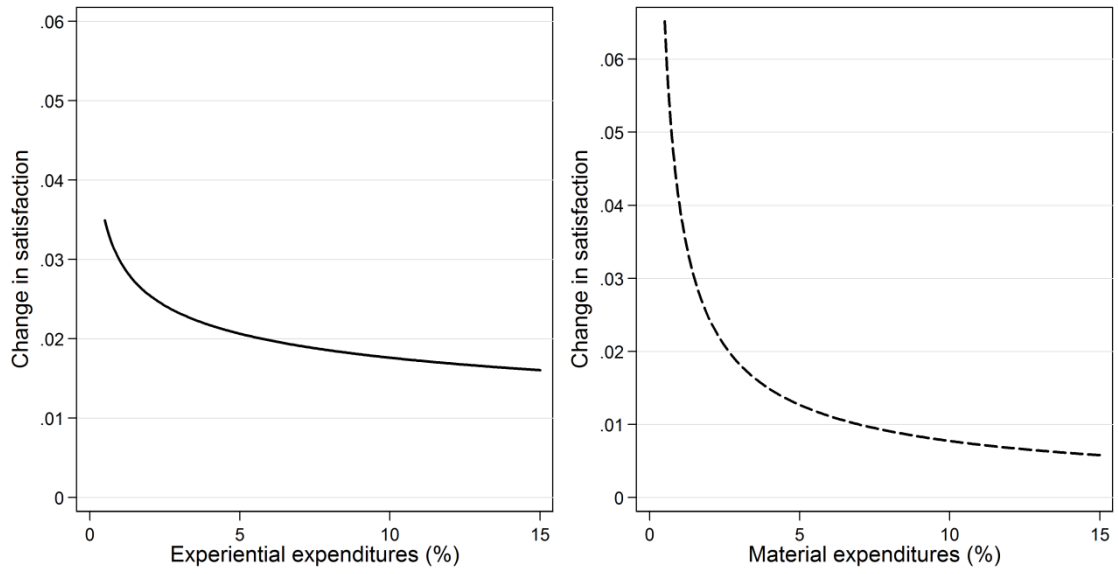
Dependent variable: Life satisfaction
Robust standard errors adjusted for clustering by household are in parentheses
Control variables: equivalent household income (ln), gender, age, age squared, education, marital status, labor force status, smoking, regular medication, somebody in the household is sick/needing nursing, feeling about household's income, household size, children in the household, value of the house (ln), number of small/large rooms of the house, type of the house, domicile, region, diary month
Dummies are included for missing regressors (except the expenditure variables)
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 4.
The association of experiential and material expenditures with subjective well-being, non-linear least squares (Hungarian Household Budget Survey)

		(1)	(2)
Experiential expenditures (%), 2002	β_1	0.042**	0.030
		(0.021)	(0.019)
	ρ_1	0.218	0.228
		(0.343)	(0.430)
Material expenditures (%), 2002	β_2	0.033	0.040**
		(0.029)	(0.018)
	ρ_2	0.323	0.711***
		(0.499)	(0.229)
Equivalent monthly expenditures (ln) , 2002		yes	yes
Control variables			yes
Adjusted R2		0.103	0.249
N		3013	3013
p-value on test of equal Beta coefficients		0.825	0.706
p-value on test of equal Rho coefficients		0.868	0.292

Dependent variable: Life satisfaction
Robust standard errors adjusted for clustering by household are in parentheses
Control variables: equivalent household income (ln), gender, age, age squared, education, marital status, labor force status, smoking, regular medication, somebody in the household is sick/needing nursing, feeling about household's income, household size, children in the household, value of the house (ln), number of small/large rooms of the house, type of the house, domicile, region, diary month
Dummies are included for missing regressors (except the expenditure variables)
* p < 0.10, ** p < 0.05, *** p < 0.01

Figure 5.
Marginal effects of experiential and material expenditures (Hungarian Household Budget Survey)



Using the non-linear estimation we can calculate the optimal allocation of expenditures. Holding constant the average total share experiential and material expenditures (2.00 percent + 6.26 percent = 8.26 percent) we get the result that the optimal share of experiential expenditures is 5.66 percent, whereas the optimal share of material expenditures is 2.60 percent.

4.6. Limitations

We have already discussed the drawbacks of the usual method. However my analysis has its own limitations also. First of all, contrary to experiments my method is not able to establish a causal relationship between expenditures and well-being. In the presence of omitted variables the estimated expenditure coefficients can be biased. Another limitation is that expenditures are measured at the household level, while satisfaction is measured at the individual level. Probably material and experiential expenditures don't split evenly among the members of the households. It would be better to know the personal expenditures.

4.7. Summary

In this research I have used large-scale representative survey databases from Hungary to analyze whether people who spend money on experiences rather than material things are more satisfied. I have estimated the association of expenditures with life satisfaction using linear and non-linear models. The main novelty of my analysis is that I have examined the effect of materialized decisions on well-being instead of mentally recalled purchases. I did not ask people directly how happy experiences or material objects have made them, thus this procedure could ease subjects' cognitive burden. In this way an ex post connection has been made between well-being and spending money on different kinds of purchases. I have demonstrated that experiences are associated stronger with life satisfaction than material things, thus my evidences based on survey data corroborate the previous results from the psychological experiments. In addition, I have shown that marginal effect of material expenditures is diminishing, whereas marginal effect of experiential expenditures is constant. It means that, ceteris paribus, a reallocation of the expenditures may increase individuals' well-being.

5. Reduction of Income Inequality and Subjective Well-Being in Europe

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References

Angrist, J. D., & Pischke, J.-S. [2009]. *Mostly Harmless Econometrics*. Princeton: Princeton University Press.

Becker, G. S., & Rayo, L. [2008]. Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox: Comment. *Brookings Papers on Economic Activity*, *2008*(1), 88–95.

Benjamin, D. J., Heffetz, O., Kimball, M. S., & Rees-Jones, A. [2012]. What Do You Think Would Make You Happier? What Do You Think You Would Choose? *American Economic Review*, *102*(5), 2083–2110. doi:10.1257/aer.102.5.2083

Bentham, J. [1988]. *An Introduction to the Principles of Morals and Legislation*. New York: Prometheus Books.

Binder, M., & Coad, A. [2011]. From Average Joe's happiness to Miserable Jane and Cheerful John: using quantile regressions to analyze the full subjective well-being distribution. *Journal of Economic Behavior & Organization*, *79*(3), 275–290. doi:10.1016/j.jebo.2011.02.005

Boes, S., & Winkelmann, R. [2006]. Ordered response models. *Algemeines Statistisches Archiv*, *90*(1), 167–181. doi:10.1007/s10182-006-0228-y

Boes, S., & Winkelmann, R. [2010]. The effect of income on general life satisfaction and dissatisfaction. *Social Indicators Research*, *95*(1), 111–128. doi:10.1007/s11205-009-9452-7

Caprariello, P. A., & Reis, H. T. [2010]. To do with others or to have (or to do alone)? The value of experiences over material possessions depends on the involvement of others. *Advances in Consumer Research*, *37*, 762–763.

Carter, T. J., & Gilovich, T. [2010a]. The relative relativity of material and experiential purchases. *Journal of Personality and Social Psychology*, *98*(1), 146–159. doi:10.1037/a0017145

Carter, T. J., & Gilovich, T. [2010b]. The relative relativity of material and experiential purchases. *Journal of personality and social psychology*, *98*(1), 146–159. doi:10.1037/a0017145

Carter, T. J., & Gilovich, T. [2012]. I am what I do, not what I have: The differential centrality of experiential and material purchases to the self. *Journal of personality and social psychology*, *102*(6), 1304–1317. doi:10.1037/a0027407

Clark, A. E., Frijters, P., & Shields, M. A. [2008]. Relative income, happiness, and utility: An explanation for the Easterlin paradox and other puzzles. *Journal of Economic Literature*, *46*(1), 95–144. doi:10.1257/jel.46.1.95

Cohen, S., Doyle, W. J., Turner, R. B., Alper, C. M., & Skoner, D. P. [2003]. Emotional Style and Susceptibility to the Common Cold: *Psychosomatic Medicine*, *65*(4), 652–657. doi:10.1097/01.PSY.0000077508.57784.DA

Colander, D. [2007]. Retrospectives: Edgeworth's Hedonimeter and the Quest to Measure Utility. *Journal of Economic Perspectives*, *21*(2), 215–225. doi:10.1257/jep.21.2.215

Csikszentmihalyi, M., & Larson, R. [1987]. Validity and reliability of the experience-sampling method. *Journal of Nervous and Mental Disease*, *175*(9), 526–536. doi:10.1097/00005053-198709000-00004

Csikszentmihalyi, M., Larson, R., & Prescott, S. [1977]. The ecology of adolescent activity and experience. *Journal of Youth and Adolescence*, *6*(3), 281–294. doi:10.1007/BF02138940

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. [1985]. The Satisfaction With Life Scale. *Journal of Personality Assessment*, *49*(1), 71–75. doi:10.1207/s15327752jpa4901_13

Diener, E., Lucas, R. E., Schimmack, U., & Helliwell, J. F. [2009]. *Well-Being for Public Policy*. New York: Oxford University Press.

Dunn, E. W., Gilbert, D. T., & Wilson, T. D. [2011]. If money doesn't make you happy, then you probably aren't spending it right. *Journal of Consumer Psychology*, *21*(2), 115–125. doi:10.1016/j.jcps.2011.02.002

Easterlin, R. A. [1974]. Does economic growth improve the human lot? Some empirical evidence. In P. A. David & M. W. Reder (Eds.), *Nations and Households in Economic Growth* (pp. 89–125). New York: Academic Press.

Frey, B. S., & Stutzer, A. [2002a]. *Happiness and Economics: How the economy and institutions affect well-being*. Princeton and Oxford: Princeton University Press.

Frey, B. S., & Stutzer, A. [2002b]. What can economists learn from happiness research? *Journal of Economic Literature*, *40*(2), 402–435. doi:10.1257/002205102320161320

Greene, W. H., & Hensher, D. A. [2010]. *Modeling Ordered Choices: A Primer*. Cambridge: Cambridge University Press.

Howell, R. T., & Hill, G. [2009]. The mediators of experiential purchases: Determining the impact of psychological needs satisfaction and social comparison. *The Journal of Positive Psychology*, *4*(6), 511–522. doi:10.1080/17439760903270993

Kahneman, D., & Krueger, A. B. [2006]. Developments in the measurement of subjective well-being. *Journal of Economic Perspectives*, *20*(1), 3–24. doi:10.1257/089533006776526030

Kahneman, D., Krueger, A. B., Schkade, D. A., Schwarz, N., & Stone, A. A. [2004]. A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method. *Science*, *306*(5702), 1776–1780. doi:10.1126/science.1103572

Kahneman, D., Krueger, A. B., Schkade, D., Schwarz, N., & Stone, A. A. [2006]. Would You Be Happier If You Were Richer? A Focusing Illusion. *Science*, *312*(5782), 1908–1910. doi:10.1126/science.1129688

Kahneman, D., Wakker, P. P., & Sarin Rakesh. [1997]. Back to Bentham? Explorations of experienced utility. *Quarterly Journal of Economics*, *112*(2), 375–405. doi:10.1162/003355397555235

Koenker, R., & Hallock, K. F. [2001]. Quantile regression. *Journal of Economic Perspectives*, *15*(4), 143–156. doi:10.1257/jep.15.4.143

Krueger, A. B., & Schkade, D. A. [2008]. The reliability of subjective well-being measures. *Journal of Public Economics*, *92*(8–9), 1833–1845. doi:10.1016/j.jpubeco.2007.12.015

Layard, R., Mayraz, G., & Nickell, S. J. [2008]. The marginal utility of income. *Journal of Public Economics*, *92*(8-9), 1846–1857. doi:10.1016/j.jpubeco.2008.01.007

Loewenstein, G., & Ubel, P. A. [2008]. Hedonic adaptation and the role of decision and experience utility in public policy. *Journal of Public Economics*, *92*(8–9), 1795–1810. doi:10.1016/j.jpubeco.2007.12.011

Mentzakis, E., & Moro, M. [2009]. The poor, the rich and the happy: Exploring the link between income and subjective well-being. *Journal of Socio-Economics*, *38*(1), 147–158. doi:10.1016/j.socec.2008.07.010

Nicolao, L., Irwin, J. R., & Goodman, J. K. [2009]. Happiness for Sale: Do Experiential Purchases Make Consumers Happier than Material Purchases? *Journal of Consumer Research*, *36*(2), 188–198. doi:10.1086/597049

OECD. [2013]. *OECD Guidelines on Measuring Subjective Well-being*. Paris: OECD Publishing.

Rosenzweig, E., & Gilovich, T. [2012]. Buyer's remorse or missed opportunity? Differential regrets for material and experiential purchases. *Journal of personality and social psychology*, *102*(2), 215–223. doi:10.1037/a0024999

Sandvik, E., Diener, E., & Seidlitz, L. [1993]. Subjective Well-Being: The Convergence and Stability of Self-Report and Non-Self-Report Measures. *Journal of Personality*, *61*(3), 317–342. doi:10.1111/j.1467-6494.1993.tb00283.x

Schneider, L., & Schimmack, U. [2009]. Self-Informant Agreement in Well-Being Ratings: A Meta-Analysis. *Social Indicators Research*, *94*(3), 363–376. doi:10.1007/s11205-009-9440-y

Stevenson, B., & Wolfers, J. [2008]. Economic growth and subjective well-being: Reassessing the Easterlin paradox. *Brookings Papers on Economic Activity*, *2008*(1), 1–87. doi:10.1353/eca.0.0001

Stevenson, B., & Wolfers, J. [2013]. Subjective Well-Being and Income: Is There Any Evidence of Satiation? *American Economic Review*, *103*(3), 598–604. doi:10.1257/aer.103.3.598

Thomas, R., & Millar, M. [2013]. The Effects of Material and Experiential Discretionary Purchases on Consumer Happiness: Moderators and Mediators. *The Journal of Psychology*, *147*(4), 345–356. doi:10.1080/00223980.2012.694378

Van Boven, L. [2005]. Experientialism, materialism, and the pursuit of happiness. *Review of General Psychology*, *9*(2), 132–142. doi:10.1037/1089-2680.9.2.132

Van Boven, L., Campbell, M. C., & Gilovich, T. [2010]. Stigmatizing materialism: on stereotypes and impressions of materialistic and experiential pursuits. *Personality and Social Psychology Bulletin*, *36*(4), 551–563. doi:10.1177/0146167210362790

Van Boven, L., & Gilovich, T. [2003]. To Do or to Have? That is the question. *Journal of Personality and Social Psychology*, *85*(6), 1193–1202.

Winkelmann, R., & Boes, S. [2006]. *Analysis of Microdata*. Berlin: Springer.

List of relevant publications

Hajdu, G., & Hajdu, T. [2011]. A jövedelmi egyenlőtlenség és a redisztribúció hatása a szubjektív jóllétre. In P. Somlai & V. Szabari (Eds.), *Kötő-jelek 2010* (pp. 35–60). Budapest: ELTE TÁTK Szociológiai Doktori Iskola.

Hajdu, T., & Hajdu, G. [2013]. Jövedelem és szubjektív jóllét: az elemzési módszer megválasztásának hatása a levonható következtetésekre. *Statisztikai Szemle*, *91*(11), 1045–1070.

Hajdu, T., & Hajdu, G. [2013]. *Szubjektív jóllét és anyagi helyzet: A kvantilis regresszió és az általánosított ordered probit modell eredményeinek összehasonlítása a standard elemzési módszerekkel* (KTI/IE Műhelytanulmányok No. 2013/28).

Hajdu, T., & Hajdu, G. [2013]. *Are more equal societies happier? Subjective well-being, income inequality, and redistribution* (KTI/IE Discussion Papers No. 2013/20).

Hajdu, T., & Hajdu, G. [2014]. Reduction of Income Inequality and Subjective Well-Being in Europe. *Economics: The Open-Access, Open-Assessment E-Journal, 8(2014-35): 1-29.*

Hajdu, T., & Hajdu, G. [2014]. *Élmények és tárgyak fogyasztásának kapcsolata a szubjektív jólléttel* (KTI/IE Műhelytanulmányok No. 2014/11).

Hajdu, T., & Hajdu, G. [2014]. Income and Subjective Well-Being: How Important is the Methodology? *Hungarian Statistical Review*, 92(Spec. No. 18), 110-128.