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Direct evidence on income comparisons and their welfare effects

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ABSTRACT

This paper provides direct evidence that income comparisons exert a significant impact on subjective well-being. It also evaluates the relative importance of different types of benchmarks. Internal comparisons to one's own past living standard outweigh any other comparison benchmarks. Local comparisons (to one's parents, former colleagues or high school mates) are more powerful than self-ranking in the social ladder. The impact of comparisons is asymmetric: under-performing one's benchmark always has a greater welfare effect than out-performing it (in absolute value). Comparisons, which reduce satisfaction also increase the demand for income redistribution, but there, the relative impact of subjective ranking is preponderant.

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1. Introduction

Is income utility relative, and if so relative to what and how important are the welfare effects of comparisons? The “discrepancy” of “relative utility” theory is quite influential among economists and psychologists (e.g. Michalos, 1985). The general idea is that individuals compare themselves to a series of standards. Satisfaction judgements then depend on the gap between their actual situation and their comparison benchmarks. The most important implication of relative utility is that increasing the income of all does not increase the happiness of all (Easterlin, 1974, 1995, 2001), which questions the relevance of National Income as an objective of economic policy.

An important share of the happiness literature is dedicated to the identification of thresholds in the welfare function of income (or consumption). Essentially, comparators can be of two types: (i) “external benchmarks”, i.e. relevant others, such as former schoolmates, colleagues, neighbors, parents, and (ii) “internal norms” or “internal benchmarks”, which involve aspirations and dynamic comparisons with one's own income in different points of time. Hedonic treadmill, habituation

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and adaptation are the consequences of the second type of comparisons. Of course internal norms are certainly influenced by external benchmarks so that the distinction is not clear-cut. Some authors have also argued that individuals' well-being depends essentially on their ordinal ranks within a group rather than on relative income (Brown et al., 2008).

In spite of the popularity of the concept of relative income in social science, there is not much direct evidence to date about those whom people really compare themselves to. Most of the time, the evidence about comparisons is indirect. In the bulk of the corpus, which is based on survey data, researchers usually have to decide for themselves how to delimit the reference groups, and then verify that the "reference income" that they have constructed does have some statistical influence on the variable of interest. This is because surveys usually contain no direct questions about the composition of reference groups.

Following this general method, some papers have hypothesized that comparisons are made with respect to neighbors. In essence, the authors define the reference group as the inhabitants of the geographical area where the respondent lives. They calculate the typical income inside this group and include this calculated variable in the regression of happiness, together with the individual income of the respondent. The scope of the geographical reference varies, from being as large as East and West Germany (Ferrer-i-Carbonell, 2005) or American States (Blanchflower and Oswald, 2004), to smaller areas such as the primary census units of the American *National Survey of Families and Households* (Luttmer, 2005) or the census tract of the Canadian *General Social Survey* (Helliwell and Huang, 2005).

Certain authors defined reference groups as being composed of people with whom one has daily interactions, such as family members and friends (MacBride, 2001). Others elicit colleagues or people exerting the same profession as being the relevant others, in particular concerning job satisfaction (Cappelli and Sherer, 1988; Clark and Oswald, 1996; Brown et al., 2008; Senik, 2004, 2008). The demonstrandum of these articles is precisely to show that the reference group that they have picked up is relevant and that its average income does exert a significant (negative or positive) effect on satisfaction.

Of course, the identification of "internal benchmarks" is an easier task. Basically, researchers model the dependence of current satisfaction over lagged periods of income. The question is then whether, because of adaptation effects and rising aspirations, past levels of income or consumption exert a negative influence on current satisfaction. The Leyden school has made an inaugural contribution in this field by illustrating the existence of a "preference drift" in income satisfaction (see Van Praag, 1971 or Van Praag and Ferrer-i-Carbonell, 2004). They estimate that about 60% of the satisfaction associated with a rise in a person's income evaporates due to a change in her aspirations. More classical studies of life satisfaction based on panel household surveys mostly confirm the presence of adaptation effects. Moreover, they stress the importance of contrast effects, i.e. of variation in income rather than level of income, as suggested by the prospect theory (Kahneman and Tversky, 1979). Studies in income adaptation and aspirations include Clark (1999), Clark et al. (2008a,b), Di Tella et al. (2003) and Stutzer (2004).

However, the type of evidence provided by these studies remains indirect: the benchmark is chosen by the researcher and injected in the satisfaction regression; the assumption that the variable is capturing a comparison benchmark remains an interpretation. Two exceptions are Melenberg (1992) and Knight and Song (2006). Melenberg used two waves of the Dutch Socio-Economic Panel data in which individuals were asked about "the people whom they meet frequently". Following the method of the Leyden school based on the "Minimum Income Question", he showed that the aspirations of individuals are increasing in the average income of their social network. Knight and Song used a survey of Chinese households and showed that when asked explicitly to whom they compare themselves, 68% of survey respondents report that their main comparison group consists of individuals in their own village. In summary, displaying some direct evidence about the composition of people's reference groups largely remains a challenge that lies ahead of the blooming literature dedicated to comparisons and adaptation.

This paper is one of the first studies that try not only to provide direct evidence of comparisons, but also to assess the relative impact of various types of comparisons, including subjective ranking on a social ladder. It also analyses the relation between income comparisons and the ensuing demand for redistribution. The literature dedicated to this issue has put in evidence the role of self-centered motives such as being a potential recipient of transfers (Alesina et al., 2001), risk-aversion (Ravallion and Lokshin, 2000) and expected mobility based on past experienced mobility (Benabou and Ok, 2001; Alesina and la Ferrara, 2005); the data offers the opportunity to verify whether relative deprivation and relative performance also exerts an impact on individuals' attitudes towards income redistribution.

This paper relies on the *Life in Transition Survey* (LITS), a cross-section representative survey of households of all countries of the former socialist bloc. Starting in 1990, transition countries have been undergoing a process of deep restructuring, leading to the transformation from an administered economy to a market economy, and in many cases from an authoritarian regime to a democracy. The *Life in Transition Survey* is an investigation into the perception of this transformation by the inhabitants of these countries. An important number of questions explicitly ask people to compare their economic and political situation in 2006 with respect to the pre-transition period (i.e. before 1989). More specifically, respondents are asked to compare their current living standard with the pre-transition period, or with that of their parents, of their former colleagues, and of their former schoolmates. Two other questions ask respondents to place themselves on a subjective economic ladder reflecting their current situation in 2006 and their past situation back in 1989.

I use this survey in order to evaluate the relevance and the relative importance of the different comparison benchmarks suggested by the aforementioned questions. I start from the idea that there is no a priori reason why some people should estimate that they have done better than their colleagues but worse than their former high school mates, or better than their parents but worse than in 1989. Looking at the effect of such opposite evolutions in different dimensions thus helps to avoid

the risk of collinearity of comparison benchmarks due to omitted variables. I thus map the different modalities of each pair of variables, creating a series of interaction terms that constitute a total partition of the sample. I estimate life satisfaction on these interaction categories, controlling for the usual socio-demographic variables and for country dummies. Finally, I also look at the impact of comparisons on the demand for income redistribution.

The results show that comparisons are relevant and exert a significant impact on subjective well-being. Comparisons are asymmetric: under-performing one's benchmark is always more important than out-performing it. A clear ranking also emerges among the type of interactions that are being analyzed: "intra-personal" comparisons are more important than inter-personal ones. Local comparisons (to parents, former colleagues or high school mates) are more powerful than general ranking in the social ladder and its evolution. Comparisons that affect subjective well-being trigger a "compensating" demand for redistribution, but the relative importance of comparison benchmarks is different, as self-ranking on a general affluence scale is the most important determinant of the demand for redistribution.

The next section presents the LITS survey. Section 3 presents the method, Section 4 the results and the last section concludes.

2. Data

The study hinges on the Life in Transition Survey (see EBRD, 2007), a survey conducted by the EBRD in 2006, in 28 post-transition countries (plus Turkey). Respondents to the survey were drawn randomly, using a two stage sampling method, with census enumeration areas as primary sampling units, and households as secondary sampling units. The survey includes 1000 observations per country, for a total of 29,002 observations. The sample is equally balanced in terms of gender, but is biased in favor of elder people, with a means of 50 years for respondents A and 46 years old for respondent B (see lower).

The main attitudinal questions that are exploited in this paper are labeled in the following way:

"To what extent do you agree with the following statements:

- I have done better in life than most of my high school mates.
- I have done better in life than most of my colleagues I had around 1989.
- I have done better in life than my parents.
- My household lives better nowadays than around 1989.
- All things considered, I am satisfied with my life now (henceforth life satisfaction).
- The gap between the rich and the poor today in this country should be reduced.

For each separate question, respondents had to tick one answer out of seven proposed modalities: "strongly disagree/disagree/neither disagree nor agree/agree/strongly agree/not applicable/don't know".

Two other comparison questions were asked:

- "Please imagine a ten-step ladder where on the bottom, the first step, stand the poorest people, and on the highest step, the tenth, stand the rich. On which step of the ten is your household today?"
- "Now imagine the same ten-step ladder around 1989, on which step was your household at that time?"

As the main questions of interest concern comparisons between 2006 and 1989, I restricted the sample to respondents aged over 40 years old, who were thus born before 1965 and were at least 24 years old in 1989, at the very start of the reform period; this implies an loss of 12,020 observations (out of 29,002).

Regrettably (in my view) the survey asks a first series of general questions concerning the household to a first respondent (respondent A), including the two "subjective ranking" questions above, and then asks all the other questions to the "last birthday person" in the household (respondent B). In many cases, it fortunately turned out that the same person actually answered all the questions, so that respondent A = respondent B. When it is not the case, it would be questionable to treat the answers of respondent A and respondent B as being associated with the same observation. Of course, this concerns only the two "subjective ranking" questions above-mentioned, which are relative to the standard of living of the household and not to the individual himself. This may attenuate the problem, conditional on the fact that the household is still the same in 2006 as it was in 1989. However, to be safe, I take a conservative approach, which consists in keeping only the observations if respondent A and respondent B are the same person. This involves an additional loss of 4796 observations. Eventually, the regressions are run on sample of 11,876 observations for 28 countries, leaving aside Turkey. This restriction does not involve noticeable change in the composition of the sample; the average age of the respondent is slightly higher (58.6 instead of 57.8) and the proportion of men higher (50% instead of 46%) in the final sample, but the mean household income is about the same. The descriptive statistics presented in Appendix B are based on the restricted sample.

In the (restricted) sample, the average level of life satisfaction was 2.93 (on a 5 steps ladder). Mean subjective ranking was 3.94 in 2006 against 5.57 in 1989 (on a 10 steps ladder). Only 27% of respondents judged that they lived better than in 1989, against 52% who estimated that they lived worse; 28% estimated that they had done better than their former high school mates, 26% than their former colleagues and 52% better than their parents. Only 16% of the respondents placed themselves above the fifth step of the social ladder in 2006. Finally, 85% of the retained sample agreed or strongly agreed that the gap between the rich and the poor should be reduced. This proportion was surprisingly similar across the different income

groups.¹ Ravallion and Lokshin (2000) observed the same phenomenon in Russia and related it to the feeling of uncertainty in Transition societies.

3. Method

The objective of the paper is to draw some causality from income comparisons to self-declared life satisfaction, as well as demand for redistribution. The formulation of comparison questions in the survey allows avoiding two important caveats in the interpretation of subjective comparisons.

The first obstacle is the possible endogenous definition of reference groups. An important strand of the psychological literature has shown that reference groups can be chosen instrumentally as a motivation device (self-improvement) or a self-validation strategy (self-enhancement) (see Diener and Lucas, 1999; Falk and Knell, 2004; Diener and Fujita, 1995). Some studies suggest that optimistic people only compare downward, whereas pessimistic people compare with more successful ones (Lyubomirsky and Ross, 1997). The LITS partly addresses this issue by setting exogenously a list of proposed comparison benchmarks. Of course, the issue of memory bias remains in the sense that respondents can instrumentally “choose” to remember such or such former colleagues. But this is unavoidable as it is important to leave some discretion to respondents in order to be sure that they are comparing with groups of persons that are actually relevant to them.

The second obstacle is that comparisons certainly exert a different impact depending on the person's initial economic background and trajectory. This is again due to the endogeneity of individual aspirations, against which one gauges his economic success. To take this into account, most comparison questions include a dynamic component as the surveyed persons are asked to compare their current economic “success” with that of past references, either their own situation around 1989, their parents, or the current situation of colleagues and schoolmates that they had before 1989. All these comparison benchmarks, except the respondent's parents, are made of persons who occupied a similar position as the respondent's around 1989. The comparison questions thus refer to a notion of race, with runners starting from the same place in 1989 and reaching more or less advanced positions in 2006. Even the subjective ladder question can be made dynamic by taking the difference between self-ranking in 2006 and self-ranking in 1989.

The third and foremost obstacle to identifying causal relations between comparisons and life satisfaction is omitted variables and reverse causation. Those who estimate that they have done better in life than their former colleagues may just be “happier” persons: they may have a higher satisfaction baseline or circumstances that cause both happiness and success. Here, I draw on the multiplicity of comparison questions. I partition the sample into categories of people who have experienced different evolutions in different dimensions. The rationale is that a priori there is no general reason why some people should estimate that they have done better than their colleagues but worse than their former high school mates, or better than their parents but worse than in 1989. No obvious omitted variable or reverse causation is available for these concomitant opposite variations.

More precisely, concerning the comparison questions, I group the possible answers in three groups: positive, negative and neutral (dropping the *not applicable* and *don't know* modalities). Hence, for *My household lives better nowadays than around 1989*, I create three mutually exclusive dummy variables: *livup*, a dummy variable which takes value 1 for the modalities *agree* and *strongly agree* and 0 otherwise, *livdown* (a dummy which takes values 1 for the modalities *disagree* and *strongly disagree* and 0 otherwise) and *livstab* (a dummy for the modality *neither agree nor disagree*). I proceed in the same way for the question *I have done better in life than most of my high school mates*, creating the dummy variables: *schoolmatesup*, *schoolmatesdown* and *schoolmatestab*. Identically, for the question *I have done better in life than most of my colleagues I had around 1989*, I create the dummy variables *colleaguesup*, *colleaguesdown* and *colleaguestab*, and for the question *I have done better in life than my parents*, I create the dummy variables *parentsup*, *parentsdown* and *parentstab*.

Concerning the 2006 income ladder question, I also create a series of dummy variables: *lowrank* a dummy variable which takes value 1 for people who position themselves under the 5th step and 0 otherwise in 2006; *averank*: a dummy which takes value 1 for people who declare that they live on the 5th rung (23% of the sample) and *highrank*, a dummy which takes value 1 if the respondent declares that he stands higher than the 5th step in 2006. Finally, I create a series of dummy variables indicating the difference between one's self-ranking on the 2006 scale and on the 1989 scale. Hence, *rankup* is a dummy variable which takes value 1 if the self-declared rank in 2006 is strictly superior to the subjective rank around 1989, *rankdown* indicates whether the self-declared rank is strictly inferior in 2006 as compared to 1989, and *rankstab* whether the respondents chooses the same step on the 2006 and 1989 income ladders.

I map the different modalities of each pair of variables, creating a series of interaction terms that constitute a total partition of the sample. I then estimate life satisfaction on these interaction categories, controlling for the usual socio-demographic variables and for country dummies.

¹ In LITS, the standard of living is measured using a series of questions regarding household expenditure during the past 12 months on an exhaustive list of items including: food, beverages and tobacco, clothing and footwear, transport and communication, recreation and entertainment, education including tuition, books, kindergarten expenses), health (including health insurance), furnishings (sheets, towels, blankets, linen, etc.), household durable goods (e.g. furniture, household appliances, TV, car, etc.) and other items. All expenditures were converted into a single currency (USD). I distinguished three groups of equal size, representing the richest, average and poorest third of the sample in term of real household consumption.

Obviously, mapping the three modalities of each question, pair-wise, creates a set of nine possible pairs of answers. I include all of them in the regression of satisfaction, choosing as the omitted category the “neutral_neutral” interaction, i.e. all the relevant pair of elements in the set of *averank*, *rankstab*, *livstab*, *schoolmatestab*, *colleaguestab* and *parentsab*. Hence the effect of interacted comparisons is evaluated against the omitted category constituted by the group of individuals who declare that their living standard has remained stable, or that their subjective rank on a social ladder is 5, or that they have succeeded in life just as well as their former colleagues, schoolmates or parents.

My interest lies with the interaction between opposite statements. I interpret their coefficient as a measure of their relative welfare impact, i.e. the net effect of opposite forces. For instance, the coefficient on the interaction variable *lowrank_livup* captures the effect of belonging to the lower part of the subjective economic ladder but living better as compared to 1989. The coefficient on *colleaguesup_schoolmatesdown* is associated to those people who declare that have made better in life than their former colleagues, but worse than their former schoolmates. The question is which variables are the most important, i.e. have the highest power in terms of explaining the variance of life satisfaction. Hence, in the tables, I only report two of the nine interaction terms.

Of course, the interactions between opposed attitudes create unequal groups, as people who estimate that they have done well in one dimension, say compared to their parents, most often also judge that they have gone up along other dimensions, say colleagues. The categories of interest include from 2% of the sample (*colleaguesup_schoolmatesdown*) to 27% (*lowrank_parentsdown*), i.e. between 200 and 3000 observations (see Table A.9 in the Appendix A).

The focus of this paper is on the welfare effect of cognitive perceptions, not on the impact of objective income, hence in all regressions, I systematically control for the objective level of household consumption, which is the best indicator of affluence available in the data. I also include the usual socio-demographic controls, namely age, age square, gender, size of the household, children, education dummies, occupation dummies, industry dummies, employment relation dummies (employee/wage-earner/independent farmer/unemployed) and type of firm dummies (private/public/foreign). Because the way respondents answer subjective questions can be influenced by cultural traits, which differ across nations, I control for country dummies. I cluster by country so as to adjust standard errors for intra-country correlations.

Finally, I also look at the impact of comparisons on the self-declared demand for income redistribution. Redistribution is a measure meant to correct the whole spectrum of income, not just the gap between my income and some other people's income. Hence, one might expect that the demand for redistribution will be more dependent on one's subjective ranking on a general economic ladder than on the more local comparisons to former schoolmates or colleagues.

3.1. Using subjective questions

In the prime infancy of the happiness literature, a discussion unavoidably had to be dedicated to the legitimacy of using subjective variables, to the justification of departing from the action-revealed method and to the reliability, the robustness and the meaningfulness of subjective variables, based on cross-ratings, neuro-psychological experiments and other tests of validity. With the accumulation of such arguments through time, readers have become accustomed to the use of subjective data and the literature has gained its *lettres de noblesse* in the best international economic journals. I leave it to the surveys by Frey and Stutzer (2002), Kahneman and Krueger (2006) or Clark et al. (2008a,b) to persuade the reader about the reliability of subjective questions.

4. Results

As this is one of the very first surveys asking directly questions about comparisons, it is worth verifying whether these questions are relevant. To be sure, the survey does not ask directly “do you often compare yourself to your former schoolmates” or “how important is it to you to compare with your former colleagues”. However, respondents can choose to declare that they “don't know” whether they have done better in life than the indicated group. It is thus interesting to look at the proportion of people (of at least 40 years old) who choose this modality.

It turns out that about 16% of respondents do not know whether they have “done better in life than most of their former high school classmates”; 13% of respondents do not know whether they have outpaced their 1989s colleagues; 4% choose this modality for the comparison with their parents; 2% for the comparison of their living standard to their 1989 level (and 2% for the life satisfaction question). Concerning the self-ranking questions, only 1% of respondents “don't know” where they stand on a subjective economic ladder, and 2% where they used to stand back in 1989. Given the large changes undergone by the economy and the society during the considered period, these figures are quite impressive. To appreciate them, note that 6% of respondents “don't know” what one's father's profession was. I checked that these orders of magnitudes are quite stable across countries. Further analysis showed that respondents who choose the “don't know” modality are slightly older and poorer, more often women, less educated and more often independent, especially independent farmers. I refer to the working paper version if this paper for the corresponding tables.

4.1. Comparisons are important... and asymmetric

The fact that comparison questions are relevant does not necessarily mean that they are important to people. In order to assess the actual impact of comparisons, I now regress life satisfaction over each of the concerned variables. I start with a

Table 1
The explanatory power of comparison questions. OLS estimates of life satisfaction.

	Whole sample		Rank 5 in 1989	
	1, Coef. and std. err.	2, Obs. and R2	3, Coef. and std. err.	4, Obs. and R2
Econrank1989	−0.041*** [0.006]	11,395 0.196		
Econrank2006	0.218*** [0.010]	11,523 0.280	0.268*** [0.022]	2430 0.321
Highrank	0.180*** [0.031]	11,523 0.252	0.180** [0.070]	2430 0.301
Lowrank	−0.537*** [0.030]		−0.739*** [0.047]	
Rankup	0.270*** [0.041]	11,365 0.245	0.180** [0.070]	2430 0.301
Rankdown	−0.437*** [0.037]		−0.739*** [0.047]	
Livup	0.491*** [0.036]	11,357 0.362	0.415*** [0.065]	2385 0.376
Livdown	−0.698*** [0.035]		−0.776*** [0.068]	
Colleaguesup	0.398*** [0.037]	9615 0.282	0.513*** [0.061]	2012 0.317
Colleaguesdown	−0.565*** [0.027]		−0.553*** [0.050]	
Schoolmatesup	0.443*** [0.035]	9434 0.281	0.474*** [0.052]	1979 0.309
Schoolmatesdown	−0.528*** [0.023]		−0.519*** [0.042]	
Parentsup	0.379*** [0.027]	11,079 0.265	0.436*** [0.046]	2316 0.293
Parentsdown	−0.448*** [0.034]		−0.446*** [0.063]	

Sub-sample of respondents aged over 40 and where respondent A = respondent B.

Controls: number of adults in household, number of children in household, age, gender, employment status of first job (wage-earner/independent/self-employed), dummies for state/private/foreign ownership of firm of first job, highest educational degree obtained, type of industry of first job, ever been member of Communist party, country dummies.

Econrank1989: subjective economic rank around 1989; econrank2006: subjective economic rank in 2006.

Highrank: declared rank in 2006 >5 (out of 10 rungs); lowrank: declared rank in 2006 <5; averank2006: declared rank in 2006 = 5.

Rankup: rank in 2006 > rank in 1989; rankdown: rank in 2006 < rank in 1989; rankstab: rank in 2006 = rank in 1989.

Schoolmatesup: dummy for the modalities “agree” and “strongly agree” with the statement “I have done better in life than most of my high school mates”.

Matedown: dummy for the modalities “disagree” and “strongly disagree” with the statement “I have done better in life than most of my high school mates”.

Colleaguesup: dummy for the modalities “agree” and “strongly agree” with the statement “I have done better in life than most of my colleagues I had around 1989”.

Colleaguesdown: dummy for the modalities “disagree” and “strongly disagree” with the statement “I have done better in life than most of my colleagues I had around 1989”.

Parentsup: dummy for the modalities “agree” and “strongly agree” with the statement “I have done better in life than my parents”.

Parentsdown: dummy for the modalities “disagree” and “strongly disagree” with the statement “I have done better in life than my parents”.

Livup: dummy for the modalities “agree” and “strongly agree” with the statement “My household lives better nowadays than around 1989”.

Livdown: dummy for the modalities “disagree” and “strongly disagree” with the statement “My household lives better nowadays than around 1989”.

Livstab, matesstab, colleaguestab and parentstab are dummies for the modality “neither agree nor disagree” with the aforementioned statements.

Omitted categories: averank2006 (rank = 5 in 2006) for rows 3 and 4, resp. livstab, rankstab, schoolmatestab, parentstab, colleaguestab for rows 7 to 14.

Each cell of the table corresponds to a separate regression. It displays the regression coefficients and standard errors in parenthesis (columns 1 and 3), as well as the number of non-missing observations and R2 of the regression (columns 2 and 4).

Columns 3 and 4: sub-sample of respondents who declare that in 1989 they stood on the fifth rung of a subjective 10 steps economic ladder.

Example: one percent increase on the 2006 social rank brings about 0.218% increase on the subjective life satisfaction scale (first column, second row).

All standard errors (in brackets) are clustered by country.

** Significant at 5%.

*** Significant at 1%.

simple regression of life satisfaction in order to verify that the structure of satisfaction estimates is standard with respect to the usual correlates of individual well-being (see for example Di Tella et al., 2003). As expected (Table A.1 in Appendix A), we observe a U-shaped relationship between age and satisfaction, and a positive correlation with real household expenditure and education. Men are slightly happier than women, a frequent observation in Central and Eastern Europe and in Latin America, as opposed to Western Europe and the United States (Graham and Pettinato, 2002; Guriev and Zhuravskaya, 2009; Easterlin, forthcoming; Grosfeld and Senik, 2008; Caporale et al., 2009). Life satisfaction increases with the number of adults and children in the household. Being in paid employment (whether in a private or state firm) is a source of higher satisfaction.

Table 1 shows that comparison questions have quite an important explanatory power in the regression of life satisfaction. Comparing favorably to other groups or ranking high on the social ladder has a positive impact on individual life satisfaction.

Conversely, unfavorable comparisons have a significantly negative impact on life satisfaction. A 1% move on the scale of comparison questions induces about one third percentage point variation on the life satisfaction scale. The welfare effect of income comparison is larger than that of log household expenditure. Actually, introducing comparison questions in the estimates reduces the coefficient on log real household expenditure from 0.27 (Table A.1) to lower values ranging from 0.14 to 0.18. This suggests that up to one third of the satisfaction stemming from consumption could be due not to actual consumption but to the representation of one's living standard as an achievement.

Regressing life satisfaction over one comparison variable runs into the risk of capturing different effects in the same time: both the effect of the subjective comparisons and the effect of individuals' objective current situation. Controlling for the level of household expenditure may attenuate the problem, but is not sufficient, as the effect of income comparisons is likely to differ from one income group to another. One way of controlling for unobserved heterogeneity is to consider people whose situation in 1989 was comparable. I use the 1989 ten-step ladder question in order to address the following question: conditional on declaring that around 1989 they stood on the 5th rung in terms of income (which is the case of 21% of the sample), how do comparisons affect people? In Table 1, the regressions are run both on the whole sample (column 1) and on the sub-sample of people who used to stand on the 5th rung of the 1989 economic scale (column 2). The results are qualitatively identical for both populations.

Table 1 shows that respondents who declare that they used to belong to the upper part of the economic ladder in 1989 report lower levels of life satisfaction (column 1). This can be interpreted in terms of adaptation or higher aspirations. Of course, at this stage, one cannot rule out the reverse causation interpretation, according to which less happy people in 2006 tend to form an ideal image their past economic situation.

A striking result of Table 1 is the asymmetry in the effect of comparisons; namely when comparisons are unfavorable, this has a more important (negative) impact on life satisfaction than when comparisons are favorable. Descending the ranks of the subjective ten-step ladder between 1989 and 2006 (rankdown) has a larger impact than going up (rankup). Judging that my living standard has deteriorated since 1989 (livdown) has a stronger effect (in absolute value) than feeling that it has improved (livup). Assessing that I have made worse in life than my former school mates (schoolmatesdown) has a stronger effect than having succeeded better (schoolmatesup); the same is true as concerns comparison of my life trajectory with that my colleagues (colleaguesup/colleaguesdown) or my parents (parentsup/parentsdown).

This asymmetry can be interpreted as an illustration of the loss aversion phenomenon suggested by Kahneman and Tversky (1979). It could also reflect the fact that the downside risk is more important than the upside risk in countries under review. As the questions are qualitative, there is no means to control for this. However, the general macroeconomic trends of the region do not particularly support this assumption. All the countries in the survey have experienced large GDP fluctuations between 1989 and 2006, with an initial stage of output fall, followed by a strong resumption of growth; the context is also different for the various countries of the sample which includes new members of the European Union aside with CIS countries (see for example, EBRD, 2006). However, the degree of loss aversion may be particularly high in the context of transition, which involves a higher degree of general uncertainty; this would make the results difficult to generalize.

4.2. Which comparisons matter more?

I now turn to the “horse race” between comparison benchmarks, identifying categories of people who have gone up in one dimension but down in another one, i.e. who have undergone different shocks² in different dimensions. I estimate life satisfaction on these interacted categories, keeping the same controls as in the previous estimates.

In the following tables, I display only two out of the nine interactions between each pair of variables. The sign of the coefficient is usually significantly positive for the “stable–up” and “up–up” and negative for the “stable–down” and “down–down” interactions.³

4.2.1. Local comparisons outweigh general ranking

In a recent paper, Brown et al. (2008) have shown that individual satisfaction and well-being is influenced not just by relative income but by the rank-ordered position of one's wage within a comparison set. Their results relate to intra-firm comparisons. Does this observation hold as concerns rankings in the general social ladder?

Table 2 does not validate this assumption. Panel A in Table 2 shows that local comparisons to parents, colleagues and former schoolmates are significantly more important than general social ranking. The sign of the coefficient on the interaction is always determined by the former rather than by the latter. Out-performing one's former colleagues or one's former living standard seems to be a more important element of satisfaction than ranking in the lower or in the upper part of the economic scale.

Concerning the subjective evolution of one's position on the social ladder, the observation is identical. Panel B of Table 2 shows that the negative effect of being outperformed by local competitors (schoolmatesdown, colleaguesdown, parents-

² Transition implies that an unusually large part of citizens's trajectory is due to exogenous shocks.

³ The entire regressions are available to any interested reader.

Table 2
The relative power of comparison benchmarks. OLS estimates of life satisfaction.

Panel A	1, Coef.	2, Obs. and R2	Panel C	5, Coef.	6, Obs. and R2
Highrank_livdown	−0.511*** [0.075]	11,256 0.384	Livup_rankdown	0.333*** [0.050]	11,158 0.364
Lowrank_livup	0.164*** [0.042]		Livdown_rankup	−0.514*** [0.071]	
Highrank_schoolmatesdown	−0.387*** [0.068]	9358 0.316	Livupmates_down	0.181*** [0.043]	9258 0.403
Lowrank_schoolmatesup	−0.018 [0.045]		Livdown_schoolmatesup	−0.282*** [0.063]	
Highrank_colleaguesdown	−0.130 [0.086]	9541 0.319	Livup_colleaguesdown	0.169*** [0.057]	9468 0.403
Lowrank_colleaguesup	0.318*** [0.063]		Livdown_colleaguesup	−0.390*** [0.058]	
Highrank_parentsdown	−0.292*** [0.092]	10,972 0.307	Livup_parentsdown	0.325*** [0.079]	10,860 0.391
Lowrank_parentsup	−0.149*** [0.051]		Livdown_parentsup	−0.311*** [0.051]	
Panel B	3, Coef.	4, Obs. and R2	Panel D	7, Coef.	8, Obs. and R2
Rankup_schoolmatesdown	0.141 [0.087]	10,823 0.305	Schoolmatesup_parentsdown	0.054 [0.092]	11,639 0.191
Rankdown_schoolmatesup	0.279*** [0.034]		Schoolmatesdown_parentsup	−0.073* [0.037]	
Rankup_colleaguesdown	−0.250*** [0.082]	9425 0.319	Colleaguesup_schoolmatesdown	−0.061 [0.079]	11,158 0.364
Rankdown_colleaguesup	−0.078 [0.056]		Colleaguesdown_schoolmatesup	−0.075 [0.069]	
Rankup_parentsdown	−0.204* [0.104]	9235 0.194	Colleaguesup_parentsdown	0.023 [0.095]	9258 0.403
Rankdown_parentsup	−0.052 [0.065]		Colleaguesdown_parentsup	−0.107**	

The table only displays the interaction between opposite attitudes, but all the interactions are included. The omitted category is “neutral_neutral”, i.e. averank_livstab, averank_matestab, averank_colleaguestab, averank_parentstab (panel A), rankstab_matestab, rankstab_colleaguestab, rankstab_parentstab (panel B), livstab_rankstab, livstab_matestab, livstab_colleaguestab, livstab_parentsstab (panel C), matestab_parentstab, colleaguestab_matestab and colleaguestab_parentstab (panel D).

Each cell of the table corresponds to a separate regression. It displays the regression coefficients and standard errors in parenthesis, as well as the number of non-missing observations and R2 of the regression.

Other controls and notes: same as Table 1.

All standard errors (in brackets) are clustered by country.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

down) is more important than the impact of moving up on the social ladder (rankup): the coefficient on the interaction is either negative or non significant. Conversely, the adverse effect of downward mobility on the social ladder (rankdown) seems to be offset by a favorable comparison with local reference groups; it is never strong enough to attract a significantly negative coefficient.

4.2.2. The predominant influence of internal benchmarks

Another very clear result is that the evolution in one’s standard of living, as compared to 15 years ago, has a more important welfare effect than any other comparisons (Panel C of Table 2). It dominates the change in one’s relative ranking as well as comparisons to local external benchmarks such as one’s former colleagues, classmates or parents. The interaction of livup with any other unfavorable comparison always attracts a significantly positive coefficient. Conversely, a deterioration in one’s living standard as compared to 1989 (livdown) always significantly dominates any other favorable local comparison.

The primacy of one’s own trajectory could stem from the fact that people have a more accurate idea about the evolution in their own standard of living than about the other evolutions that they are asked to evaluate. As sensible as this seems, this is not consistent with the proportion of “don’t know” answers to those questions (see Section 4, first paragraph); it also does not explain the asymmetric effect of comparisons.

Amongst local “external” comparators, which are the most important determinants of subjective well-being: schoolmates, colleagues or parents? The estimates (Panel D of Table 2) do not produce clear-cut results. The only significant interactions are between parents on the one hand and former colleagues or schoolmates on the other hand: former colleagues and schoolmates seem to be reference groups of similar importance, outweighing one’s parents.

Table 3

The demand for income distribution and comparisons OLS estimates of the demand for redistribution.

	1, coefficients and std. errors	2, observations and R2
Econrank1989	0.013** [0.005]	11,197 0.061
Econrank2006	−0.053*** [0.009]	11,322 0.070
Highrank	−0.152*** [0.033]	11,322 0.069
Lowrank	0.076*** [0.025]	
Rankup	−0.042 [0.040]	11,164 0.069
Rankdown	0.154*** [0.028]	
Livup	0.004 [0.028]	11,155 0.066
Livdown	0.152*** [0.024]	
Schoolmatesup	0.007 [0.030]	9303 0.060
Schoolmatesdown	0.039 [0.031]	
Colleaguesup	−0.019 [0.031]	9472 0.062
Colleaguesdown	0.033 [0.034]	
Parentsup	0.127*** [0.028]	10,908 0.064
Parentsdown	0.039 [0.029]	

Controls and notes: same as Table 2.

Each cell of the table corresponds to a separate regression. It displays the regression coefficients and standard errors in parenthesis (column 1), as well as the number of non-missing observations and R2 of the regression (column 2).

The estimated variable is the answer to the question whether “The gap between the rich and the poor should be reduced”. Possible answers were strongly disagree/disagree/neither agree nor disagree/agree/strongly agree, coded from 1 to 5 in ascending order.

All standard errors (in brackets) are clustered by country.

** Significant at 5%.

*** Significant at 1%.

The main lesson of Table 2 is that one's own income trajectory matters more than any other comparison benchmark. The feeling of decaying is an inconsolable pain, even for respondents who outperformed their former colleagues, schoolmates or parents.

4.3. Comparisons and the demand for redistribution

Income gaps seem to exert a sizeable impact on subjective well-being. Is this associated with a demand for income redistribution?

Table 3 shows that the agreement with the statement that “The gap between the rich and the poor today in this country should be reduced” is influenced by income comparisons. Favorable comparisons are related to a significantly lower demand for redistribution whereas unfavorable ones are associated with a significantly higher demand for income redistribution. The demand for redistribution thus seems to be consistent with the welfare effects of comparisons.

However, income redistribution is meant to correct the whole social spectrum of income, not just the gap between my income and some other people's income. Hence, one could expect the demand for redistribution to be more dependent on the subjective income ladder than on subjective local comparisons to former schoolmates or colleagues. This prediction is confirmed by Table 3. Subjective ranking appears to be a significant determinant of the demand for income redistribution, whereas among local comparison benchmarks, only parents and one's own past living standard are.

Concerning interactions, the effects are essentially similar. Panel A of Table 4 illustrates the predominance of subjective ranking (highrank, lowrank) over more local comparisons. Panel B of Table 4 shows that going down in the economic ladder (rankdown) significantly increases the preference for income redistribution. All other interactions between local benchmarks attract a non-significant or positive coefficient. This is the case of interactions that includes comparisons to one's former standard of living (Panel C of Table 4) or one's parents (Panel D). Hence, unfavorable local comparisons always dominate favorable ones. Going down in any dimension seems to be a sufficient motive of the demand for redistribution, without any clear hierarchy between local benchmarks. This last observation, again, can be interpreted as a sign of loss aversion.

Table 4
The relative impact of different comparison benchmarks on the demand for redistribution OLS estimates of the demand for redistribution.

Panel A	1, Coef.	2, Obs. and R2	Panel C	5, Coef.	6, Obs. and R2
Highrank_livdown	−0.036 [0.052]	14,595 0.065	Livup_schoolmatesdown	0.190*** [0.050]	12,338 0.059
Lowrank_livup	0.102* [0.045]		Livdown_schoolmatesup	0.275*** [0.043]	
Highrank_schoolmatesdown	−0.243*** [0.065]	13,406 0.061	Livup_parentsdown	0.255*** [0.064]	14,097 0.066
Lowrank_schoolmatesup	0.050 [0.035]		Livdown_parentsup	0.384*** [0.050]	
Highrank_colleaguesdown	−0.179** [0.067]	11,988 0.065	Livup_colleaguesdown	0.143*** [0.051]	11,677 0.064
Lowrank_colleaguesup	0.093 [0.064]		Livdown_colleaguesup	0.245*** [0.040]	
Highrank_parentsdown	−0.102 [0.061]	15,286 0.066			
Lowrank_parentsup	0.229*** [0.050]				
Panel B	3, Coef.	4, Obs. and R2	Panel D	7, Coef.	8, Obs. and R2
Rankup_parentsdown	−0.007 [0.091]	14,072 0.067	Collup_matesdown	−0.014 [0.088]	11,133 0.057
Rankdown_parentsup	0.285*** [0.043]		Colldown_matesup	0.033 [0.085]	
Rankup_livdown	−0.112 [0.070]	12,338 0.059	Collup_parentsdown	0.184*** [0.049]	11,815 0.068
Rankdown_livup	0.069* [0.040]		Colldown_parentsup	0.309*** [0.047]	
Rankup_matesdown	−0.096 [0.079]	12,320 0.055	Matesup_parentsdown	0.126* [0.064]	13,131 0.060
Rankdown_matesup	0.085*** [0.025]		Matesdown_parentsup	0.266*** [0.050]	
Rankup_collown	−0.021 [0.078]	11,570 0.065			
Rankdown_collup	0.134*** [0.043]				

Controls and notes: same as Table 2.

Each cell of the table corresponds to a separate regression. It displays the regression coefficients and standard errors in parenthesis (column 1), as well as the number of non-missing observations and R2 of the regression (column 2).

All standard errors (in brackets) are clustered by country.

- * Significant at 10%.
- ** Significant at 5%.
- *** Significant at 1%.

In summary, income comparisons seem to influence the demand for redistribution based on self-centered motives, as people express a higher demand for redistribution when they declare that they fare worse than their comparison benchmarks. Social ranking is the primary motive of the preference for income redistribution. Local comparisons exert a weak impact on the demand for redistribution. Compared to the omitted category, people who experience any unfavorable comparison are more in favor of income-equalizing measures.

4.4. Robustness of findings

This section examines whether the results are robust to other specifications of the estimates. As a first robustness test, I have run all the regressions on the entire sample of people aged over 40, without the restriction that respondent A = respondent B (see Section 2); the results were qualitatively identical. Second, as the results could be influenced by the fact that 58% of the restricted sample is made of people who were not in paid work at the time of the survey, I ran all the estimations on the sub-sample of respondents who were in paid work in 2006. Again, the results were qualitatively similar.⁴

Third, for simplicity, I chose to present OLS estimates in the text, where the coefficients are directly interpretable in terms of elasticity. However, this interpretation is based on the assumption that the answers scale is taken as continuous by respondents. In order to give more generality to the results, I ran all the regressions with an ordered probit specification and a logit specification (after collapsing the answers into two modalities⁵); the results remained qualitatively unchanged. As an

⁴ For space constraints, they are not included in the text, but are available to any interested reader.

⁵ For space constraints, the logit estimates are not included in the text, but are available to any interested reader.

illustration, Table A.1 in Appendix A presents the results of both an ordered probit and an OLS estimate of life satisfaction: the coefficients on all explanatory variables are extremely similar. Table A.2 presents an ordered probit estimate of life satisfaction including comparison benchmarks: the latter are statistically significant, with similar coefficients as in the OLS specification presented in Table 1 (column 1).

Fourth, in order to explore the possible heterogeneity in the perception of income gaps, I partitioned the sample into three equal size percentiles in terms of real household consumption, i.e. the third poorest, the third richest and the remaining tier of the sample. Table A.3 in Appendix A shows that the coefficients on comparisons benchmarks do not vary much across consumption percentiles. The main differences are that (i) subjective ranking in 1989 has a lower negative impact on welfare for the poorest percentile and (ii) the coefficient on highrank is not significant in the regression on the poorest percentile, although the number of observations is not negligible (510).

Finally, local comparisons could be more or less influent depending on the integration of the considered countries into the world market. Amongst the concerned countries, most countries of Central and Eastern Europe have now entered the European Union; two of them have gone as far as adopting the Euro as their national currency (Montenegro and Slovenia). One could expect that these new members of the European Union are more integrated into the rest of the world, hence less sensitive to local comparisons. However, Table A.4 in the Appendix A shows that there is no difference in the impact of comparisons whether respondents are citizens of the European Union, the Community of Independent States (CIS) or Former Yugoslavia.

5. General conclusions

Income comparisons do seem to exert an impact on subjective well-being per se. “Internal benchmarks” created by one’s own trajectory are the most powerful. This does not mean that external benchmarks are not important; local comparison to precise groups of people prove to be more influential than self-ranking on an economic ladder. Comparisons to former schoolmates and colleagues are also more important than comparison to one’s parents. The analysis also provides pervasive evidence of loss aversion. Unfavorable comparisons are always more powerful, in terms of welfare effect, than positive ones.

The welfare impact of comparisons is associated with a consistent demand for redistribution in the sense that unfavorable comparisons, which reduce life satisfaction, also call for higher income redistribution (and conversely). However, the demand for redistribution is essentially associated with social ranking, rather than with local comparison benchmarks.

The two main results, i.e. the power of comparisons to one’s own past level of income and loss aversion, can be interpreted as manifestations of adaptation. Models of habituation with adjustment costs are consistent with the stronger effect of a reduction in consumption as compared to an increase. Indeed, with adaptation, the welfare effect of an increase in one’s income partly “evaporates” due to the “preference drift”, whereas the welfare effect of a decrease in income is magnified: individuals then suffer not only from the reduced consumption due to the fall in their income but also from the adjustment in the level of aspirations.

The higher welfare impact of one’s own trajectory and of the reference groups formed by former schoolmates and colleagues can be interpreted as the effect lost or seized opportunities. What is painful is to have done worse than people who were like you at some point. This is much more important than moving along the general economic ladder. People suffer less from going down in the social hierarchy if all their former peers share the same fate. But they hate under-performing their former companions. This may be because reference groups represent some virtual, potential achievement. In summary, the idea would be that comparisons hurt not so much because of relative deprivation but rather because people care about having seized their opportunities.

The fact that local comparisons have a higher impact on subjective well-being, whereas the demand for income redistribution is mostly responsive to social ranking bears policy implications. Aversion to inequality should not be confused with relative utility. People suffer from relative deprivation rather than from general income inequality. They especially dislike experiencing a decline in their living standard. But this does not turn them in favor of income equalization. Hence, offering people the opportunity to improve their own situation and achieve their projects could be more welfare improving than narrowing the income ladder.

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Appendix A.

Please see the Tables A.1–A.9 .

Table A.1
Basic regressions of life satisfaction, OLS and ordered probit estimates.

	–1, OLS	–2, ordered probit
Log real household expenditure	0.266*** [0.018]	0.271*** [0.018]
Age	–0.048** [0.004]	–0.048*** [0.004]
Age square	0.000*** [0.000]	0.000*** [0.000]
Male	0.041 [0.025]	0.047* [0.025]
# adults 14 years and older	0.068*** [0.009]	0.071*** [0.010]
# children less than 14 years	0.038** [0.014]	0.038*** [0.014]
Private firm	0.145* [0.076]	0.153* [0.080]
State firm	0.147* [0.075]	0.146* [0.080]
Foreign firm	0.120 [0.088]	0.138 [0.092]
Wage-earner	–0.272 [0.183]	–0.299 [0.184]
Self-employed	0.049 [0.155]	0.050 [0.157]
Independent farmer	0.031 [0.213]	0.010 [0.217]
Compulsory education	–0.006 [0.049]	–0.013 [0.050]
Secondary education	0.160*** [0.057]	0.158*** [0.058]
Professional training	0.098* [0.050]	0.092* [0.051]
University	0.325*** [0.063]	0.325*** [0.062]
Post-graduate	0.514*** [0.090]	0.556*** [0.095]
Constant	1.942*** [0.133]	
Observations	16,570	16,570
R-squared	0.198	

Omitted categories: not in paid employment/no education. Country dummies and industry dummies included. Sub-sample of respondents aged over 40 and where respondent A = respondent B. All standard errors (in brackets) are clustered by country.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Table A.2
Ordered probit estimates of life satisfaction including comparison benchmarks.

	–1, Coef.	–2, observations
Econrank1989	–0.041*** [0.006]	11,395
Econrank2006	0.236*** [0.012]	11,523
Highrank	0.214*** [0.039]	11,523
Lowrank	–0.551*** [0.030]	
Rankup	0.306*** [0.044]	11,365
Rankdown	–0.449*** [0.037]	
Livup	0.612*** [0.045]	11,357
Livdown	–0.743*** [0.038]	
Colleaguesup	0.453*** [0.043]	9615
Colleaguesdown	–0.577*** [0.031]	

Table A.2 (Continued)

	–1, Coef.	–2, observations
Schoolmatesup	0.499*** [0.042]	9434
Schoolmatesdown	–0.540*** [0.027]	
Parentsup	0.407*** [0.033]	11,079
Parentsdown	–0.460*** [0.039]	

Controls and notes: same as Table 1.

Each cell of the table corresponds to a separate regression. It displays the regression coefficients and standard errors in parenthesis, as well as the number of non-missing observations.

All standard errors (in brackets) are clustered by country.

*** Significant at 1%.

Table A.3

Life satisfaction and comparisons, by percentiles of real household consumption OLS estimates of life satisfaction.

	1, poor	2, middle	3, rich
Econrank2006	0.224*** [0.014]	0.208*** [0.012]	0.225*** [0.018]
Observations	4729	3721	3073
R-squared	0.280	0.252	0.270
Econrank1989	–0.020* [0.011]	–0.058*** [0.011]	–0.054*** [0.010]
Observations	4679	3674	3042
R-squared	0.187	0.181	0.183
Highrank	0.040 [0.078]	0.190*** [0.041]	0.298*** [0.046]
Lowrank	–0.671*** [0.052]	–0.459*** [0.040]	–0.473*** [0.050]
Observations	4729	3721	3073
R-squared	0.252	0.223	0.244
Rankup	0.277*** [0.071]	0.358*** [0.063]	0.184** [0.066]
Rankdown	–0.446*** [0.045]	–0.374*** [0.053]	–0.502*** [0.066]
Observations	4669	3663	3033
R-squared	0.235	0.228	0.235
Livup	0.500*** [0.056]	0.525*** [0.036]	0.465*** [0.049]
Livdown	–0.754*** [0.046]	–0.634*** [0.055]	–0.678*** [0.055]
Observations	4671	3664	3022
R-squared	0.365	0.340	0.346
Colleaguesup	0.430*** [0.063]	0.383*** [0.051]	0.416*** [0.046]
Colleaguesdown	–0.614*** [0.039]	–0.543*** [0.051]	–0.497*** [0.044]
Observations	3776	3142	2697
R-squared	0.295	0.258	0.259
Schoolmatesup	0.460*** [0.072]	0.455*** [0.047]	0.429*** [0.042]
Schoolmatesdown	–0.550*** [0.041]	–0.497*** [0.040]	–0.534*** [0.044]
Observations	3657	3120	2657
R-squared	0.279	0.262	0.259
Parentsup	0.428*** [0.044]	0.363*** [0.045]	0.333*** [0.050]
Parentsdown	–0.464*** [0.049]	–0.395*** [0.049]	–0.470*** [0.061]

Table A.3 (Continued)

	1, poor	2, middle	3, rich
Observations	4504	3600	2975
R-squared	0.272	0.238	0.246

Controls and notes: same as Table 1. Each cell of the table corresponds to a separate regression. It displays the regression coefficients and standard errors in parenthesis, as well as the number of non-missing observations and R2 of the regression.

All standard errors (in brackets) are clustered by country.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

Table A.4

Comparisons and life satisfaction, by regions OLS estimates of life satisfaction.

	CIS		European Union		Former Yugoslavia	
	Coefficient	Obs. and R2	Coefficient	Obs. and R2	Coefficient	Obs. and R2
Econrank2006	0.222*** [0.015]	6054 0.291	0.198*** [0.017]	6932 0.257	0.263*** [0.021]	2819 0.257
Econrank1989	-0.036*** [0.006]	5445 0.200	-0.042*** [0.010]	6411 0.185	-0.041** [0.014]	2676 0.138
Livup	0.498*** [0.059]	5376 0.365	0.467*** [0.046]	6402 0.346	0.502*** [0.065]	2654 0.310
Livdown	-0.643*** [0.027]		-0.668*** [0.053]		-0.796*** [0.029]	
Schoolmatesup	0.468*** [0.062]	4961 0.325	0.381*** [0.035]	5808 0.270	0.429*** [0.089]	2519 0.228
Schoolmatesdown	-0.590*** [0.051]		-0.567*** [0.032]		-0.541*** [0.048]	
Colleaguesup	0.455*** [0.075]	4132 0.313	0.335*** [0.056]	5360 0.265	0.430*** [0.077]	2334 0.238
Colleaguesdown	-0.590*** [0.048]		-0.587*** [0.016]		-0.575*** [0.059]	
Parentsup	0.370*** [0.042]	5681 0.284	0.331*** [0.052]	6732 0.247	0.212** [0.049]	2720 0.197
Parentsdown	-0.485*** [0.033]		-0.453*** [0.061]		-0.499*** [0.075]	

Controls and notes: same as Table 1.

Each cell of the table corresponds to a separate regression. It displays the regression coefficients and standard errors in parenthesis, as well as the number of non-missing observations and R2 of the regression.

All standard errors (in brackets) are clustered by country.

*** Significant at 1%.

Table A.5

Country composition of the sample.

	Observations weighted	Percentage weighted
Albania	420	3.3
Armenia	374	3.0
Azerbaijan	307	2.4
Belarus	440	3.5
Bosnia	418	3.3
Bulgaria	600	4.7
Croatia	567	4.5
Czechrep	529	4.2
Estonia	567	4.5
Fyrom	395	3.1
Georgia	488	3.9
Hungary	614	4.8
Kazakhstan	420	3.3
Kyrgyzstan	349	2.8
Latvia	569	4.5
Lithuania	544	4.3
Moldova	501	4.0
Mongolia	269	2.1
Montenegro	401	3.2
Poland	455	3.6
Romania	474	3.7
Russia	489	3.9

Table A.5 (Continued)

	Observations weighted	Percentage weighted
Serbia	430	3.4
Slovakia	481	3.8
Slovenia	485	3.8
Tajikistan	308	2.4
Ukraine	473	3.7
Uzbekistan	321	2.5
Total observations, unweighted	11,876	100

Weights (3rd column) correct for the national composition of the population but do not reconstitute the size of the different countries.

Table A.6

Socio-demographic variables.

Variable	No. observations	Mean weighted	Std. Dev. weighted	Min	Max
Log real household expenditure	11,842	7.4	0.9	1	10.2
Nb Adults in household	11,874	2.0	1.2	1	12
Nb Children in household	11,874	0.2	0.6	0	7
Age	11,874	58.6	11.8	41	97
Gender	11,874	0.5	0.5	0	1

Table A.7

Professional variables.

	Freq. weighted	Percent weighted
Highest degree of education obtained		
Compulsory education	857	6.8
Secondary education	2524	19.9
Professional training	2638	20.8
University	4095	32.3
Post-graduate	2453	19.4
No education	112	0.9
Employment status in primary job		
Unemployed	7295	57.7
Employee	4297	34.0
Self-employed	848	6.7
Independent farmer	207	1.6
Among employed people		
State firm	1788	44
Private firm	2274	56
Foreign owned firm	180	4.4
Type of industry of primary job		
Unemployed	7321	57.7
Agriculture hunting and forestry	666	5.3
Fishing fish farming	28	0.2
Mining and quarrying	80	0.6
Manufacturing	668	5.3
Electricity gas and water supply	220	1.7
Construction	505	4.0
Wholesale and retail trade; repair	587	4.6
Hotels and restaurants	137	1.1
Transport communications	404	3.2
Financial intermediation	89	0.7
Real estate renting and business activities	62	0.5
Public administration military social	367	2.9
Education	613	4.8
Health and health work	352	2.8
Other community social and personal services	485	3.8
Activities of households	90	0.7
Extra-territorial organizations and bodies	15	0.1

Weighted statistics. Weights correct for the national composition of the population but do not reconstitute the size of the different countries.

Table A.8
Subjective variables.

Variable	Observations	Mean	Std. Dev.	Min	Max
Life satisfaction	11,672	2.93	1.16	1	5
Econrank2006	11,738	3.94	1.78	1	10
Econrank1989	11,608	5.57	2.13	1	10
Livup	11,478	0.27	0.44	0	1
Livdown	11,478	0.52	0.50	0	1
Livstab	11,478	0.21	0.41	0	1
Highrank	11,738	0.16	0.37	0	1
Lowrank	11,738	0.60	0.49	0	1
Averank	11,738	0.23	0.42	0	1
Rankup	11,574	0.16	0.37	0	1
Rankdown	11,574	0.65	0.48	0	1
Rankstab	11,574	0.19	0.40	0	1
Matesup	9535	0.28	0.45	0	1
Matesdown	9535	0.34	0.47	0	1
Matestab	9535	0.37	0.48	0	1
Collup	9724	0.26	0.44	0	1
Colldown	9724	0.35	0.48	0	1
Collstab	9724	0.39	0.49	0	1
Parentsup	11,207	0.52	0.50	0	1
Parentsdown	11,207	0.27	0.44	0	1
Parentstab	11,207	0.22	0.41	0	1
Reduce inequality	16,335	4.19	0.95	1	5

Weighted statistics. Weights correct for the national composition of the population but do not reconstitute the size of the different countries. The mean value of these dummy variables indicates the proportion of respondents who chose the corresponding modality.

Table A.9
Interactions between opposite attitudes: proportion of observations.

Variable	Observations	Weighted freq.	Mean	Std. Dev.	Min	Max
Highrank_schoolmatesdown	9456	10,110	0.03	0.17	0	1
Lowrank_schoolmatesup	9456	10,110	0.11	0.32	0	1
Highrank_colleaguesdown	9647	10,375	0.03	0.18	0	1
Lowrank_colleaguesup	9647	10,375	0.11	0.31	0	1
Highrank_parentsdown	11,094	11,828	0.03	0.16	0	1
Lowrank_parentsup	11,094	11,828	0.27	0.44	0	1
Highrank_livdown	11,372	12,127	0.05	0.22	0	1
Lowrank_livup	11,372	12,127	0.11	0.31	0	1
Livupschool_schoolmatesdown	9337	9968	0.04	0.21	0	1
Livdownschool_schoolmatesup	9337	9968	0.10	0.29	0	1
Livup_colleaguesdown	9556	10,266	0.04	0.21	0	1
Livdown_colleaguesup	9556	10,266	0.08	0.28	0	1
Livup_parentsdown	10,969	11,690	0.03	0.16	0	1
Livdown_parentsup	10,969	11,690	0.20	0.40	0	1
Livup_rankdown	11,272	12,022	0.09	0.29	0	1
Livdown_rankup	11,272	12,022	0.02	0.15	0	1
Rankup_schoolmatesdown	9332	9968	0.03	0.18	0	1
Rankdown_schoolmatesup	9332	9968	0.15	0.36	0	1
Rankup_colleaguesdown	9531	10,242	0.03	0.18	0	1
Rankdown_colleaguesup	9531	10,242	0.13	0.34	0	1
Rankup_parentsdown	10,944	11,663	0.02	0.15	0	1
Rankdown_parentsup	10,944	11,663	0.30	0.46	0	1
Colleaguesup_parentsdown	9483	10,189	0.03	0.17	0	1
Colleaguesdown_parentsup	9483	10,189	0.11	0.31	0	1
Colleaguesup_schoolmatesdown	8843	9504	0.02	0.14	0	1
Colleaguesdown_schoolmatesup	8843	9504	0.02	0.15	0	1
Schoolmatesup_parentsdown	9280	9916	0.03	0.18	0	1
Schoolmatesdown_parentsup	9280	9916	0.11	0.31	0	1

Weighted statistics. Weights correct for the national composition of the population but do not reconstitute the size of the different countries. The mean value of these dummy variables indicates the proportion of respondents who chose the corresponding modality.

Appendix B. Descriptive statistics

Sample restricted to respondents aged over 40, where respondent A = respondent B, and no observation is missing for the subjective comparison questions.

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