How Reliable and Consistent Are Subjective Measures of Welfare in Europe and Central Asia?

Evidence from the Second Life in Transition Survey

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Abstract

This paper analyzes the reliability and consistency of subjective well-being measures. Using the Life in Transition Survey, which was administered in 34 countries of Europe and Central Asia in 2006 and 2010, the paper evaluates subjective well-being measures (satisfaction with life and subjective relative income position) against objective measures of welfare based on consumption and assets. It uses the different formulations of life satisfaction in the survey to test robustness to alternative framing and scaling. It also explores within-household differences in subjective well-being assessments. The analysis finds that subjective relative income is weakly correlated with household relative welfare position as measured by consumption or assets. Life satisfaction, by contrast, is highly correlated

with objective and subjective measures of household welfare. It generally reflects cross-country differences in average consumption, assets, or per capita gross domestic product, although Central Asian countries report much higher life satisfaction levels than their incomes would suggest. Two alternative measures of life satisfaction are highly correlated and the correspondence between verbal and numeric scales is strong within a country or groupings of similar countries. Within households, subjective assessments of relative income are roughly consistent but measurement error is correlated with individual characteristics (gender and age of respondents), which could cause systematic biases in the analysis.

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1. Introduction

Subjective measures of well-being can capture dimensions of welfare that go beyond a narrow focus on consumption or income (Layard, 2005). There is increasing interest among academics and policymakers in developing measures of development and societal progress that capture the multifaceted nature of well-being², in order “to shift emphasis from measuring economic production to measuring people’s well-being” (Stiglitz, Sen and Fitoussi, 2009).³ A growing literature has established strong correlations of measures of happiness or satisfaction with life with income, health, marriage and employment.

Yet, issues of salience⁴, framing and scaling of subjective well-being measures, as well as the challenges in interpreting various types of well-being measures remain and need to be given careful consideration when employing such data to measure well-being over time, across space or population groups, or for policy evaluation. Ferrer-i-Carbonell (2005) notes that unobserved factors like personality traits can have a significant effect on subjective well-being. Lucas and Diener (2008) find that “correlations between subjective well-being and personality characteristics such as extraversion and neuroticism are stronger than correlations with any demographic predictor or major life circumstance that has been studied so far.” Also, Kahneman and Krueger (2006) note that subjective well-being measures have been found to be affected by the weather or trivial events such as finding a dime, and that in studies that collected repeated measures of subjective well-being over short periods of time these exhibited lower correlations across test-retest rounds than other variables like levels of education or earnings (Schwarz and Clore 1983, Lucas, Diener and Suh 1996). Last, Deaton (2011) cautions us that the ‘best possible life’ evaluations in the daily Gallup Poll appear to be affected more by Valentine’s day than by the doubling of unemployment in the United States.⁵

On the other hand, subjective well-being measures have been shown to exhibit consistent patterns across surveys and regions. For instance, Diener et al. (1995) examined four subjective well-being surveys in a total of 55 countries with a combined population of 4.1 billion people and a total survey sample of 100,000 respondents, and found “strong covariation among surveys, despite different years, sample populations, wording, and response formats.” Using data from the first three waves (2006-2008) of the World Gallup Poll, Helliwell et al. (2009) find that international differences in life evaluations are due to differences in life circumstances rather than differences in structural relations between circumstances and life evaluations. As they note, the “[a]pplication of the same well-being equation to 125 different national societies shows the same factors coming into play in much the same way and to much the same degree.” In other words, international differences in subjective well-being are found not to be driven by different

² Frey and Stutzer 2002, Dolan 2006; 2011; Graham 2010.

³ Subjective assessments of welfare began to be included in the World Bank’s Living Standards Measurement Study (LSMS) surveys in 1993.

⁴ For instance, the possibility that the respondent may be influenced by the preceding questions, or by the type of organization implementing the survey (see Dolan 2011).

⁵ In fact, subjective well-being data have been found to be reasonably stable over time, although the degree of stability is somewhat lower for life satisfaction measures than for measures of affect (Lucas and Diener 2008). This stability is partly the result of stable personality traits, and partly the result of adaptation to events.

meanings of a good life.⁶ There is also evidence supporting the assumption of *ordinal interpersonal comparability* implicit in subjective well-being analysis, i.e. two individuals reporting similar answers to life satisfaction questions can be presumed to enjoy similar levels of well-being (van Praag 2007)^{7,8}.

The literature thus supports the view that subjective well-being measures can be taken seriously, and that the insights that may be gained over and above conventional data on objective household welfare are informative. Yet, the concerns with respect to the interpretation of subjective well-being data remain. To what extent can subjective well-being measures provide reliable and consistent measures of welfare across individuals, countries and time? The objective of this paper is to understand how various subjective well-being measures are related with objective welfare measures and examine their consistency across different scales and within households.

The Life in Transition Survey (LiTS) provides a unique opportunity for analysis of the reliability and consistency of subjective well-being measures, not only across individuals, but also across time and countries. The survey was simultaneously administered in 34 countries of Europe and Central Asia in two different rounds (2006 and 2010). It includes (i) comparable data for the countries of Central and Eastern Europe and Central Asia, and, in 2010, for several Western European countries; (ii) objective measures of welfare based on household expenditures and assets; and (iii) different measures of subjective well-being (notably life satisfaction and subjective relative income questions).

By consistency and reliability we primarily mean the following: (i) in the case of life satisfaction, we take advantage of the alternative scales and examine whether the country-level and individual-level relationships between life satisfaction and important determinants of life satisfaction such as objective welfare measures and other socio-demographic characteristics are robust to the choice of the formulation of the life satisfaction question; and (ii) in the case of the subjective household welfare question (welfare ladder) we look for congruence in the accounts of subjective household welfare and measures of objective household welfare, and we also look for systematic within-household differences in subjective assessments of household welfare.

⁶ A number of other studies have similarly found strong positive associations between measures of subjective well-being and income, health, marriage and employment. Current subjective well-being measures also predict future behavior such as marital break-up, or job quits (for reviews of findings, see Clark et al. 2008; Dolan et al. 2009).

⁷ This assumption is further reinforced by other studies that find a correspondence between well-being reported by the respondent and assessments of the respondent's well-being by friends, relatives, or the interviewer (Sandvik et al 1993).

⁸ Ferrer-i-Carbonell and Frijters (2005) examine the more stringent assumption of cardinality, i.e. that the difference between responses 2 and 3 on the satisfaction scale is the same, for instance, as the difference between 6 and 7. Relying on data from the German Socio-Economic Panel (GSOEP) they look at differences between ordinal and cardinal models of life satisfaction using the 11-step response to the following question: "How happy are you at present with your life as a whole? Please answer by using the following scale in which 0 means totally unhappy, and 10 means totally happy." They find that results are largely unaffected by the choice of cardinal vs. ordinal specification.

Section 2 presents the data and descriptive statistics. Section 3 compares subjective and objective measures of welfare, at the individual and country level. Section 4 explores the measurement of subjective measures, their consistency and the issue of measurement error.

2. The data: Measures of welfare in the Life and Transition survey

This paper uses data from two rounds of the Life in Transition Survey⁹. Following the first LiTS (2006), the second LiTS was conducted in 2010 simultaneously in 29 ECA countries, and in five Western European ‘comparator’ countries (Germany, Italy, UK, France, Sweden). In both surveys, the questionnaire was administered to a nationally representative sample of at least 1,000 respondents in each country¹⁰, using face-to-face interviews. Taken together, the two surveys provide a wealth of information on prevailing living standards, opinions and attitudes in 2006 and 2010. Most of the analysis in this paper is based on the second round of the survey (2010), although some comparisons are also drawn with the first round.

2.1. “Objective” measures of welfare: Consumption and assets

Using recalled household expenditure data in the LiTS, we construct a consumption aggregate by summing all expenditure categories, expressed in per capita annual equivalents, and converted to US dollars according to market exchange rates (see Appendix 1 for more detail on the measurement of consumption in the LiTS and the construction of our consumption aggregate).

We also construct, overall and separately for each country, an asset index as an alternative “objective” measure of household welfare. The asset index is based on household ownership of the following items: a car, a secondary residence, a bank account, a debit card, a credit card, a mobile phone, a computer, access to internet at home, and household access to water, electricity, a fixed telephone line, central heating, public (piped) heating, and pipeline gas. Summary statistics as well as the methodology for constructing the asset index are presented in Appendix 2.

2.2. Subjective measures of well-being

The LiTS provides a number of subjective well-being variables:

- (i) A 5-step scale measure of satisfaction with one’s life: *All things considered, I am satisfied with my life now* (strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree);
- (ii) A 5-step scale measures of satisfaction with one’s financial situation: *All things considered, I am satisfied with my financial situation as a whole* (strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree);

⁹ The Life in Transition Survey (LiTS) was conducted by the European Bank for Reconstruction and Development (EBRD) and the World Bank. The main purpose of LiTS I was to better understand how peoples’ lives had been affected by the events of the previous 15 years; four years later, LiTS II was carried out at a time when most countries in the ECA region were still facing the consequences of the global economic crisis of 2008-2010.

¹⁰ The only exception is Sweden, where the sample consists of 900 respondents.

- (iii) A 10-step life satisfaction measure: *All things considered, how satisfied or dissatisfied are you with your life these days? Please answer on a scale from 1 to 10, where 1 means completely dissatisfied, and 10 means completely satisfied;*
- (iv) A 10-step relative income ladder: *Please imagine a ten-step ladder where on the bottom, the first step, stand the poorest 10% of people in our country, and on the highest step, the tenth, stand the richest 10%. On which step of the ten is your household today?*
 - a. *Now, imagine a ten-step ladder 4 years ago. On which step was your household at that time?*
 - b. *And where on the ladder do you believe your household will be 4 years from now?*

These subjective well-being measures are all so-called “evaluative” measures. They are concerned with global assessments of (satisfaction with) life as a whole¹¹.

Note that satisfaction with life is measured with two different Likert¹² scales in the LiTS. We explore the relationship between these two measures in section 4.

3. Subjective measures of welfare in the LiTS: Consistency with “objective” welfare

In this section, we examine the consistency of two subjective well-being measures (satisfaction with life and subjective relative income) with objective measures of welfare (consumption and assets). Discrepancies between these measures are to be expected, if only because subjective measures of well-being may capture multiple dimensions of welfare in ways that income and consumption cannot.

3.1. Subjective relative income

The economic ladder question can be interpreted as a subjective measure of relative income. Respondents were asked to place their household on an economic ladder on which the poorest 10 percent of people in their country stood at the lowest step (step 1) and the richest 10 percent of the people were at step 10. Unlike the question about satisfaction with finances, the economic ladder question only asks the respondent to place the welfare of the household in their country’s

¹¹ Accounts of subjective well-being measures are broadly categorized into *evaluative* measures and *affective* measures. In contrast with evaluative measures, affective measures such as those collected via the Experience Sampling Method or the Day Reconstruction Method, are generally concerned with *experienced utility*, or the amount of affect experienced at any given moment (Kahneman and Krueger, 2006).

¹² Likert measures are generally based on a symmetric scale that can measure disagreement (possible responses are strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree) or satisfaction (e.g. very dissatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied, and very satisfied). Another type of evaluative measure is the Cantril ladder, based on a self-anchoring scale derived from the following description: “Please imagine a ladder with steps numbered from zero at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?” It is used, for instance, in the Gallup Poll (see Deaton 2011).

welfare distribution, without expressing an opinion on whether the present welfare level of the household is satisfactory. For instance, two respondents can place their households at step 3 of the ladder, but one of them could be fully satisfied with that placement (perhaps due to a recent improvement in finances), whereas the other could be completely dissatisfied (perhaps due to higher aspirations or feelings of loss resulting from some recent negative income shock). The key question is then whether the placement of households in the country's welfare distribution based on the economic ladder question is consistent with their placement in the country's welfare distribution based on measured expenditures or assets.

Figure 1: Mean asset index by subjective relative income position

Figure 1 reports for each country the mean of the asset index for each of the 10 steps of subjective positions on the welfare ladder. Except for the highest steps (9th and 10th) of the ladder (for which estimates are imprecise as there are very few observations at the top), welfare ladder assessments exhibit a clear wealth gradient in most countries. The only exceptions are several countries in Central Asia (Kyrgyzstan, Tajikistan, and Uzbekistan) where the graph is essentially flat throughout most of the ladder, increasing only at the very top.

In most countries a gradient can similarly be observed for expenditures, although it is less pronounced than for the asset index. The mean of the household per capita expenditures for each of the steps of the welfare ladder is presented in Figure A3 (Appendix 3).

Regardless of the correspondence between subjective relative income and rankings based on objective welfare, a uniform distribution of answers to the relative income distribution would be expected in theory. If there was no systematic error in the way households placed themselves on the ten-step scale of relative income, the same proportion in every country (10 percent) should be found on each decile. Figure 2 shows the raw distribution of the responses to the economic ladder question by country. It can be seen that the distribution of subjective welfare positions is concentrated in the middle, with 60 percent of households placing themselves in the fourth, fifth or sixth deciles, and in many countries skewed to the left.

Figure 2: Distribution of economic ladder question responses, by country

Source: LiTS II, 2010.

There could be many factors explaining differences between households' subjective views on their relative position in the economic ladder and their objective position as measured by their actual relative income or consumption. Aside from measurement error in our household consumption aggregate, we may have miscalculated "actual" relative income for example because we do not account for cost-of-living differences or because of errors in constructing

equivalence scales to account for differences in household demographic composition (Ravallion and Lokshin, 2002)¹³.

Following Ravallion and Lokshin (2002), we construct quantiles of objective welfare that match the raw distribution of responses across the categories of the income ladder question for each country, collapsing the categories 8-10 into one category because very few respondents rank their household's welfare in rungs 9 or 10.¹⁴ The matrix in Table 1 provides further illustration of the weak association between objective and subjective rank¹⁵. Cramer's V statistic is only 0.10 and of the 1732 individuals who place their household on the bottom rank of the subjective welfare ladder only 231 are also on the bottom ladder based on objective welfare.¹⁶

Table 1: Objective and subjective welfare rank, full sample

		Subjective welfare rank								
		1	2	3	4	5	6	7	8	Total
Objective welfare rank	1	231	289	392	332	329	91	44	24	1,732
	2	247	381	579	615	718	204	104	53	2,901
	3	385	650	1,241	1,298	1,548	580	304	129	6,135
	4	358	605	1,304	1,622	2,129	873	410	193	7,494
	5	326	621	1,604	2,127	3,192	1,451	768	309	10,398
	6	108	210	639	898	1,393	767	450	215	4,680
	7	51	95	271	420	736	484	337	182	2,576
	8	26	50	105	182	353	230	159	142	1,247
	Total	1,732	2,901	6,135	7,494	10,398	4,680	2,576	1,247	37,163

Source: LiTS II, 2010.

One hypothesis suggested by Ravallion and Lokshin (2002) is that responses to the economic welfare ladder question can be a function not only of household's income, but also, of factors

¹³ In their paper, Ravallion and Lokshin (2002) find that the large differences between subjective and objective measures of welfare in Russia can only partly be explained by the differences in the weights ascribed to household demographic composition (in constructing equivalence scales) or cost-of-living differences. In this paper we are not able to test for this hypothesis, as the LiTS survey does not include local-level prices.

¹⁴ Here the objective rank is based on per capita household expenditures, and the table aggregates the observations for the entire sample.

¹⁵ Regressions show that only 10 percent or less of the variation in the welfare ladder is explained by household expenditures in any of the countries in the sample. The asset index exhibits a somewhat higher (albeit still low) correlation with the economic ladder variable: with the exception of Albania and Bulgaria it explains less than 20 percent of the variation in the welfare.

¹⁶ Note that unlike in Ravallion and Lokshin (2002) we have a less precise measure of objective welfare, based on a short consumption module, and we cannot account for special differences in prices or poverty lines. Nonetheless, the matrix in Table 1 is based solely on an ordinal ranking of welfare, and there is evidence that the LiTS expenditure measure credibly accounts for the variation in living conditions in Europe and Central Asia (Zaidi et al., 2009 and Appendix 1 to this paper).

such as past income, expectations of future income, as well as factors such as education and current health (via their impact on expected income). Unemployment can have a negative effect on perceptions of welfare independently of the associated income loss. Marriage can offer a greater sense of security, given income. The influence of such factors on perceptions of economic welfare can be seen in Table A3.1 (Appendix).

Our findings are largely in line with the earlier findings of Ravallion and Lokshin (2002) which were based on Russian data. In particular, subjective welfare is rated higher by married individuals, and also exhibits a U-shaped relationship with age. Compared to those residing in households with main income coming from wages, those in households that rely primarily on pensions, social assistance, or remittances rate their welfare lower, holding expenditures constant. Better health as well as a higher level of education are also associated with higher perceived welfare. In terms of the attitudinal variables, we find that those who have not been affected by the recent financial crises (as per their own assessment) have a higher subjective assessment of welfare, while those who perceive that connections are necessary to get ahead in key aspects of life such as getting a government or private sector job, or university education, tend to perceive their current welfare position as lower. Perceptions of need in society as being mainly driven by injustice (laziness) are associated with lower (higher) subjective welfare (relative to bad luck being the main driver or need). Finally, it is notable that the R^2 also increases from 0.09 in the specification with only expenditures and household size to 0.26 in column (III) where individual characteristics and attitudinal variables are controlled for, although this improvement in the R^2 is much below that reported by Ravallion and Lokshin (2002) for Russia.

Other behavioral explanations, including differences in views on what constitutes poverty and wealth in a given country, or misreporting, with the reluctance to admit to poverty (wealth) by the poor (rich), can also be at play. We discuss in section 4 the possibility of frame of reference biases.

3.2. Satisfaction with life

As described in section 2, two measures of overall life satisfaction are available in the LiTS. We discuss differences between the two measures in section 4, as an example of the role of framing in subjective welfare assessments. Averaged over the entire region, 53 percent of the adult population reported to be satisfied with life in 2010. This measure ranges from less than 20 percent in Romania and Hungary to 89 percent in Sweden. The share of the adult population satisfied with life is considerably lower in Eastern Europe and Central Asia than in Western European countries. With the exception of Italy, in all of these countries (Germany, France, Sweden, UK), more than 70 percent of the adult population are satisfied with life (only 50 percent in Italy). Using the alternative life satisfaction scale that ranges from 1 (completely dissatisfied) to 10 (completely satisfied), the mean level of life satisfaction in the region is 5.9 out of 10, which is broadly consistent with the 5-step Likert scale.

There is considerable evidence of a positive association between average life satisfaction and country income at any given point in time (Deaton, 2008). In Figure 3, we look at whether a similar gradient can be observed in the LiTS data for the two life satisfaction measures that are available.

Figure 3: Average life satisfaction and objective welfare

Source: LiTS II and WDI.

Consistent with the literature, average life satisfaction measures are positively correlated with the means of objective welfare measures (household expenditures, asset index or per capita GDP in PPP terms). However, average satisfaction with life is not always aligned with countries' relative levels of economic development. In particular, Mongolia and the countries of Central Asia appear to have higher average life satisfaction levels than their incomes would suggest. Of the

two life satisfaction variables, the 1-10 scale is more strongly correlated with objective welfare than the 5-step Likert scale measure.

At the individual level, income and consumption (both perceived and actual) are also important determinants of life satisfaction (Graham, 2010). This is confirmed by the high correlation between satisfaction with life and satisfaction with household finances (based on the similar 5-step Likert scale). Indeed, satisfaction with finances accounts for 87 percent of the variation in satisfaction with life.¹⁷

One would expect satisfaction with household finances to be more highly correlated with objective welfare compared to satisfaction with life overall, since it should be less influenced by other (non-pecuniary) considerations. However, in practice the relationship between satisfaction with finances and the two objective measures of welfare mirrors that of the 5-step Likert measure of life satisfaction in Figure 2 above. In individual level regressions (see table 2) the effect of employment status and of household expenditures on satisfaction with finances is indeed somewhat stronger than for satisfaction with life. The relationship between satisfaction with finances and other independent variables in the multivariate profile is similar to that of overall life satisfaction.

Consistent with existing studies of subjective well-being, overall life satisfaction is not simply a function of consumption. At the individual level, we present multivariate profiles of life satisfaction (based on the two scales). In both cases, overall life satisfaction increases with household expenditures and with the asset index. However, holding these two measures of objective welfare constant, life satisfaction is also strongly correlated with level of education, marital status, attachment to the labor market, or religion¹⁸.

Finally, whether households accurately assess their relative income position or not, their perceived (present and future) relative income is strongly correlated with satisfaction with life. 56% of the variation in life satisfaction (measured on the 10-step scale) and 54% of the variation in satisfaction with household finances are explained by variation in subjective relative income (54 percent in the case of satisfaction with household finances).

¹⁷ The implied correlation coefficient is 0.93. The individual-level Spearman rank correlation between the two variables is 0.60.

¹⁸ Satisfaction with life also increases away from middle age, consistent with the previously found U-shaped age profile of life satisfaction (Blanchflower and Oswald, 2008), and is higher for those residing in rural areas. In our regressions, low levels of education, as well as absence from the labor market are negatively associated with subjective well-being, and the same is true of any marital status other than being married. Also, Protestants and Catholics are more satisfied with life relative to Orthodox Christians, accounting for other characteristics, including country fixed effects.

Table 2: Life satisfaction across different scales

	Satisfaction with life (1- 10 scale)	Satisfaction with life (disagree – agree scale)	Satisfaction with finances (disagree - agree scale)
Ln(household expenditures)	0.118*** (0.013)	0.112*** (0.014)	0.170*** (0.015)
HH asset index	0.161*** (0.006)	0.132*** (0.006)	0.134*** (0.006)
Primary education or less	-0.136*** (0.022)	-0.039* (0.022)	-0.008 (0.023)
Secondary (baseline)			
Post-secondary education	0.139*** (0.015)	0.112*** (0.015)	0.155*** (0.016)
Did not work during past 12 months	-0.083*** (0.015)	-0.065*** (0.015)	-0.135*** (0.016)
cut1	-1.237*** (0.095)	-0.828*** (0.096)	0.091 (0.101)
cut2	-0.754*** (0.095)	0.077 (0.096)	1.031*** (0.101)
cut3	-0.203** (0.095)	0.820*** (0.097)	1.762*** (0.102)
cut4	0.254*** (0.095)	2.332*** (0.099)	3.129*** (0.105)
cut5	0.944*** (0.096)		
cut6	1.383*** (0.096)		
cut7	1.878*** (0.097)		
cut8	2.475*** (0.099)		
cut9	2.860*** (0.102)		
Pseudo R2	0.063	0.069	0.068
Obs	37402	37402	37402

Notes: Ordered probit regressions. Robust standard errors, clustered at PSU level in parentheses. Regressions also included as independent variable age, sex, religion, marital status, area of residence and country dummies (coefficients not reported). Significance: * 0.10 ** 0.05 *** 0.01.

4. Measurement error in subjective well-being data: Consistency across scales and within households

4.1. Framing and scaling

We exploit the existence of two separate life-satisfaction questions in the LiTS (with different scales and placement in the survey) to examine the role of framing in variations in subjective

welfare. In the first measure, the scale measures agreement with the statement “All things considered, I am satisfied with my life now” in five steps (strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree). In the second measure, the scale is numeric, ranging from 1 to 10, where 1 is labeled “very dissatisfied”, 10 is labeled “very satisfied”, and the intermediate values are unlabeled.

The two measures are strongly correlated – at country-level one of the scales accounts for 73 percent of the variation in the alternative scale.¹⁹ However, country rankings are not robust to the choice of the life satisfaction measure. In figure 4 below, countries are sorted in ascending order by the share of the country’s population who either agrees or strongly agrees with the question “All things considered, I am satisfied with my life now”. While life satisfaction in Sweden is highest by either of the two measures, Italy ranks ten positions higher – and Kyrgyzstan 14 positions lower – if ranked by the 1-10 life satisfaction measure rather than the 5-step qualitative scale.

Figure 4: Ranking SWL across countries with alternative scales

Verbal responses to Likert scale questions (in the LiTS case “strongly disagree”, “disagree” etc.) may be preferred because these categories may be more understandable to the respondents than the 0-10 scale. On the other hand, such verbal categories may not carry the same meaning to everyone. There is some evidence that the numeric scale is less ambiguous, and potentially less problematic for interpersonal comparability (van Praag 2004).

We investigate the consistency between the two life satisfaction measures. Table 3 presents, for each of the countries in the LiTS II sample, the median life satisfaction score on the 1-10 scale for each of the categories of the life satisfaction measures based on the strongly disagree – strongly agree scale.

¹⁹ The implied correlation coefficient between the two variables is 0.85.

Table 3: Median life satisfaction score (1-10 scale) for each category

All things considered, I am satisfied with my life now					
	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
<u>Western Europe</u>					
France	3	5	6	7	8
Germany	3	4	6	8	8
Italy	5	6	6	7	8
Sweden	2	7	7	8	9
UK	4	5	6	8	9
<u>New EU</u>					
Bulgaria	2	3	5	5	7
Czech	4	5	5	7	8
Estonia	3	5	5	6	8
Hungary	3	5	5	7	8
Latvia	3	4	5	6	8
Lithuania	3	5	5	5	8
Poland	4	4	5	7	8
Romania	3	4	5	6	8
Slovakia	4	5	5	7	7
Slovenia	4	5	6	7	8
<u>Europe, non-EU</u>					
Albania	3	5	5	6	7
BiH	4	4	5	6	8
Croatia	5	5	5	7	8
FYROM	3	4	5	6	7
Kosovo	4	5	5	5	6
Montenegro	4	5	5	7	7
Serbia	3	5	5	7	8
<u>CIS</u>					
Armenia	3	4	5	5	7
Azerbaijan	4	4	5	5	6
Belarus	5	4	5	6	7
Georgia	2	3	4	5	6
Kazakhstan	3	4	5	6	7
Kyrgyzstan	4	4	4	5	5
Moldova	4	4	5	6	6
Russia	3	4	5	6	8
Tajikistan	2	4	5	6	7
Ukraine	3	4	5	6	6
Uzbekistan	4	4	5	6	7

Source: *LiTS II, 2010*.

For the region as a whole there is little support for the view that the mapping across the two scales is similar. For any verbal life satisfaction indicator, the average life satisfaction score on the 1-10 scale is higher in Sweden than in Tajikistan for example. One possibility is that respondents use a *global* standard when answering satisfaction with life questions²⁰, i.e.

²⁰ Although the LITS Satisfaction with Life Questions do not explicitly invite respondents to think about “the best possible life” (as in Deaton, 2008; see Graham et al., 2009 for a discussion).

respondents in rich countries such as Sweden know how bad life is in the poorest countries of the world, and vice-versa. However, if the countries are divided into four broad regions (Western European countries, new EU states, non-EU European states, and Former Soviet Republics), there appears to be considerable consistency between the two scales within each of these regions, i.e. individuals appear to apply a common mapping from the non-numeric Likert scale to the numeric one. This suggests that comparisons of SWL across countries within a sub-region or of individuals within a country may be meaningful (robust to the choice of the life satisfaction scale), so long as the groups being compared share sufficiently homogenous norms about what is a satisfactory life.

We then examine the stability of the relationships between life satisfaction and aspects of life that are correlated with it across countries and scales. Figure 5 presents the point estimates (and their 95% confidence intervals) for several important determinants of well-being, obtained from individual-level regressions estimated separately for each country for the 5-step life satisfaction variable and for the 10-step life satisfaction variable.

Several conclusions can be drawn from these estimates. First, and consistent with previous findings, unemployment is overwhelmingly negatively associated with life satisfaction. Marriage and post-secondary education are overwhelmingly positively associated with life satisfaction. Second, across countries the magnitudes of these effects are similar (the confidence intervals are, for most countries, overlapping). Third, across the two life satisfaction scales the country estimates are clearly correlated (Figure 6). In other words, the association between life satisfaction and important aspects of life such as employment, marriage or education is consistent across countries and robust to alternative scaling of the life satisfaction question.

Figure 5: Coefficient estimates and 95% confidence intervals from individual-level regressions, by country

Figure 6: Coefficient estimates individual-level regressions for different life satisfaction scales

4.2. Systematic biases: Consistency of subjective relative income assessments within households

For the economic ladder, we test the presence of systematic biases in reporting by examining within-household differences in ladder assessments. In 40 percent of the households in the sample, the economic ladder question was asked to two respondents – the head of the household who answered questions about household composition, assets and expenditures, and the randomly chosen household member who provided answers to the rest of the LiTS modules (including all attitudinal questions). There is clear variation in the economic welfare assessments provided for the same household by two different household members. However, the assessments are “roughly” consistent – for most of the ladder steps, more than 80 percent of the evaluations by the second household member are within -1 /+1 interval from the evaluation given by the head of the household.

The two variables that are available in the LiTS data for all respondents are their age and sex. It is thus possible to examine whether answers to the economic ladder question are influenced by these demographic characteristics. Table 4 presents household fixed effects regressions for the

sample of households with two respondents, which allows us to abstract from characteristics and traits that do not vary within the household. The results suggest that the very young (18-24) group in Eastern Europe have a higher assessment of the household's economic welfare, and that the elderly (65+ group) in the CIS appear to have a lower assessment, suggesting a frame of reference bias. Women in the CIS subsample also appear to report a lower household welfare level when answering the ladder question. Jointly age and sex appear to be significant in all but the Western European subsample.

Table 4: Differences in within-household assessments of household economic welfare

	Full Sample	Western Europe	New EU	Europe, non-EU	CIS
Age 18-24	0.093*** (0.029)	0.052 (0.153)	0.128** (0.058)	0.092* (0.052)	0.047 (0.049)
25-34	0.034 (0.029)	0.024 (0.118)	0.060 (0.055)	0.045 (0.050)	-0.014 (0.048)
35-44 – Baseline					
45-54	-0.027 (0.027)	-0.013 (0.111)	-0.038 (0.054)	-0.051 (0.048)	-0.016 (0.047)
55-64	-0.024 (0.032)	-0.013 (0.125)	-0.031 (0.065)	0.030 (0.056)	-0.074 (0.053)
65+	-0.068** (0.034)	0.081 (0.141)	-0.015 (0.074)	-0.055 (0.058)	-0.129** (0.055)
Male – Baseline					
Female	-0.018 (0.011)	-0.052 (0.040)	-0.013 (0.019)	0.039* (0.022)	-0.066*** (0.021)
Constant	4.619*** (0.020)	5.128*** (0.077)	4.772*** (0.039)	4.692*** (0.035)	4.406*** (0.034)
F	5.911	0.438	2.061	3.519	3.373
Prob>F	0.000	0.854	0.054	0.002	0.003
N	27522.000	1680.000	8118.000	7712.000	9032.000

Notes: Fixed effects regressions. Robust standard errors, clustered by household in parentheses. Significance: * 0.10
 ** 0.05 *** 0.01

5. Conclusion

Our results do not reveal substantial biases in accounts of life satisfaction due to scaling. In particular, the relationship between important determinants of life satisfaction and reported life satisfaction at the individual level is robust to alternative formulations and scales of the life satisfaction question. Furthermore, the country-level relationships between subjective well-being and objective measures of welfare are broadly consistent across the two subjective well-being scales (with the exception of Central Asia), although the ranking of countries is not invariant to the scale of the life satisfaction measure.

Individual assessments of household relative income position, on the other hand, do not appear to be reliable predictors of objective poverty or wealth. In fact, we find that subjective relative income position is only weakly correlated with assets or consumption – results that are consistent with earlier findings. Subjective perceptions of welfare appear to be shaped by a variety of factors that go beyond objective economic welfare. Last, there are differences in evaluations of the household's relative standing across different household members, and these differences are correlated with the age and sex of the respondent.

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APPENDIX 1: Measurement of Consumption in the LiTS

A small consumption module in the LiTS allows constructing an expenditure-based welfare aggregate. In this appendix, we present a comparison of this welfare aggregate with measures of consumption from other data sources.

LiTS surveys collected information on consumption based on recalled expenditures in a small number of categories: (i) Food, beverages and tobacco; (ii) Utilities (electricity, water, gas, heating, fixed line phone); (iii) Transportation (public transportation, fuel for car); (iv) Education (including tuition, books, kindergarten expenses); (v) Health (including medicines and health insurance); (vi) Clothing and footwear; (vii) Durable goods (e.g. furniture, household appliances, TV, car, etc). Categories (i) – (iii) are based on an 1-month recall, and categories (iv) – (vii) are based on a 12-month recall.

Using recalled household expenditure data in the LiTS, we construct a consumption aggregate by summing all expenditure categories, expressed in per capita annual equivalents, and converted to US dollars according to market exchange rates. For a detailed discussion of the various assumptions, such as inclusion / exclusion of various categories, equivalence scales, or price indices, see Deaton and Zaidi (1999).

In many cases respondents answered “don’t know” to the expenditure questions, or simply did not state / refuse to state the amount of money they spent for a given expenditure category. The incidence of missing values ranges from 9 percent of households in the case of food expenditures to 20 percent for education expenditures. Missing values are imputed based on consumptions regressions run separately for each country and expenditure category.

Table A1 presents the mean of annual per capita expenditures from the 2010 round of the LiTS for all countries in the sample, and the corresponding values for the final household consumption expenditure from World Development Indicators (WDI).²¹ The table also includes GINI indices of inequality from the LiTS and corresponding GINI indices from WDI.

Household expenditures in the LiTS survey are lower than National Accounts estimates of final household consumption expenditures by a factor of 2, on average. The discrepancy is usual for survey data. It is larger for more developed countries, which is expected, given definition of household final consumption expenditures in NAC. For countries for which NAC estimates are available, country rankings are broadly consistent with those obtained from the LiTS. The largest differences are for Russia, Estonia and Croatia, all three countries being ranked 4 or 5 positions higher in the country ranking based on NAC estimates than the LiTS data would suggest.

²¹ Households’ final consumption expenditure consists of expenditure incurred by resident households on consumption goods and services, included fees paid to government for educational and health services etc., and imputed expenditures like rent on owner occupied dwellings and consumption of output for own final use (Source: WDI database).
<http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/EXTDECSTAMAN/0,,contentMDK:20882842~pagePK:64168427~piPK:64168435~theSitePK:2077967~isCURL:Y~isCURL:Y,00.html>

Comparing Gini indices of inequality from LiTS and official Gini estimates from Eurostat and WDI, we find that the welfare aggregate from LiTS provides a rough approximation of inequality for countries in our sample.²²

²² Note that the Gini estimates are not strictly comparable, since Eurostat reports *income* based inequality measures for EU countries.

Table A1: Consumption and inequality estimates from LiTS II and National Accounts

	Mean consumption per capita (LiTS)	Mean final household consumption per capita (NAC)	NAC/LiTS ratio	Gini (LiTS)	Official Gini	Gini (LiTS) / Official Gini
Albania	1,876	3,149	1.7	0.346	0.345	1.0
Armenia	1,184	2,738	2.3	0.350	0.309	1.1
Azerbaijan	1,730	1,603	0.9	0.313	0.337	0.9
Belarus	1,788	2,876	1.6	0.316	0.272	1.2
BiH	2,446	--		0.305	0.362	0.8
Bulgaria	2,357	4,267	1.8	0.285	0.332	0.9
Croatia	4,650	7,773	1.7	0.288	0.27	1.1
Czech	4,166	9,189	2.2	0.241	0.249	1.0
Estonia	3,881	6,849	1.8	0.246	0.313	0.8
France	8,610	23,952	2.8	0.303	0.298	1.0
FYROM	2,115	3,254	1.5	0.304	0.442	0.7
Georgia	1,005	--		0.379	0.413	0.9
Germany	9,871	23,934	2.4	0.307	0.293	1.0
Hungary	3,221	10,106	3.1	0.281	0.241	1.2
Italy	7,398	21,037	2.8	0.261	0.315	0.8
Kazakhstan	1,815	3,214	1.8	0.284	0.309	0.9
Kosovo	1,728	--		0.336	0.302	1.1
Kyrgyzstan	715	812	1.1	0.303	0.334	0.9
Latvia	3,501	6,743	1.9	0.256	0.361	0.7
Lithuania	3,214	7,071	2.2	0.288	0.369	0.8
Moldova	1,356	1,450	1.1	0.374	0.38	1.0
Mongolia	1,180	--		0.370	0.365	1.0
Montenegro	3,433	--		0.308	0.3	1.0
Poland	3,003	7,870	2.6	0.257	0.314	0.8
Romania	2,148	5,641	2.6	0.332	0.349	1.0
Russia	3,374	5,024	1.5	0.296	0.423	0.7
Serbia	2,563	4,343	1.7	0.305	0.282	1.1
Slovakia	3,776	11,025	2.9	0.264	0.248	1.1
Slovenia	6,561	13,144	2.0	0.305	0.238	1.3
Sweden	10,673	21,301	2.0	0.354	0.241	1.5
Tajikistan	543	613	1.1	0.393	0.336	1.2
Turkey	2,618	6,043	2.3	0.338	0.397	0.9
UK	7,835	22,902	2.9	0.351	0.324	1.1
Ukraine	1,607	1,669	1.0	0.369	0.275	1.3
Uzbekistan	758	--		0.290	0.367	0.8

Source: LiTS II, WDI and Eurostat. WDI and Eurostat data for 2010 or latest available.

APPENDIX 2: Construction of the asset index

We compute an asset index based on a linear combination of household asset ownership and housing characteristics. Table A2.1 shows average asset ownership and housing characteristics by country.

Principal components analysis (PCA) is used to derive weights (Filmer and Pritchett, 2001). The asset index performs reasonably well – the first principal component explains 25.6 percent of variation in the 14 asset variables; while Spearman's rank correlation between the asset index and the consumption aggregate is 0.63, these results are in line with those in Filmer and Pritchett (2001).

Figure 1 plots the average of the asset index and log consumption by country. Country rankings based on the asset index and household expenditures are broadly consistent. The largest discrepancies are observed for Kosovo, Belarus and Macedonia, which are ranked much higher based on the asset index.

Figure A2: Means of the asset index and household expenditures by country

Source: LiTS II (2010)

Table A2: Asset ownership and housing characteristics used for the construction of the asset index, by country (%)

	Tap water	Electricity	Phone	Central heat	Piped heat	Natural gas	Car	Second residence	Bank account	Debit card	Credit card	Mobile phone	Computer	Internet
Albania	89.9	99.1	54.0	4.6	0.0	12.7	37.0	5.0	44.5	20.4	17.4	89.4	43.3	26.9
Armenia	95.5	97.1	69.0	2.5	5.2	71.2	35.1	6.0	9.0	6.0	7.9	88.5	32.0	22.1
Azerbaijan	69.1	99.9	70.8	1.0	7.1	73.8	28.1	2.9	1.1	44.7	2.3	93.4	16.1	11.4
Belarus	95.3	100.0	93.1	83.0	91.2	90.2	43.8	9.9	15.7	11.7	13.0	92.9	66.7	46.4
Bosnia and Herzegovina	81.0	99.7	74.1	6.3	13.2	4.8	58.5	5.2	47.8	18.8	15.2	76.9	43.9	33.3
Bulgaria	99.7	99.4	58.7	11.0	17.4	1.3	52.6	11.8	30.4	50.5	16.1	80.6	46.6	44.6
Croatia	94.0	100.0	90.0	24.3	5.7	28.8	71.1	20.2	74.4	71.2	38.5	83.1	56.7	52.0
Czech Republic	99.0	99.8	26.9	52.2	46.0	73.3	74.8	5.7	89.9	55.6	41.9	96.6	78.5	75.5
Estonia	86.7	99.6	56.7	16.8	51.0	23.8	49.0	15.0	89.2	87.8	29.8	90.9	61.9	59.3
France	99.1	99.8	91.9	38.6	11.8	40.4	90.2	10.7	98.6	65.3	52.5	90.3	80.0	75.5
Georgia	63.7	99.8	44.4	0.0	0.0	42.3	24.8	5.6	4.4	17.4	6.7	77.6	27.6	23.6
Germany	99.9	99.7	90.8	81.7	16.9	50.1	79.7	5.3	98.3	93.5	38.3	89.8	73.9	70.6
Great Britain	99.7	100.0	86.8	93.9	15.4	0.0	72.1	5.5	94.4	87.8	58.0	89.4	73.5	67.4
Hungary	98.6	99.7	52.6	33.7	14.7	78.2	42.3	2.5	61.3	12.3	58.8	75.8	46.2	42.1
Italy	99.8	99.9	72.0	52.8	13.0	87.7	91.9	13.8	89.8	72.1	45.8	94.0	69.6	58.8
Kazakhstan	73.6	99.9	71.1	0.1	57.6	63.0	35.1	3.2	10.4	7.3	5.9	80.9	43.0	22.2
Kyrgyzstan	65.0	99.9	29.9	12.4	8.9	21.6	33.2	4.9	0.5	0.2	0.7	91.5	11.4	4.9
Latvia	91.7	99.6	42.8	7.5	71.8	71.8	38.3	10.9	77.7	55.4	35.9	88.2	54.5	51.8
Lithuania	78.4	100.0	42.8	41.0	31.0	38.7	61.7	9.1	77.1	45.3	12.9	60.4	66.6	49.7
Macedonia	94.9	99.9	66.0	8.0	7.1	0.0	56.3	11.5	60.5	46.2	32.6	87.4	61.3	51.3
Moldova	68.3	100.0	89.6	0.0	25.8	53.3	27.8	4.1	6.2	11.4	2.2	55.7	31.7	27.2
Mongolia	31.2	98.2	16.4	28.5	21.6	2.4	33.2	18.6	46.2	3.1	20.4	94.8	36.3	12.8
Poland	97.2	99.5	41.5	55.5	44.1	56.9	58.6	3.6	69.7	32.9	18.7	78.1	56.6	50.7
Romania	79.0	99.8	45.0	10.7	24.2	57.3	37.5	7.1	21.0	33.8	12.4	74.6	47.5	37.3
Russia	95.2	99.9	69.8	66.4	87.0	69.1	36.8	4.9	22.9	22.9	10.4	86.5	52.2	40.5
Serbia	87.5	99.9	86.7	9.4	22.7	8.6	57.6	13.4	67.7	35.4	22.1	82.5	53.4	40.6
Slovakia	96.4	100.0	47.1	54.8	45.5	87.7	72.8	9.8	91.2	45.2	39.9	95.4	79.0	73.6
Slovenia	98.5	100.0	90.2	83.5	7.6	31.4	83.8	12.9	96.2	51.8	47.4	93.1	79.9	74.9
Sweden	99.4	99.4	95.4	62.7	50.9	5.3	77.2	24.2	98.2	95.0	70.4	97.3	94.4	94.4
Tajikistan	37.9	100.0	12.7	0.5	1.4	2.7	35.8	4.7	0.7	0.1	1.0	85.8	9.2	1.6
Turkey	99.4	98.2	55.2	9.3	7.6	37.0	28.6	6.6	40.9	57.8	55.2	90.3	45.7	33.6
Ukraine	80.2	99.3	55.7	44.0	50.1	85.8	23.6	4.2	7.4	8.2	20.0	79.7	37.9	25.9
Uzbekistan	67.8	100.0	33.0	0.4	7.6	93.4	28.2	3.2	1.7	4.4	0.8	79.4	8.3	2.3
Kosovo	81.8	99.6	41.9	9.8	0.4	0.0	75.5	7.3	60.0	15.1	18.3	94.4	74.7	66.0
Montenegro	91.6	99.9	60.5	2.1	0.0	0.0	66.6	14.4	47.4	22.8	20.2	92.5	59.7	43.8
Overall	85.6	99.6	60.7	30.0	26.1	42.7	51.5	8.4	49.5	36.7	25.0	85.3	51.6	42.8

Notes: Estimates based on LiTS II (2010).

APPENDIX 3: Subjective welfare ladder position and expenditures

Figure A3: Mean per capita expenditures by subjective relative income position

Table A3.1: Subjective welfare ladder – individual level regressions

	(I)	(II)	(III)
Ln(HH expenditures)	0.566*** (0.023)	0.285*** (0.027)	0.285*** (0.026)
Ln(HH size)	0.182*** (0.027)	-0.178*** (0.029)	-0.139*** (0.029)
Female share		-0.041 (0.041)	-0.044 (0.041)
Children's share		-0.103* (0.058)	-0.139** (0.057)
Area of residence: baseline -- urban			
Rural		0.089** (0.040)	0.062 (0.039)
Metropolitan		-0.000 (0.059)	-0.009 (0.057)
Asset index		0.247*** (0.011)	0.231*** (0.011)
Age 18-24		0.306*** (0.037)	0.224*** (0.036)
25-34		0.135*** (0.028)	0.085*** (0.027)
35-44 (baseline)			
45-54		-0.084*** (0.028)	-0.029 (0.027)
55-64		-0.092*** (0.034)	-0.022 (0.034)
65+		0.159*** (0.041)	0.180*** (0.041)
Female headed household		-0.084*** (0.024)	-0.063*** (0.024)
Female		0.046** (0.022)	0.057*** (0.021)
Primary education or lower		-0.150*** (0.036)	-0.125*** (0.035)
Secondary education (baseline)			
Post-secondary education		0.267*** (0.023)	0.248*** (0.022)
Married		0.206*** (0.022)	0.204*** (0.022)
Atheist		-0.037 (0.041)	-0.041 (0.040)
Employed		0.047* (0.024)	0.031 (0.024)
Main income source: wage income -- baseline)		0.000 (.)	0.000 (.)
Self-employment income		0.164*** (0.036)	0.154*** (0.035)
Farming		0.120** (0.056)	0.107* (0.056)
Pensions		-0.228*** (0.031)	-0.207*** (0.031)
State benefits		-0.899*** (0.060)	-0.826*** (0.060)
Help from relatives		-0.110* (0.066)	-0.080 (0.065)
Other		-0.169	-0.155

		(0.109)	(0.084)
Not affected by the financial crisis			0.347***
			(0.027)
Connections are vital to get ahead			-0.121***
			(0.026)
Cause of need in society -- Because they have been unlucky (baseline)			
Laziness and lack of willpower			0.118***
			(0.039)
Because of injustice in society			-0.220***
			(0.038)
Inevitable part of modern life			-0.004
			(0.042)
Other			-0.114**
			(0.047)
In good health			0.335***
			(0.022)
Constant	0.759***	3.542***	3.324***
	(0.139)	(0.200)	(0.201)
R-squared	0.089	0.234	0.260
Obs	32806	32806	32806

Notes: Robust standard errors, clustered at PSU-level in parentheses. Significance levels: * 0.1, ** 0.05, *** 0.01. Country dummies included in all specifications but not reported.