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***When Information Dominates Comparison:  
A Panel Data Analysis Using Russian Subjective Data***

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**When Information Dominates Comparison.  
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**Abstract**

We propose a micro-econometric investigation into the relation between subjective life satisfaction and income distribution, using a balanced panel survey of the Russian population (RLMS), running from 1994 to 2000, including 4096 individuals. We show that in the context of the Russian very volatile environment, Hirschman's (1973) "tunnel effect" conjecture seems to be validated : variables reflecting income distribution do not influence satisfaction through social comparisons; individuals rather seem to use their informational content in order to form their expectations. The reference group's income exerts a **positive** influence on individual satisfaction, which contrasts with other studies on the subject. Inequality indices do not affect individual welfare.

**Key words:** subjective welfare, relative income, inequality, transition, panel data.

**JEL Codes:** I31, D60, D63, P30

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## **I. Introduction**

How does income distribution affect individual utility? In a seminal paper, Hirschman (1973) suggested that individuals could derive positive flows of utility from observing other people's faster progression if they interpret this evolution as a sign that their turn will come soon (for instance if the other lane of cars starts progressing towards the exit while their lane is still immobile in a tunnel's traffic jam). Dubbed the "tunnel effect" after the metaphor used by the author, this suggests that rising inequality may increase welfare, even for the poor, if it is interpreted as a positive signal. This is at odds with the vision of Thurow (1977) who indicated that people may dislike inequality as such because they have quasi-aesthetic preferences for more equal distributions of wealth. The same opposition can be found, concerning the interpretation of the reference level of income, i.e. the income of a reference group, which can be defined as the set of "relevant others" (e.g. peers, people living in the same area, of the same gender, doing the same job, with the same level of qualification, or people just above me in the distribution of income, etc.). On the one hand, the notion that utility is relative dates back to Veblen (1899) and Duesenberry (1949) and implies that individual utility depends on the comparison of one's income relative to a reference level, i.e. to the income of a reference group. This comparison effect has been documented since then, e.g. van de Stadt et al. (1985) and Clark and Oswald (1996); its consequence is that the reference group's income should affect individual utility negatively. On the other hand, Hirschman's conjecture suggests that an individual can use the observation of his reference group's income as an information about his own perspectives (see also Levy-Garboua and Montmarquette, 2001), hence derive a positive utility from it. There are then at least two ways in which income distribution may affect subjective welfare : either as a direct argument in individual utility, or as a piece of information used to form

expectations about future variables<sup>1</sup>. Our purpose is to try to disentangle these two aspects, focusing on the notion of the reference level of income.

We propose an empirical test of this issue based on the analysis of individual life satisfaction judgements; we use the 5 last rounds of the Russian Longitudinal Monitoring Survey (RLMS), a representative household survey that runs from December 1994 to October 2000<sup>2</sup>. The balanced panel includes 4096 individuals (descriptive statistics are presented in Annex II). We hinge on the longitudinal, panel nature of the data in order to analyze intra-individual variations in satisfaction, using various econometric specifications as a test of robustness of the results.

This relies on an interpretation of the transition as a natural experiment characterized by an unusually high variance in absolute and relative incomes. Since 1992 indeed, transition countries have witnessed large movements in the distribution of wealth, income and labor market status, due to the transformation of the coordination system, the productive structure and relative prices in the economy. These evolutions have been associated with a high degree of uncertainty both at the individual level (employment and income perspectives) and at the aggregate level (macroeconomic and regulatory environment). Rising income inequality is an important part of this evolution<sup>3</sup>. In the particular case of Russia, the presence of mineral and energy resources, and their privatization through the 1995 «loans for share» program, has led to a sharp increase in the income gap. The swings in macroeconomic policy also shook the population's income (Tables A1 to A3 in Annex I) from the years of high inflation 1992-1995,

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<sup>1</sup> This implies that agents are forward looking and that their satisfaction depends not only on their current income, but also on their expected schedule of future income flows. An extreme version of this assumption is the theory of anticipatory feelings (Leahy and Caplan, 2000).

<sup>2</sup> All information about the RLMS, including the data itself, is available on the internet at the address [www.epc.unc.edu/projects/rlms](http://www.epc.unc.edu/projects/rlms).

<sup>3</sup> In the late 1980's, the Gini coefficient for socialist economies averaged about 23 points, whereas Western countries' coefficients were about 6 points higher. With the transition, these coefficients have increased, sometimes dramatically, above 50 in Russia for example. This results from explicit and implicit asset redistribution, primarily through privatization, the suppression of subsidies, the liberalization of wages and prices, and the gap between the State and the new more productive private sector's wages (see also Brainard, 1999, Ferreira, 1999 and Commander et al., 1999).

through a period of monetary austerity and exchange rate stability, until the 1998 devaluation and the following resumption of growth (see Lokshin et al., 2000).

How do individuals perceive these important fluctuations? Is the Hirschman assumption verified? We believe that the Russian context constitutes an ideal material to test this conjecture as it enshrines all the necessary ingredients: uncertainty, growing inequality and prospects for development. Ravallion and Lokshin (2000) have already advocated the presence of a “tunnel effect” in Russia, based on the analysis of the demand for income redistribution in 1996. Analyzing the answers to the question “*do you agree that the government should restrict the income of the rich?*”, they show that individuals who answer positively are not necessarily those who are poorer but rather those whose perspectives are more uncertain. This is consistent with the conjecture that it is not inequality *per se* that affects individual utility. We pursue the exploration of this issue concentrating on the notion of the reference level of income. We show that in the Russian very volatile environment, individuals appreciate positively the evolution of their reference group’s income, which suggests that the informational effect dominates the comparison effect.

The next section presents the empirical strategy with more details; section 3 discusses the results and section 4 concludes.

## **2. Empirical strategy**

We use the 5 last rounds of the RLMS household survey that runs from December 1994 to October 2000. The balanced panel includes 4096 individuals<sup>4</sup> and is representative of the Russian population<sup>5</sup> (descriptive statistics are presented in Annex II). We analyze

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<sup>4</sup> The panel nature of the data is crucial in order to avoid the usual inter-personal comparison and omitted variables problems associated with the analysis of subjective satisfaction judgements. It is also necessary in order to take into account the dynamic nature of satisfaction variables. This is, to our knowledge, the first study exploiting the whole time dimension of the RLMS data. Ravallion and Loshkin have used this database in the past (2000 and 2001), but they have either concentrated on the analysis of one round or simply used the difference between 2 rounds.

<sup>5</sup> As the survey is based on a stratified sample of dwelling units, the attrition bias is due households or individuals who move (not talking about non response); it represent about 15% of the initial sample, a low rate by international standards. The attrition bias although small, essentially consists in the loss of

the answers to the Life Satisfaction Question contained in the adult questionnaire<sup>6</sup>. The question is : “*to what extent are you satisfied with your life in general at the present time?*”. Respondents must tick one of the following answers : *fully satisfied, rather satisfied, both yes and no, less than satisfied, not at all satisfied*. We interpret this ordinal, discrete variable as a proxy for the flow<sup>7</sup> of utility derived by individuals, assuming a latent continuous utility function. Due to the smallish proportion of people choosing the *fully satisfied* answer, we aggregate the *fully* and *rather satisfied* together.

Obviously (Table 1), the distribution of the population into satisfaction categories varies during the considered period, with a general movement of rising dissatisfaction until 1998 and an upheaval of satisfaction from 1998 to 2000 (which can be associated with the return of growth and domestic production after the 1998 devaluation of the ruble).

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urban households, especially from Moscow and St Petersburg regions, as well as of households with higher income and expenditure. Attrition also has the effect of aging the panel of individuals.

<sup>6</sup> An alternative choice would be to use the “economic rank” question which is formulated the following way: “*and now please imagine a 9 steps ladder where on the bottom, the first step, stand the poorest people, and on the highest step, the ninth, stand the rich. On which step are you today?*” (see Table E1 in Annex II). Ravallion and Lokshin (2001) interpret this variable as a measure of “economic satisfaction”. As this question contains a notion of comparison, using it would be tautological for our purpose. In round 9, a specific question is asked about economic satisfaction: “*Tell me please, how satisfied are you with your economic conditions at the present time?*”. The interviewed person must tick one response out of the same set as for the life satisfaction question, from *very satisfied* to *not at all satisfied*. It turns out that the answers to this question are more correlated with *life satisfaction* ( $R^2 = 0.57$ ) than with *economic rank* ( $R^2 = 0.42$ ), confirming our view that economic rank is too narrow a concept for our purpose. The same results hold with Spearman rank correlation coefficients (the  $R^2$  are respectively equal to 0.57 versus 0.44).

<sup>7</sup> The alternative would be to consider the answer as a measure of the stock of happiness accumulated by the individual. We believe that the way the question is formulated encourages the interviewed person to think about his current life conditions as opposed to the average satisfaction over his entire life.

**Table 1**  
**The Evolution of Life Satisfaction in Russia 1994-2000**  
*To what extent are you satisfied with your life in general at the present time ?*

	Round 5	Round 6	Round 7	Round 8	Round 9	Total
Not satisfied						5636
%	22.80	28.75	31.80	37.85	23.93	29.13
Rather not						7495
%	44.18	38.54	37.99	34.68	38.75	38.74
Yes and no						3874
%	20.48	20.80	19.89	17.17	21.88	20.02
Satisfied (fully and rather)						2344
%	12.53	11.91	10.32	10.30	15.44	12.11
<i>Total</i>	<i>3671</i>	<i>3736</i>	<i>3827</i>	<i>4049</i>	<i>4066</i>	<i>19349</i>

The mobility of individuals across categories of satisfaction during the 5 rounds of the RLMS study (Table 2) is noticeable. In average, only about 40% of the population remains in the same category from one round to the other. The most stable category is the *not satisfied at all*, with 50% of that class remaining in the same category throughout the study. The other categories are less stable, and it is surprising that almost 10% of the *rather not satisfied* become *satisfied* at some point, while 13% of the *satisfied* become *unsatisfied*.

**Table 2**  
**The Mobility of Satisfaction Responses Across the 5 Last Rounds of RLMS**

	Not satisfied	Rather not	Yes and no	Satisfied	Total
Not satisfied					4626
%	50.71	31.95	11.91	5.43	100
Rather not					5875
%	26.60	45.38	18.77	9.24	100
Yes and no					2962
%	19.14	36.29	30.62	13.94	100
Satisfied					1708
%	12.88	29.16	24.00	33.96	100
Total %	30.95	37.68	19.58	11.78	100
<i>Total observations</i>	<i>4696</i>	<i>5717</i>	<i>2971</i>	<i>1787</i>	<i>15171</i>

Using satisfaction judgements requires some explanation as these variables are sometimes regarded with suspicion by economists who are more attached to action-

revealed preferences<sup>8</sup>, even though the stock of economic studies based on subjective data is important and vivid<sup>9</sup>. The reluctance to use subjective data is motivated by a multifaceted doubt about the psychological mechanisms that underlie people's sayings: social constraints on self image, cultural biases towards demonstrating or hiding satisfaction, interaction with the surveyor, questionable lucidity and memory of the surveyed person, formulation and questions order effects, answers to irrelevant questions, cognitive dissonance, «mood effects»<sup>10</sup> (see Bertrand et Mullainathan, 2001) and difficulty to interpret the answers. This last point may well be the most delicate, whereas the others result in classical measurement errors which can be benign if they are not correlated with explanatory variables. The specific difficulty with subjective variables rests in the possible bias introduced by language or culture in the link between the latent variable (actual satisfaction) and its expression (satisfaction judgements). The main issue is whether individuals associate the same labels to the same satisfaction level. If not, then interpersonal comparisons of responses are meaningless. Dubbed the «anchoring effect» (Winkelmann and Winkelmann, 1997), this problem is not insuperable as long as it is possible to depart from the analysis of satisfaction levels and turn to variations in satisfaction. The anchoring effect is thus a problem for cross-section analysis (especially if the anchor is correlated with explanatory variables), but not for longitudinal panel data.

Using subjective data raises other problems such as analyzing discrete observations, assuming the same utility function for many individuals<sup>11</sup>, and dealing with individual

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<sup>8</sup> A distinction is often made between *decision utility*, which reflects preferences, and *experienced utility* a more Benthamian notion, which can diverge from the former (see for example Frey and Stutzer, 2002). We refer to the second notion.

<sup>9</sup> A stream of recent research on political values, demand for redistribution and votes, hinges on subjective attitudinal questions including life satisfaction, e.g. Alesina, di Tella, and Mac Culloch (2000), Corneo and Grüner (2000, 2001), Corneo (2000), Di Tella and Mac Culloch (2001), Ravallion and Lokshin (2000).

<sup>10</sup> According to Diener et al. (1999) however, empirical studies reveal that the stable component of satisfaction is dominant in the satisfaction answers. Ravallion and Lokshin (2001) note that even though mood variability may reduce the statistical fit with the regressors related to long term determinants of welfare, it is not an obvious source of bias.

<sup>11</sup> The problem is that considering a common subjective welfare function for everybody (even allowing for individual effects) implies making inter-personal comparisons and assuming that one is actually

heterogeneity and unobserved variables. However, far from than being specific to subjective data, these caveats are the common lot of econometric analysis. Rather, our main difficulty will be to implement panel data analysis in order to deal with individual heterogeneity<sup>12</sup>, while respecting the ordinal nature of the satisfaction variable.

The last objective can be met using an ordered logit (or probit) statistical model (see van Praag et al., 2000, for instance) of the following form: as individuals answer the life satisfaction question, they choose among 5 verbal labels which we collapse into 4 ordered categories  $u_1 \dots u_4$ . Hence, if  $U_{it}$  is the latent utility function and  $u_k$  the declared level of satisfaction (with  $t=1, 5$ ), we can write:

$$P(U_{it} = u_k) = P(\mu_{k-1} < F(\varepsilon_{it}, X_{it}, \theta) < \mu_k), \quad k = 1, 4 \quad (1)$$

Or equivalently :

$$P(U_{it} = u_k | X_{it}) = P(\mu_{k-1} < \theta' \cdot X_{it} + \varepsilon_{it} < \mu_k), \quad k = 1, 4 \quad (2)$$

Where,  $F$  is a linear satisfaction function depending on a vector of characteristics  $X_{it}$ , a parameter vector  $\theta$ , a random variable  $\varepsilon_{it}$  that follows a normal a logistic distribution, and a set of parameters  $\mu_k$  (cut-points).

In order to take heterogeneity into account, the most usual route is to assume that unobserved individual heterogeneity takes the form of an additive individual (fixed or random) effect  $v_i$  which is explicitly included in the individual welfare function (i.e.  $\varepsilon_{it} =$

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dealing with measures of utility (cardinalization) instead of a mere ranking of utility levels. This is a strong assumption in view of the foundations of economic theory. However, the idea of preference intensity has its partisans. Ng (1997) for instance, pleads for the cardinality of utility on the basis of his conviction that he is able to estimate exactly how much he prefers bundle A to bundle B (see also Van Praag, 2000). Physicians have established the positive correlation between emotional expressions or brain activity and answers to satisfaction questions, which suggests that "a materialistic (biological, neural) basis of mind makes interpersonal comparisons of utility possible" (Ng, 1997). Diener et al. (1999) show that individuals are able to recognize and predict the satisfaction levels of others; in particular, their spouses or friends. Ultimately, there is almost no measure of economic policy that can be thought of without inter-personal comparison of utility.

<sup>12</sup> Neglecting individual heterogeneity can lead to a problem of omitted variables that can seriously bias the estimation of the welfare function and lead to spurious regressions. The intuition of this problem is that there are some time invariant individual characteristics ("personality") that influence both the explanatory variables (income for instance) and satisfaction.

$\eta_{it} + v_i$ ). One can then deal with the fixed effect by taking the first difference or the difference to the mean of relevant variables (see Mundlak, 1978). However, in the case of satisfaction judgements, it would make no sense to calculate such differences ( $u_{it} - u_i$ ), as the observed variable  $u_{it}$  is ordinal. As there is no accepted general method for panel analysis allowing ordered probit or logit with fixed effects, we are thus confronted with a methodological dilemma : respecting the ordinal nature of the life satisfaction variable or using standard linear panel techniques. Our choice is to explore many routes and check that the results are robust to the method.

- (i) We run maximum-likelihood ordered logit estimations with variants in which a Mundlak transformation of the exogenous variables reproduces the between ( $X_i$ ) and within ( $X_{it} - X_i$ ) effects. We apply this treatment to all variables for which there are reasons to suspect individual heterogeneity (e.g. income and expenditure categories). We control for the fact that the 5 observations per individual are certainly not independent.
- (ii) We treat the life satisfaction variable as a continuous one. We use linear fixed effects regressions as well as standard dynamic panel techniques<sup>13</sup>. Di Tella and Mac Culloch (1999) do this as a test that the more simple specification without the lagged dependent variable holds, thus as a check test. We follow the same approach.

Of course, this route is purely heuristic. It relies on the heroic assumption that observations (individual responses) are points of the latent variable itself, i.e. exact measures of individual satisfaction. This raises many problems. First, it

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<sup>13</sup> Satisfaction is indeed certainly a dynamic variable, e.g. it could be a mean-reverting process, a target-aiming process or an addiction process. This requires taking lagged values of satisfaction into account. However, because of unobserved heterogeneity, including the lagged dependent variable in the right hand side of the equation will create some auto-correlation of the residuals. Differencing the data also makes the lagged variable correlated with the error term. To correct for this, the Generalized Method of Moments technique developed by Arellano and Bond (1991) consists in instrumenting the differenced lagged dependent variables with differenced dependent variable dated  $t-2$  and earlier. In a general way, the method consists in instrumenting the lagged satisfaction variable ( $t-1$ ) with different lagged values ( $t-2$ ,  $t-3$ ) and running a two-stage least squares fixed effects or first difference regression (see Sevestre and Trognon, 1995, for instance).

rests on the *a priori* unjustified<sup>14</sup> assumption that the (psychological) distance between the various responses is constant, i.e. the distance between the *not at all satisfied* and *less than satisfied* is the same as that between *rather satisfied* and *fully satisfied*. The fact that the variable is upper-bounded (with a maximum corresponding to the *fully satisfied* answer) is also a restriction on the form of the satisfaction variable<sup>15</sup>.

- (iii) We collapse the life satisfaction variable into two categories (satisfied/dissatisfied) and run standard conditional fixed effects logit estimations. The cost of this strategy is of course the loss of information incurred.

We include the results of the first method (ordered logit) in the text, and present the outcomes of the other methods in Annex I. Eventually, the individual welfare function that we are estimating depends on current real individual income ( $\log Y_{it}$ ), income expectations formed in  $t-1$  ( $E_{i,t-1}$ ), the individual reference group's income ( $\log Y_{\text{reference } it}$ ), socio-demographic characteristics ( $X_{it}$ ), and time and regional dummies (as well as inequality measures in some specifications) :

$$U_{it} = V [\log Y_{it}, E_{i,t-1}, \log Y_{\text{reference } it}, U_{i,t-1}, X_{it}, I_t] \quad (3)$$

Hence, with the ordered logit model :

$$P(U_{it} = u_k) = P(\mu_{k-1} < F(\varepsilon_{it}, \log Y_{it}, E_{i,t-1}, \log Y_{\text{reference } it}, U_{i,t-1}, X_{it}, I_t, \theta) < \mu_k),$$

$$\text{with } k = 1, 4 \text{ and } t = 1, 5 \quad (4)$$

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<sup>14</sup> Although van Praag (1991), in a different context, argues that individuals in their attempt to make their answers as significant as possible, always mentally divide their total imaginable welfare into equal intervals separated by the proposed labels, which means that the difference between the various satisfaction labels is the same in terms of welfare.

<sup>15</sup> For a justification of this restriction, see van Praag (1971, 1991). The idea is that individuals always evaluate their situation by comparing it to the best imaginable situation. Hence, the satisfaction score corresponding to the best situation is 1, and the satisfaction variable in general can be represented as running from 0 to 1.

In equation (4), the influence of the real income variable is obvious; *ceteris paribus* higher income should be synonymous with higher satisfaction. We use two categories of income: individual real income and household real income. In the data, individual income includes cash and non cash salaries, other paid works and income, unemployment benefits and pensions. Household income includes all possible kinds of income, including work payment, state transfers (children's benefits, stipends, subsidies, etc.), private transfers (from family, relatives, friends, church, etc.), the value of the home production of fruits, vegetables, meat and dairy products consumed or given away, net of the expenditure on home production (e.g. seed, fertilizers, feed), i.e. the largest possible notion of household general net income.

However, real income is likely to be endogenous to satisfaction because of the omitted variable problem. To deal with this issue, we run each regression both with and without income variables. Because of measurement errors and risks of under-declaration of income, we also alternatively replace real income with real household expenditure, following the idea that measurement errors are smaller on the latter variable (see Ravallion and Lokshin, 2001, for example). Household expenditure data is constructed with the same degree of analytical decomposition as household income, distinguishing the volume and cost of each element of expenditure (on food, durable goods, furniture, clothing, housing, rents, transportation, communication, land use, home production, leisure, travel, services, health, insurance, credit repayment, lending, savings and transfers). All these financial categories are deflated using a national Consumer Price Index<sup>16</sup>. Alternatively, we have used regional price indices and regional poverty lines available in the RLMS data base; our results are robust to the choice of the deflator, hence we only present those based on Russian CPI. Classically, we use the natural logarithm of the income and expenditure categories; in the particular case of our model, this is based on the assumption that utility is a concave function of income.

The role of information and expectations is central to our discussion of satisfaction and reference income. Expectations may also influence satisfaction by raising the

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<sup>16</sup> CPI are constructed by the Russian statistical organ *Russian Economic Trends*, and are available on their web site <http://www.recep.org/ret/>.

aspirations level. We thus introduce lagged income expectations in the regressions. In the linear specification, we apply the same method as for satisfaction: we instrument the lagged expectations variable with lagged periods ( $t-2$ ) and earlier.

One usually needs to make assumptions about the process of expectations themselves. However, thanks to the richness of the RLSM data, we have access to a direct measure of what we see as individual income expectations, namely the question: “*Do you think that in the next 12 months you and your family will live better than today, or worse ?*”. The answers to this question are described in Table E1 in Annex II. Expectations about material living conditions follow about the same dynamics as that of life satisfaction and income, i.e. a degradation from 1994 to 1998 followed by an upheaval. Again, income expectations are variable : less than 40% of the individuals choose the same category across all rounds. We include the response to the expectation question in ( $t-1$ ) in the regression of satisfaction at time  $t$ .

In equation (4),  $X_{it}$  is a vector of socio-demographic individual characteristics that influence life satisfaction (marital status, number of kids, size of the family, region, mother tongue, health status, education, job status). Regional dummies capture the influence of unexplained location effects such as local public goods, local job market or goods market externalities, or higher living standards (wages and prices). Lastly,  $I_t$  is a set of year dummies that capture the effect of cyclical macroeconomic fluctuations on individual satisfaction.

Finally, in certain specifications of equation (4), we include variables related to the perception of income distribution such as reference group’s income, Gini indices and Stark indices of income overhang, which are described in the following sub-sections.

### **Constructing the reference group’s income**

Following Clark and Oswald (1996), we estimate, round by round, in a separate regression, the logarithm of the typical real income of an individual, based on his highest diploma, years of experience, region, age, sex, and primary occupation ILO code (International Standard Classification of Occupations). The  $R^2$  of the regressions

vary between 13.7 (round 6) and 21.3 (round 9)<sup>17</sup>. We then use the post-estimation predicted individual log real income as a proxy for the individual's reference group's income. The rationale is that this constructed variable is the average pay-off associated with the productive characteristics of a given individual. We believe that it conveys an important informational content. In a context where the association between skills and pay-off is changing rapidly<sup>18</sup> and somewhat unpredictably, the observation of the typical income of people sharing the same skills and the same position is a good indicator of what an individual can expect for himself.

### **Inequality indices**

In order to obtain individual inequality indices, we use Stark indices of income overhang STARKH (resp. STARKL) which measure the average difference between my income and those of richer (resp. poorer) people in the country or in my region. We also include regional and national GINI indices of real income for each round.

## **3. Results**

We first present the general socio-demographic correlates of life satisfaction; we then discuss the role of the reference group's income; lastly, we turn to the influence of inequality. At each stage, we present the ordered logit estimations and check that the other methods presented in section 2 lead to the same results.

### **The usual correlates of satisfaction**

We verify that the data generate the usual socio-demographic correlates of life satisfaction, which have proven to be quite stable across countries (see for example Oswald, 1997, di Tella et al., 1996, Diener and Suh, 1997, Diener et al. 1999). As expected (Table 3), satisfaction is U shaped in age, increases with health evaluation and

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<sup>17</sup> The results of these regressions can be communicated upon demand.

<sup>18</sup> This is due to the industrial restructuring of the country which implies the contraction of certain activities (machine-building, metal-working) and the expansion of new ones (services), the changing demand for the various skills (e.g. lower demand for administrative skills, higher demand for qualified workers), the apparition of new professions (entrepreneurs), of a new private sector, etc.

years of education, is positively correlated with religious belief, with being a male, and with being married rather than divorced or widowed. The gender effect is specific to Russia ; it differs from the usual finding that women are happier than men, all things equal. Further, we find life satisfaction to be higher for those living in Moscow or St Petersburg metropolis, having a non Russian mother tongue, and answering in round 9 (i.e. in year 2000). It is an observation of all regressions that satisfaction decreases from round 5 to round 8 and then increases again. As expected, satisfaction is higher in more prestigious professions such as legislators, senior managers and officials, as well as for technicians which are in excess demand on the Russian labor market (see Grosfeld et al., 2001). As already noted by Ravallion and Lokshin (2001), household income or expenditure is a good predictor of satisfaction, better than individual income.

These are strong and invariant relations in all types of regression, robust to any specification of the satisfaction equation using the RLMS data (Tables B1 to B3 in Annex I). Hausman tests systematically show that coefficients are significantly different in the within and the between linear specifications, which confirms the importance of the individual fixed effects. We thus do not present random effect specifications of linear panel estimations.

Life satisfaction is often assumed to be a mere mean-reverting process; if this were the case, then the coefficient on lagged life satisfaction should be negative : if I was happier yesterday than on I am average (fixed effect regression), my satisfaction should decrease today because I am going back to my target level. Results do not confirm this assumption; we find that the coefficient on lagged satisfaction is positive in fixed effects specifications (Table B1 in Annex I), even though not always significant. It is also positive in between specifications (column 2 in Table B1), which is related to inter-individual persistent differences mentioned above (different «aptitude to happiness»).

**Table 3**  
**Basic Regressions of Life Satisfaction**  
**Maximum-Likelihood Ordered Logit<sup>1</sup>**

	(1)	(2)	(3)	(4)	(5)
<b>Lagged satisfaction<sup>2</sup></b>					
Less than satisfied	0,819*** (0,042)				
Yes and no	1,315*** (0,052)				
Satisfied	1,965*** (0,072)				
<b>Lagged income expectations<sup>2</sup></b>					
Worse		0,498*** (0,050)	0,480*** (0,050)	0,471*** (0,050)	0,470*** (0,057)
The same		0,741*** (0,047)	0,680*** (0,047)	0,680*** (0,047)	0,701*** (0,054)
Better		1,043*** (0,065)	0,924*** (0,066)	0,951*** (0,067)	0,953*** (0,076)
<b>Income categories</b>					
Real household expenditure (log)			0,512*** (0,025)		
Real household income (log)				0,393*** (0,024)	
Individual income (log)					0,130*** (0,019)
Age	-0,069*** (0,007)	-0,076*** (0,009)	-0,076*** (0,009)	-0,075*** (0,009)	-0,069*** (0,010)
Age square	0,001*** (0,000)	0,001*** (0,000)	0,001*** (0,000)	0,001*** (0,000)	0,001*** (0,000)
<b>Health categories<sup>2</sup></b>					
Bad health	0,622*** (0,126)	0,647*** (0,149)	0,647*** (0,149)	0,675*** (0,152)	0,746*** (0,163)
Average health	1,213*** (0,125)	1,311*** (0,150)	1,311*** (0,150)	1,315*** (0,153)	1,428*** (0,164)
Good health	1,432*** (0,132)	1,562*** (0,157)	1,562*** (0,157)	1,547*** (0,160)	1,774*** (0,173)
Very good health	1,384*** (0,214)	1,534*** (0,257)	1,534*** (0,257)	1,573*** (0,271)	1,572*** (0,331)
Household size	-0,035*** (0,012)	-0,134*** (0,015)	-0,134*** (0,015)	-0,119*** (0,015)	-0,047*** (0,017)
Believer	0,179*** (0,038)	0,205*** (0,048)	0,205*** (0,048)	0,224*** (0,048)	0,224*** (0,054)
Male	0,099*** (0,039)	0,120** (0,048)	0,120** (0,048)	0,129*** (0,048)	0,206*** (0,055)
Years education	0,019*** (0,006)	0,010 (0,007)	0,010 (0,007)	0,014* (0,007)	0,013 (0,008)
Round 6 <sup>2</sup>	0,101** (0,045)	-0,049 (0,041)	dropped	-0,281*** (0,043)	0,465*** (0,050)
Round 7	dropped	-0,213*** (0,045)	-0,049 (0,041)	-0,359*** (0,042)	0,372*** (0,052)
Round 8	-0,206*** (0,045)	0,400*** (0,043)	-0,213*** (0,045)	-0,615*** (0,044)	dropped
Round 9	0,505*** (0,040)	dropped	0,400*** (0,043)	dropped	0,686*** (0,050)

<sup>1</sup> We control for the auto-correlations of the residuals of observations relating to the same individual.

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Table 3 continued

<b>Region</b> <sup>2</sup>					
Northern and North Western	-0,423*** (0,107)	-0,334** (0,134)	-0,334** (0,134)	-0,306** (0,132)	-0,455*** (0,144)
Central and Central Black-Earth	-0,323*** (0,089)	-0,122 (0,113)	-0,122 (0,113)	-0,156 (0,112)	-0,283** (0,120)
Volga-Vaytski and Volga Basin	-0,436*** (0,089)	-0,210* (0,113)	-0,210* (0,113)	-0,257** (0,112)	-0,345*** (0,123)
North Caucasian	-0,442*** (0,094)	-0,287** (0,119)	-0,287** (0,119)	-0,230* (0,119)	-0,355*** (0,130)
Ural	-0,514*** (0,090)	-0,332*** (0,114)	-0,332*** (0,114)	-0,379*** (0,113)	-0,544*** (0,123)
Western Siberia	-0,524*** (0,098)	-0,498*** (0,121)	-0,498*** (0,121)	-0,486*** (0,122)	-0,529*** (0,134)
Eastern Siberia and Far Eastern	-0,318*** (0,098)	-0,271** (0,120)	-0,271** (0,120)	-0,259** (0,119)	-0,282** (0,133)
Russian tongue	-0,234*** (0,048)	-0,246*** (0,060)	-0,246*** (0,060)	-0,255*** (0,061)	-0,278*** (0,071)
<b>ISCO code</b> <sup>2</sup>					
Legislators, senior managers, officials	0,723*** (0,125)	0,677*** (0,154)	0,677*** (0,154)	0,688*** (0,153)	0,680*** (0,156)
Professionals	0,435*** (0,068)	0,417*** (0,081)	0,417*** (0,081)	0,418*** (0,080)	0,463*** (0,093)
Technicians	0,406*** (0,064)	0,329*** (0,075s)	0,329*** (0,075)	0,359*** (0,076)	0,356*** (0,088)
Clerks	0,178** (0,088)	0,130 (0,102)	0,130 (0,102)	0,101 (0,102)	0,089 (0,112)
Services workers	0,230*** (0,084)	0,115 (0,098)	0,115 (0,098)	0,120 (0,100)	0,058 (0,115)
Skilled agr & fish.	0,633** (0,253)	0,650** (0,267)	0,650** (0,267)	0,599** (0,277)	0,882 (0,306)
Craft and related	0,278*** (0,062)	0,257*** (0,073)	0,257*** (0,073)	0,238*** (0,073)	0,220** (0,086)
Operators and assemblers	0,280*** (0,061)	0,182** (0,073)	0,182** (0,073)	0,205*** (0,073)	0,135 (0,088)
Elementary unskilled occup.	0,080 (0,065)	0,068 (0,076)	0,068 (0,076)	0,036 (0,077)	-0,021 (0,088)
Army	0,197 (0,282)	0,117 (0,286)	0,117 (0,286)	0,120 (0,304)	0,119 (0,337)
<b>Marital status</b> <sup>2</sup>					
Married	0,039 (0,064)	-0,042 (0,076)	-0,042 (0,076)	-0,002 (0,077)	-0,092 (0,088)
Divorced	-0,219** (0,089)	-0,257** (0,106)	-0,257** (0,106)	-0,258** (0,107)	-0,413*** (0,119)
Widower	-0,221*** (0,082)	-0,204** (0,099)	-0,204** (0,099)	-0,182* (0,100)	-0,366*** (0,109)
_cut1	-0,356 (0,211)	3,314 (0,330)	3,314 (0,330)	1,965 (0,317)	0,308 (0,316)
_cut2	1,496 (0,213)	5,142 (0,332)	5,142 (0,332)	3,784 (0,319)	2,186 (0,318)
_cut3	2,880 (0,214)	6,506 (0,333)	6,506 (0,333)	5,138 (0,320)	3,535 (0,318)
Number of obs	14642	13073	13073	12942	9764
Wald chi2(37)	2094	1678	1678	1518	1096
Prob > chi2	0,000	0,000	0,000	0,000	0,000
Pseudo R2	-17602	-15832	-15832	-15747	-11959
Log likelihood	0,0763	0,066	0,066	0,062	0,056

<sup>2</sup> The reference categories are : “not at all satisfied” for lagged satisfaction, “much worse” for lagged income expectations, “very bad health” for health evaluation, Moscow and St Petersburg for region, Round 5 for rounds, “unemployed” for ISCO code, “single” for marital status.

Concerning the role of income expectations, we find that, controlling or not for the level of real income or expenditure, optimistic past income expectations attract a negative coefficient in all fixed-effects specifications (column 1 in Table B1). Using past income expectations as dummy variables, and taking the most pessimistic expectation of future income (*much worse*) as the reference category, we find that the other categories attract a significant and negative coefficient (column 1 in Tables B2 and B3). By contrast, the sign of the coefficient is positive in the between specifications (column 2 in Tables B1 and B2). This is natural and expected; it reflects the difference between fixed effects regressions, which capture the intra-individual differences in satisfaction, and «between» regressions, which capture the inter-individual differences in satisfaction : more optimistic persons are happier, everything else equal, but if I had high expectations yesterday, I am more demanding today hence more difficult to satisfy.

These results are consistent with our view about the role and importance of expectations in the formation of individual satisfaction. The next section goes deeper into the investigation of this issue.

### **The influence of the reference group's income on satisfaction**

We now include the reference group's income, constructed as indicated in section 2. In some specifications, we also include the residual of the estimation (income gap) as a proxy for the individual actual income. Alternatively, we control for the level of real household income or expenditure<sup>19</sup>. We first present the regression of life satisfaction on the entire population including unemployed persons and those with a no individual income.

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<sup>19</sup> Including household real expenditure in the regression is also meant to correct for possible measurement errors, in particular the under-declaration of income.

**Table 4.a**  
**The Positive Influence of the Reference Income (Whole Sample)**  
**Maximum-Likelihood Ordered Logit Estimates of Life Satisfaction <sup>1</sup>**

	(1)	(2)	(3)	(4)	(5)
Log Reference Income	0,247*** (0,0522)	0,179*** (0,051)	0,191*** (0,051)	0,403*** (0,050)	0,290*** (0,050)
Log Real Individual Income	0,156*** (0,019)	0,111*** (0,016)	0,078*** (0,016)		
Log Household Expenditure		0,447*** (0,026)			0,447*** (0,026)
Log Household Income			0,443*** (0,030)		
Log Income Gap <sup>2</sup>				0,156*** (0,019)	0,111*** (0,016)
_cut1	0,480 (0,369)	3,490 (0,409)	3,295 (0,414)	0,480 (0,369)	3,490 (0,409)
_cut2	2,356 (0,370)	5,404 (0,411)	5,207 (0,416)	2,356 (0,370)	5,404 (0,411)
_cut3	3,658 (0,371)	6,727 (0,412)	6,527 (0,417)	3,658 (0,371)	6,727 (0,412)
Number of observations	13612	13611	13580	13612	13611
Wald chi2(38)	967.600	1273.54	1213.06	967.60	1273.54
Prob > chi2	0,000	0.0000	0.0000	0.0000	0.0000
Log likelihood	-16953	-16757	-16743	-16953	-16757
Pseudo R2	0,040	0.0507	0.0491	0.0396	0.0507

<sup>1</sup> We control for the fact that observations that relate to the same individual are correlated.

<sup>2</sup> The income gap is the difference between individual income and reference income, i.e. the residual of the estimation of the latter.

Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%. Controls: age, marital status, household size, health evaluation, believer, gender, mother tongue, years of education, nationality, region, round.

(4) Test that the coefficient of reference income > coefficient of income gap :  $\chi^2(1) = 22.61$ , Prob >  $\chi^2 = 0.0000$ . (5) Test that the coefficient of reference income > coefficient of income gap :  $\chi^2(1) = 12.36$ , Prob >  $\chi^2 = 0.0004$ .

We find that the reference group's income exerts a positive and significant effect on individual satisfaction (Table 4.a). This positive sign is systematic, whichever the specification retained, whether income gap, real income or expenditure is included for control, whether expectations are included or not. It is also verified in linear within and between specifications, showing that the level as well as the variation in the reference income has a positive influence on satisfaction (Tables C1 and C2 in Annex I). Of course, the coefficients on individual income, household income, household expenditure and income gap are also positive and significant. In the case of the income gap, the coefficient accounts for the influence of personal income.

Note that the estimation of the reference income gives:  $y_i = z_i + \varepsilon_i$ , where  $y_i$  is the individual income,  $z_i$  is the estimated reference income and  $\varepsilon_i$  is the residual of the estimation. Neglecting the other variables, the estimation of the welfare function writes:  $U_i = \alpha.y_i + \beta.z_i + \mu_i$ , which is equivalent to  $U_i = \alpha.z_i + \varepsilon_i + \beta.z_i + \mu_i$ , i.e.  $U_i = \alpha.\varepsilon_i + (\alpha+\beta).z_i + \mu_i$ , where  $\varepsilon_i$  is the income gap, and  $z_i$  is the reference income. Hence, in order to test of the significance of the reference income, one needs to check whether  $\beta > 0$ , i.e. whether the coefficient on the reference income  $z_i$  is greater than the coefficient on the income gap  $\varepsilon_i$ . The results in Table 4.a (columns 4 and 5) show that this is indeed the case, and chi2 tests confirm that the difference is significant.

The notion of reference income for unemployed people or people without any individual income could be questioned on the grounds that the “productive characteristics” of such people are not clear<sup>20</sup>. Hence, we run the same estimation keeping only employed people with a strictly positive individual income. This halves the size of our sample, which still contains about 8000 individuals. In the remainder of the analysis of the reference income, all regressions will be made on the sub-sample of working people.

The positive influence of the reference income is confirmed by the estimation on the sub-sample of working people (Table 4.b). The coefficient of the reference income is significantly larger than that on the income gap. It is also larger than that of individual income.

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<sup>20</sup> It is also well known (Heckman, 1979) that the simple estimation of an equation gain tends to overestimate the potential income of those without an actual revenue.

**Table 4.b**  
**The Positive Influence of the Reference Income for Working People**  
**Maximum-Likelihood Ordered Logit Estimates of Life Satisfaction <sup>1</sup>**

	(1)	(2)	(3)	(4)
Log Reference Income		0,297*** (0,082) 0,008	0,224*** (0,080) 0,008	0,224*** (0,080) 0,007
Log Individual Income	0,199*** (0,025) 0,014	0,186*** (0,025) 0,014	0,125*** (0,021) 0,012	0,083*** (0,021) 0,007
Log Household Expenditure			0,472*** (0,035) 0,026	
Log Household Income				0,465*** (0,039) 0,027
_cut1	-1,563 (0,581)	-0,185 (0,696)	2,908 (0,736)	2,671 (0,746)
_cut2	0,387 (0,581)	1,768 (0,696)	4,901 (0,738)	4,663 (0,747)
_cut3	1,725 (0,582)	3,107 (0,698)	6,262 (0,740)	6,021 (0,749)
Number of observations	7941	7939	7939	7926
Wald chi2(38)	593.53	603.32	821.98	773.60
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Log likelihood	-9944	-9934	-9817	-9812
Pseudo R2	0.0384	0.0392	0.0504	0.0491

<sup>1</sup> We control for the fact that observations that relate to the same individual are correlated.

<sup>2</sup> Controls: age, marital status, household size, health evaluation, believer, gender, mother tongue, years of education, nationality, region, round. Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

In each cell, the first figure is the coefficient, the second, in parenthesis, is the standard error and the third is the marginal effect of an increase of the independent variable by one standard deviation, on the probability of choosing the "satisfied" response.

(2): the confidence interval of the coefficient for the reference income goes up from 0.000 to 0.002 when expectations are introduced. (3): the confidence interval of the coefficient for the reference income goes up from 0.005 to 0.018 when expectations are introduced. (4): the confidence interval of the coefficient for the reference income goes up from 0.005 to 0.019 when expectations are introduced.

Test that the coefficient of reference income > coefficient of income gap :  $\chi^2(1) = 13.08$ ,  $\text{Prob} > \chi^2 = 0.0003$  without other control,  $\chi^2(1) = 7.80$ ,  $\text{Prob} > \chi^2 = 0.0052$  with log total real household expenditure as control.

Computing marginal effects (Table 4.b) shows that the influence of the reference income on life satisfaction is far from negligible. Marginal effects are calculated as the effect of a 1 standard deviation increase in the independent variable on the probability of choosing the *satisfied* answer to the life satisfaction question. It turns out that the marginal effect of the reference income amounts to about 57% of the effect of an

increase in actual individual income and over 30% of the effect of an increase in real household expenditure or income.

We now introduce the Mundlak distinction between intra *versus* inter individual effects. We find that the variation in the reference level of income is more influential than the average reference level, although both have positive coefficients (Table 4.c). As before, tests show that the coefficient on the reference income is significantly higher than that on the income gap (in variation), which proves that it does have a positive influence on life satisfaction. In terms of magnitude, we find that the marginal effect of a 1 standard deviation increase in the reference income is now equivalent to a 1 standard deviation increase in individual or household income. This relates to the variation of income, the within effect; the order of magnitude of the average reference income is 3 times lower. This observation is consistent with the idea that it is the news conveyed in the reference income that affects individual satisfaction, as there is clearly more information in the variation of the reference income than in its average level.

**Table 4.c**  
**The Positive Influence of the Reference Income in the Active Population**<sup>1</sup>  
**Distinguishing Between and Within Effects**  
**Maximum-Likelihood Ordered Logit Estimates of Life Satisfaction**

	(1)	(2)	(3)	(4)
<b>Inter-Individual Effects (Average)</b>				
Log reference income		0,266** (0,127)	0,142 (0,123)	0,280** (0,119)
Log real individual income	0,312*** (0,035)	0,300*** (0,036)	0,176*** (0,034)	
Log real household expenditure			0,605*** (0,054)	
Log real household income				0,722*** (0,052)
<b>Intra-individual effects (Variation)</b>				
Log reference income		0,299*** (0,083)	0,254*** (0,083)	0,239*** (0,082)
Log real individual income	0,107*** (0,025)	0,095*** (0,024)	0,072*** (0,022)	
Log real household expenditure			0,311*** (0,041)	
Log real household income				0,334*** (0,039)
_cut1	-1,118 (0,589)	0,130 (0,784)	3,702 (0,850)	4,415 (0,862)
_cut2	0,841 (0,590)	2,091 (0,784)	5,703 (0,853)	6,413 (0,865)
_cut3	2,184 (0,591)	3,436 (0,785)	7,070 (0,854)	7,776 (0,867)
Number of observations	7941	7939	7939	7926
Wald chi2(38)	612.26	619.80	825.86	772.23
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.0405	0.0412	0.0525	0.0509
Log likelihood	-9922.	-9913	-9796	-9793

<sup>1</sup> We control for the fact that observations that relate to the same individual are correlated. We implement the Mundlak decomposition of within and between effects of the independent variables. Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%. Controls: age, marital status, household size, health evaluation, believer, gender, mother tongue, years of education, nationality, region, round.

(2) Test that the coefficient on reference income > coefficient on income gap (within):  $\chi^2(1) = 5.17$ ;  $\text{Prob} > \chi^2 = 0.0230$ . (3) Test that the coefficient on reference income > coefficient on income gap (within):  $\chi^2(1) = 4.18$ ;  $\text{Prob} > \chi^2 = 0.0410$ .

These results are unusual. Studies in relative income typically find a negative relation between reference income and satisfaction, suggesting that only relative income matters. Clark and Oswald (1996) for instance, use a similar earnings equation on British data to estimate the reference income of an individual, based on his productive characteristics

(age, qualification, occupation, region, sex); they find that job satisfaction depends negatively on what they call the «comparison income». Moreover, they find that the coefficients of individual income and reference income, although of opposite sign, are not significantly different in absolute value. Clark and Oswald (1994) also show that the disutility of unemployment is relative : the unemployment of the relevant others is positively correlated with an unemployed person's satisfaction.

We interpret our results as the sign that in the context of the Russian transition, reference group categories play a predominantly informational role. In other words, in a very rapidly changing context, social comparisons *per se* lose significance as relative positions are highly unstable. Rather, agents try to use as much information as possible in order to form their expectations concerning future variables.

### ***Controlling for individual mobility and expectations***

A skeptical view could be that the favorable influence of the reference group's income is driven by individuals who are upwardly mobile. Under this interpretation, the satisfaction of ascending individuals would hide the dissatisfaction of people who lose income and suffer from the progression of their peers. In order to test this idea, we separate the (working) population in two groups: those whose real income has increased (or remained the same) as compared to the previous round, and those whose real income has decreased. We then run two separate regressions on ascending and descending people. We find (Table 4.d) that the sign of the reference income is positive and significant in both groups. Hence, it seems that for ascending, as well as for descending people, the progression of their peers is interpreted as a good news.

This symmetry of the “tunnel effect” is certainly related to the uncertainty of the Russian environment. Most individuals are unsure about their future prospects and the valuation of their specific skills, because of the rapid economic change. Hence, for currently descending people, the progression of their peers is taken as a promise of future improvement, while for ascending people, it is interpreted as a sign that the favorable evolution of their situation is based on objective grounds. Ravallion and Lokshin (2000) have shown that up to 63% of persons belonging to the upper consumption decile in 1996 were in favor of restricting the income of the rich; the same

was true of 44% of the subjectively richest persons (those who put themselves on rungs 7 to 9 in terms of economic rank). This is because they expected their welfare to deteriorate in the next twelve months. Our own calculations show that in average, from 1994 to 2000, about 28% of the persons who belonged to the upper real income decile expected their situation to become worse or much worse in the next twelve months. Uncertainty is thus present at the top of the income ladder as well as at the bottom.

**Table 4.d**  
**The Role of the Reference Income for Ascending versus Descending People**  
**Maximum-Likelihood Ordered Logit Estimates of Life Satisfaction <sup>1</sup>**

	(1)		(2)	
	Increasing individual income	Decreasing individual income	Increasing individual income	Decreasing individual income
Log Reference Income	0,307*** (0,114)	0,345*** (0,125)	0,253** (0,111)	0,255** (0,121)
Log Individual Income	0,327*** (0,052)	0,085*** (0,027)	0,219*** (0,045)	0,053** (0,024)
Log Household Expenditure			0,436*** (0,053)	0,618*** (0,058)
_cut1	-0,320 (0,981)	-0,595 (1,477)	2,355 (1,011)	3,573 (1,476)
_cut2	1,577 (0,983)	1,340 (1,476)	4,281 (1,014)	5,576 (1,477)
_cut3	2,958 (0,985)	2,707 (1,476)	5,681 (1,016)	6,979 (1,477)
Number of observations	3546	2663	3546	2663
Wald chi2(38)	333,140	272,030	431,150	385,500
Prob > chi2	0,000	0,000	0,000	0,000
Pseudo R2	0,044	0,047	0,053	0,067
Log likelihood	-4471	-3267	-4430	-3200

<sup>1</sup> We control for the fact that observations that relate to the same individual are correlated.

<sup>2</sup> Controls: age, marital status, household size, health evaluation, believer, gender, mother tongue, years of education, nationality, region, round. Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

The same results hold when controlling for the log of total real household income.

(1) Introducing expectations dummies increases the confidence interval of the reference income coefficient from 0,007 to 0,072 for individuals whose personal income has increased since the last round, and from 0,006 to 0,012 for those whose individual income has gone down. (2) Introducing expectations dummies increases the confidence interval of the reference income coefficient from 0,023 to 0,141 for individuals whose personal income has increased since the last round, and from 0,036 to 0,062 for those whose individual income has gone down.

The informational role played by the reference income is comforted by the following observation : when current expectations about future income are introduced in the regression, they reduce the explanatory power of the reference income, especially for

individuals whose personal income decreases (they increase the confidence interval of the reference income coefficient so much as to change the level of significance).

As another test of our conjecture, we have selected the occupation groups whose income increased in average from round 8 (1998) to round 9 (2000), i.e. all groups except agricultural and military workers. Running the usual regression, we have checked that the satisfaction of all members of this group increased with their reference income, no matter whether their own trajectory was ascending or descending; the effect was even more important for descending people<sup>21</sup>.

### *Some further tests of the role of uncertainty*

In order to assess the cognitive role of the reference income, we now include variables that capture the volatility and uncertainty that individuals are confronted with. First, we compute the standard deviation of individual real income across rounds. We divide the working population in two groups depending on whether their income variability is higher or lower than the average. We then run the usual regression on the two groups. We find (Table 4.e) that the coefficient of the reference income is higher and more significant for people who experience higher income volatility, hence whose income is less predictable. This is consistent with the view that the reference income is used as a basis to form expectations about future income. We verify that the substitutability between reference income and expectations is greater for higher volatility groups.

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<sup>21</sup> We have checked that the same results hold when the symmetrical example is taken. Between round 7 (1996) and round 8 (1998), all ISCO groups except ISCO 1, 6 and 10 have seen their average real income and expenditure decrease. We verified that the reference group's income had a positive and significant sign for everybody, although the significance of the coefficient was usually more important for descending individuals than for ascending ones.

**Table 4.e**  
**The Reference Income and the Volatility of Individual Income (Working People)**  
**Maximum-Likelihood Ordered Logit Estimates of Life Satisfaction <sup>1</sup>**

	(1)		(2)		(3)	
	High income volatility	Low income volatility	High income volatility	Low income volatility	High income volatility	Low income volatility
Log Reference Income	0,409*** (0,149)	0,188* (0,099)	0,345** (0,146)	0,145 (0,098)	0,348** (0,146)	0,146 (0,098)
Log Individual Income	0,075*** (0,022)	0,575*** (0,047)	0,043** (0,021)	0,447*** (0,049)	0,015 (0,022)	0,396*** (0,051)
Log Household Expenditure			0,496*** (0,054)	0,372*** (0,047)		
Log Household Income					0,402*** (0,055)	0,408*** (0,054)
_cut1	-2,564 (1,279)	2,513 (0,831)	0,981 (1,283)	4,668 (0,885)	0,176 (1,314)	4,681 (0,884)
_cut2	-0,566 (1,278)	4,499 (0,834)	3,030 (1,284)	6,675 (0,890)	2,218 (1,314)	6,688 (0,888)
_cut3	0,796 (1,280)	5,865 (0,837)	4,420 (1,286)	8,052 (0,893)	3,595 (1,316)	8,065 (0,892)
Number of observations	2544	4376	2900	4376	2891	5035
Wald chi2(38)	483,380	809,630	365,850	865,810	336,520	562,870
Prob > chi2	0,000	0,000	0,000	0,000	0,000	0,000
Pseudo R2	0,086	0,096	0,057	0,100	0,054	0,059
Log likelihood	-3007	-5182	-3534	-5155	-3534	-6197

<sup>1</sup>We control for the fact that observations that relate to the same individual are correlated.

Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

Controls: age, marital status, household size, health evaluation, believer, gender, mother tongue, years of education, nationality, region, round.

(1) Introducing expectations dummies increases the confidence interval of the reference income coefficient from 0,006 to 0,032 for high variance income, and from 0,057 to 0,098 for low variance income. (2) Introducing expectations dummies increases the confidence interval of the reference income coefficient from 0,018 to 0,078 for high variance income, and from 0,137 to 0,196 for low variance income. (3) Introducing expectations dummies increases the confidence interval of the reference income coefficient from 0,017 to 0,067 for high variance income, and from 0,135 to 0,200 for low variance income.

As another proxy for uncertainty, we now use the answer to the following question: *How concerned are you about the possibility that you might not be able to provide yourself with the bare essentials in the next 12 months?* . Again, we divide the population in two groups, depending on whether they answer that they are anxious or not (we aggregate the multiple answer categories in order to obtain a dichotomic variable). We find (Table 4.f) that the reference income plays the usual positive role for people who are anxious about getting the basic necessities, but not for the others, a strong result in favor of the cognitive interpretation of the reference income.

**Table 4.f**  
**The Role of the Reference Income Depending on Material Uncertainty**  
**Maximum-Likelihood Ordered Logit Estimates of Life Satisfaction for Working People <sup>1</sup>**

	<i>How anxious are you about getting the basic necessities ?</i>	
	Anxious	Not anxious
Log Reference Income	0,275*** (0,087)	0,171 (0,203)
Log Individual Income	0,189*** (0,028)	0,081 (0,039)
_cut1	-0,045 (0,750)	-1,917 (1,561)
_cut2	1,969 (0,751)	0,275 (1,555)
_cut3	3,384 (0,753)	1,667 (1,558)
Number of observations	6360	1552
Wald chi2(38)	447,900	78,100
Prob > chi2	0,000	0,000
Pseudo R2	0,036	0,024
Log likelihood	-7708	-1942

<sup>1</sup> We control for the fact that observations that relate to the same individual are correlated. Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%. Controls: age, marital status, household size, health evaluation, believer, gender, mother tongue, years of education, nationality, region, round. The confidence interval of the reference income coefficient is 0,002 for those who are anxious about getting necessities, and 0,401 for those who are not. The same results hold when controlling for the log of total real household income or expenditure.

Lastly, we use the question *How concerned are you that you might lose your job?*. We divide the (working) respondents in two groups depending on whether they are concerned or not (aggregating the multiple responses into two categories). We find (Table 4.g) that the reference income is always positive but is not significant for those who are not afraid.

**Table 4.g**  
**The Role of the Reference Income Depending on Job Uncertainty (Working People)**  
**Maximum-Likelihood Ordered Logit Estimates of Life Satisfaction <sup>1</sup>**

	<i>How afraid are you that you might loose your job ?</i>	
	<b>Afraid</b>	<b>Not afraid</b>
Log Reference Income	0,340*** (0,097)	0,218 (0,141)
Log Individual Income	0,170*** (0,031)	0,228*** (0,049)
_cut1	0,297 (0,861)	0,161 (1,137)
_cut2	2,289 (0,863)	2,101 (1,137)
_cut3	3,717 (0,865)	3,366 (1,139)
Number of observations	4874	3008
Wald chi2(38)	382,050	212,210
Prob > chi2	0,000	0,000
Pseudo R2	0,040	0,033
Log likelihood	-5934	-3864

<sup>1</sup> We control for the fact that observations that relate to the same individual are correlated. Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%. Controls: age, marital status, household size, health evaluation, believer, gender, mother tongue, years of education, nationality, region, round. The confidence interval of the reference income coefficient is 0,000 for those who are afraid to lose their job, and 0,124 for those who are not. The same results hold when controlling for the log of total real household income or expenditure.

All these results suggest that the reference level of income is used predominantly as an informational category. The analysis of the role of inequality indices further comfort this cognitive conjecture.

### **Inequality indices**

When introducing inequality measures, whether Gini or Stark indices, in the regressions of life satisfaction, we find that those are systematically insignificant, whatever the specification<sup>22</sup> and the controls used (Table 5). This could be attributed to ignorance, i.e. people do not perceive the distribution of income, hence it does not influence their

<sup>22</sup> For lack of space, we do not present the linear and conditional fixed effects regressions in the text, but we keep them available upon request.

satisfaction. To explore this idea, we include Stark and Gini indices calculated at the regional level, assuming that people may have a better perception of the distribution of income in their region rather than in the whole country. It turns out that regional inequality indices are insignificant as well (Table 5). Yet, we verify that people do perceive their relative position in the national or regional distribution of income. When asked about their relative economic rank (*Please, imagine a 9-step ladder where on the bottom, the first step, stand the poorest people, and on the highest step, the ninth, stand the rich. On which step are you today ?*), their answer is significantly correlated with their actual position in the distribution of income, as represented by the STARKH index or their decile of real individual income (Table D in Annex I). Thus, if inequality apparently has no influence on life satisfaction, it is not because individuals are unaware of it.

Hirschman's conjecture that the revenue of other people affect me through the information they vehicle can be used again to interpret this result. In a society where income distribution is perceived to change rapidly, the observed static distribution of income does not contain an important information value. This could explain why it does not affect individual subjective satisfaction. The same general framework can be applied to explain the lower aversion for inequality that Alesina et al. (2000), have put in evidence in the United States<sup>23</sup>. Introducing Gini indices in the estimation of subjective life satisfaction judgements, they show that inequality indices play an exceptionally weak role in the satisfaction of Americans, as compared to Europeans. Their interpretation is that when (perceived) expected mobility is high, the perception of static inequality is dominated by the prospect for mobility.

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<sup>23</sup> Corneo and Grüner (2001), using demand for redistribution data, also observe a particularly low aversion for inequality in the United-States.

**Table 5**  
**Inequality Indices Do Not Affect Life Satisfaction**  
**Ordered Logit Estimates**

		(1)	(3)	(2)	(5)
GINI individual income	-0.727 (.520)				
National STARKH <sup>1</sup>		-0.000126 (.0000127)			
Regional STARKH <sup>2</sup>			-0.000162 (.0000149)		
National STARKL <sup>3</sup>				.0000398 (.0000916)	
Regional STARKL <sup>4</sup>					-0.000478 (.0000998)
_cut1	2.229 (.337)	2.478 (.278)	2.463747 (.277)	2.505 (.278)	2.490 (.276)
_cut2	4.046 (.339)	4.296 (.279)	4.280 (.278)	4.324 (.279)	4.307 (.278)
_cut3	5.377 (.339)	5.626 (.280)	5.611 (.279)	5.653 (.280)	5.637 (.278)
Number of obs	18700	18525	18700	18525	18700
Wald chi2(33)	1762.35	1740.01	1758.50	1741.07	1760.12
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.0510	0.0506	0.0510	0.0506	0.0510
Log likelihood	-23140	-22933	-23139	-22934	-23140

<sup>1</sup> STARKH is the measure of the average distance between my real individual income and those of richer people in the country.

<sup>2</sup> Regional STARKH is the measure of the average distance between my individual real income and those of richer people in my region.

<sup>3</sup> STARKL is the measure of the average distance between my real individual income and those of poorer people in the country.

<sup>4</sup> Regional STARKL is the measure of the average distance between my individual real income and those of poorer people in my region.

Controls : log(household expenditure), age, age square, health evaluation, believer, gender, marital status, household size, nationality, years of education, mother tongue, region dummies, occupation dummies, round dummies. Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%. The same results hold when controlling for lagged income expectations and income categories instead of expenditure.

## 4. Conclusion

This study has revealed unusual findings. Although basic socio-demographic variables are correlated in a quite classical way with individual satisfaction, social comparison indicators are not. The reference group's income exerts a positive influence on individual satisfaction, which contrasts with other studies on the subject. This is particularly true of categories of the population who experience high income volatility and feelings of uncertainty. Inequality indices do not seem to matter although people do seem to be aware of the distribution of income.

We interpret these unusual results, especially the positive sign of the reference group's income, as a sign of a Hirschman type «tunnel effect» whereby agents use income variables (the income of other people) in a cognitive manner rather than for comparison purposes. This may be due to the very rapidly changing context, in which social comparisons *per se* lose significance as relative positions are highly unstable. Rather, agents try to use as much information as possible in order to form their expectations concerning future variables. In other words, a rapidly changing environment gives a particularly high value to information as an input for expectations. In this context, inequality indices, which reflect the static income distribution, do not affect individual satisfaction because of their weak informational content. By contrast, an increase in the income of one's reference group (people with the same productive characteristics) is an encouraging promise of future income gains.

A brighter version, closer to Hirschman's intuition, would be that Russians are optimistic about their chance to gain from the transformation process, which makes them neutral to the perception of immediate inequality<sup>24</sup>. Whatever the preferred version, the general conclusion is that it is not always the case that people engage into social comparisons based on frustration or domination schemes. Transition could well

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<sup>24</sup> Hirschman's conjecture was two-faceted: in a first stage, he thought that people would tolerate inequality as a promise for prosperity. In a second stage, however, if these expectations were not fulfilled, he warned that their attitude towards inequality could soar, bringing a danger of social unrest. So far, Russia still seems to be in the first phase.

be a case in which people go back to «fundamentals» and care only for their own sake, including the information necessary to predict it.

Beyond the case of transition economies, how general is the conjecture that other people's revenue affect me essentially through their informational content? And how much does the respective role of information *versus* comparison depend on the features of the environment such as the degree of uncertainty and the prospect for mobility? This question has obvious policy implications, in particular in the domain of redistribution policy<sup>25</sup>. We believe that there is room for further empirical research in this direction.

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<sup>25</sup> For example, one application is the definition of the relevant synthetic measure of perceived income distribution : should one use static or dynamic measures of inequality (income distribution *versus* the distribution of expected income gains)?

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# **Annex I**

**Additional Tables Based on the RLMS Balanced panel  
Round 5 - Round 9 (1994-2000)**

**Table A1- High and Unstable Gini Indices**

	Household real income	Household nominal income	Household real expenditure	Household nominal expenditure	Individual nominal income
1994 round 5	41	43	42	43	56
1995 round 6	44	43	43	43	61
1996 round 7	50	47	47	47	67
1998 round 8	44	46	46	46	62
2000 round 9	46	45	45	45	57

**Table A2 - Other Gini Indices, for Comparison**

		Source	Gini index
Russia 1992	Gross income	Milanovic	24
Russia 1994	Gross income	Milanovic	48
Austria 1987	Net individual income	LIS	23
France 1984	Net household income	LIS	32
USA 1991	Net household income	LIS	35
Brazil 1988	Personal income	Rocha	64

*Source : United Nations World Institute for Development Economics Research, World Income Inequality Database (WIID ).*

**Table A3 - Variations in Income and Expenditure between 2 Rounds of RLMS (%)**

Year	Round	Real household average income	Real household average expenditure	Real household median income	Real household median expenditure	Real Russian GDP Growth
1994	5					
1995 /1994	6 / 5	-21	-16	-23	-15	- 4.1
1996/1995	7 / 6	-4	-11	-9	-17	- 3.5
1998/1996	8 / 7	-22	-26	-19	-25	- 3.8
2000/1998	9 / 8	25	16	19	17	10.5

*Source : Author's calculation using RLMS for household indicators, EBRD Transition Report 2000 and IIF for Real Russian GDP.*

**Table B1**  
**Basic Regressions of Life Satisfaction on Socio-Demographic Variables**  
**Two Stages Least Squares Fixed Effects Estimations <sup>1</sup>**

	<i>(1)</i> <i>Fixed-effects (within) IV</i>		<i>(2)</i> <i>Between effects IV</i>	
	Coefficient	Standard Error	Coefficient	Standard Error
Life satisfaction in t-1 <sup>3</sup>	0.065	0.044	0.574***	0.030
Income expectations in t-1 <sup>3</sup>	-0.01	0.041	0.077**	0.031
Age	-0.032	0.100	-.012**	0.005
Age square	.000*	0.000	0.000***	0.000
Bad health <sup>2</sup>	.050	0.116	0.256***	0.085
Average health	.296**	0.123	0.401***	0.083
Good health	.310**	0.135	0.435***	0.090
Very good health	.420*	0.214	0.498***	0.145
Believer	(dropped)		0.051*	0.028
Male	(dropped)		0.037	0.028
Years of education	-0.006	0.017	0.001	0.004
Russian mother tongue	(dropped)		-.104**	0.036
Northern and North Western <sup>2</sup>	(dropped)		0.004	0.080
Central and Central Black-Earth	(dropped)		-0.003	0.068
Volga-Vaytski and Volga Basin	(dropped)		-0.040	0.068
North Caucasian	(dropped)		-0.040	0.072
Ural	(dropped)		-0.028	0.069
Western Siberia	(dropped)		-0.100	0.072
Eastern Siberia and Far Eastern	(dropped)		0.040	0.076
Round 6 <sup>2</sup>				
Round 7				
Round 8	-0.222	0.183	-.271***	0.055
Round 9				
Legislators, senior managers, officials	-0.020	0.197	.414***	0.142
Professionals	0.045	0.177	.322***	0.114
Technicians	-0.180	0.169	.240**	0.114
Clerks	-0.261	0.206	0.163	0.125
Services and market workers	-0.177	0.182	.376***	0.126
Skilled agr. and fish. Workers	0.889	0.588	0.313	0.283
Craft and related trades	0.001	0.171	.234**	0.116
Machine Operators and Assemblers	0.043	0.170	0.184	0.115
Elementary unskilled occupations	0.064	0.166	0.108	0.119
Army	-0.050	0.589	0.305	0.215
Married	.386***	.146	.103**	.0511
Divorced	-.036	.173	.095	.068
Widower	-.021	.184	.116*	.064
Intercept	1.830	4.699	0.636***	0.179
Number of observations	5400		5400	
Number of groups	2994		2994	
R sq. within	0.025		0.118	
R sq.between	0.001		0.426	
R sq. overall	0.003		0.166	

<sup>1</sup>Eq. (7) and (8): satisfaction in (t-1) and income expectations in (t-1) are instrumented using satisfaction in (t-2), satisfaction in (t-3), expectations in (t-2) and expectations in (t-3) as instruments.

<sup>3</sup>This implies treating the lagged satisfaction and expectations variables as continuous.

<sup>2</sup>Reference categories: for health evaluation: very bad health; for region: metropolis (Moscow, St Petersburg); for rounds: Round 5; for marital status: never married, for ILO code: not working.

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Table B2

## Linear Basic Estimations of Life Satisfaction

	(1) Fixed effects		(2) Between effects	
	Coefficient	Standard Error	Coefficient	Standard Error
Age	-.004	.033	-.022***	.004
Age square	0.0003*	.0001	0.0003***	.00005
Bad health <sup>1</sup>	0.126**	.063	0.236**	.1003
Average health	0.289***	.066	0.570***	.093
Good health	0.332***	.071	0.726***	.099
Very good health	0.482***	.105	0.727***	.163
Believer	(dropped)		0.101***	.024
Male	(dropped)		0.045*	.026
Russian mother tongue	(dropped)		-.080	.054
Years of education	-.005	.007	0.006	.004
Northern & North Western <sup>1</sup>	(dropped)		-.137**	.067
Central & Black-Earth	(dropped)		-.115**	.057
Volga	(dropped)		-.145**	.057
North Caucasian	(dropped)		-.192***	.061
Ural	(dropped)		-.226***	.058
Western Siberia	(dropped)		-.259***	.061
Eastern Siberia and Far Eastern	(dropped)		-.127*	.065
Round 6 <sup>1</sup>	-.007	.153	0.230**	.111
Round 7	-.095	.123	(dropped)	
Round 8	-.247***	.064	-.101	.109
Round 9	(dropped)		0.184*	.102
Legisl., senior manag.	0.152	.095	0.595***	.162
Professionals	0.095	.077	0.372***	.116
Technicians	0.114	.074	0.260**	.117
Clerks	0.043	.087	0.129	.125
Services workers	0.057	.084	0.162	.129
Skilled agri. & fish wke	0.168	.234	0.482*	.270
Craft and related trades	0.139*	.074	0.162	.118
Operators and assemblers	0.152**	.074	0.183	.117
Elementary unskilled	0.066	.073	0.044	.119
Army	-.008	.263	0.328	.202
Married <sup>1</sup>	0.049	.069	-.010	.046
Divorced	-.157	.082	-.151**	.062
Widower	-.071	.086	-.163***	.058
<b>Lagged income expectations :</b>				
Worse <sup>1</sup>	-.062**	.025	.580***	.047
The same	-.077***	.023	.815***	.039
Better	-.094***	.034	1.130***	.054
Intercept	1.435	1.561	1.263	.172
sigma_u	.783			
sigma_e	.782			
Rho	.500			
R-sq within	0.036		0.002	
R-sq between	0.001		0.264	
R-sq overall	0.001		0.094	
F	12.75		32.73	
corr(u_i, Xb)	-.402			
nb observations	12949		12949	
nb groups	3693		3693	

<sup>1</sup>Reference categories : for health evaluation: very bad health; for region: metropolis(Moscow, St Petersburg); for rounds: Round 5; for marital status: never married; for past income expectations: much worse; for ILO code: not working. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

**Table B3**  
**Basic Estimation of Life Satisfaction**  
**Conditional Fixed Effects Logit <sup>1</sup>**

	Coefficient	Standard Error
Age	.0141	.112
Age square	.0009**	.00037
Bad health <sup>2</sup>	.0795	.236
Average health	.537**	.245
Good health	.663***	.255
Very good health	1.016***	.347
Years of education	-.0119	.023
Round 6 <sup>2</sup>	.263	.519
Round 7	.006	.416
Round 8	-.437**	.216
Legislators, senior managers, officials	.323	.303
Professionals	.0146	.241
Technicians	.116	.231
Clerks	-.036	.279
Services and market workers	-.0148	.263
Skilled agriculture and fishery workers	.725	.764
Craft and related trades	.208	.235
Operators and assemblers	.308	.237
Elementary unskilled occupation	.0638	.235
Army	-.556	.908
Married <sup>2</sup>	.165	.205
Divorced	-.352	.264
Widower	-.170	.273
<i>Lagged income expectations:</i>		
Worse income <sup>2</sup>	-.177**	.084
The same income	-.197**	.078
Better income	-.208**	.106
Number observations	7011	
Number groups	1935	
LR chi2(27)	174.89	
Log likelihood	-2554	

<sup>1</sup>Conditional fixed effects estimations require aggregating life satisfaction evaluations into a dichotomic (0 - 1) variable.

<sup>2</sup>Reference category, for health : very bad, for marital status : single, for rounds : Round5, for past income expectations : much worse, for ILO code: not working.  
\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

**Table C1**  
**The Influence of the Reference Group's Income**  
**Two Stages Least Squares Estimations<sup>1</sup> of Life Satisfaction**

	Fixed-effects (within) IV	Fixed-effects IV	First-Differenced IV	First-Differenced IV
Reference income <sup>2</sup>	.327*** (.113)	.288** (.112)	.324*** (.113)	.286** (.112)
Income gap <sup>3</sup>	.0930** (.0377)	.0639* (.0380)	.0930** (.0377)	.0639* (.0381)
Household expenditure		.1422*** (.0371)		.1421 *** (.0371)
Number of obs	4152	4152	1558	1558
Number of groups	2594	2594	1558	1558
R-sq: Within	0.0505	0.0703	.	0.0015
Between	0.0069	0.0052	0.0028	0.0015
Overall	0.0045	0.0031	0.0028	0.0015
Chi2 / Wald chi2(10)	30368.35	31009.51	23.41	38.74
Prob > chi2	0.000	0.000	0.005	0.000
corr(u_i, Xb)	-0.888	-0.876	-0.689	-0.688
Sigma_u	1.876	1.794	1.323	1.322
Sigma_e	.778	.771	1.101	1.090
Rho	.853	.844	.591	.5951

<sup>1</sup>Satisfaction in (t-1) and income expectations in (t-1) are instrumented using satisfaction in (t-2), satisfaction in (t-3), expectations in (t-2) and expectations in (t-3) as instruments. This implies that satisfaction and income expectations are treated as continuous variables.

<sup>2</sup> The reference income is the estimated income of an individual based on his professional characteristics. <sup>3</sup> The income gap is defined as the difference between the current individual income and the reference group's income, i.e. the residual of the estimation of the latter.

Controls : age, age square, health evaluation, marital status, household size, years of education, round dummies. Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

**Table C2**  
**The Influence of the Reference Group's Income**  
**Conditional Fixed Effects Logit<sup>1</sup> Estimation of Life Satisfaction**

	(1)	(2)	(3)	(4)	(5)
Log reference income <sup>2</sup>	0,290** (0,144)	.335** (.145)	.249* (.145)	.258* (.145)	.265* (.146)
Income gap <sup>3</sup>		.0856** (.0340)			
Log individual income			.0856** (.0340)		
Log household expenditure				.394*** (.079)	
Log household income					.295*** (.071)
Number of observations	3048	3048	3048	3048	3032
Number of groups	939	939	939	939	935
LR chi2(18)	185.39	191.96	191.96	210.88	202.18
Prob > chi2	0.000	0.000	0.000	0.000	0.000
Log likelihood	-1040	-1036	-1036	-1027	-1026

<sup>1</sup>Conditional fixed effects estimations require aggregating life satisfaction evaluations into a dichotomic (0 - 1) variable.

<sup>2</sup>The reference group's income is the estimation of the real individual income based on professional characteristics. <sup>3</sup>The income gap is defined as the difference between the current individual income and the reference group's income, i.e. the residual of the estimation of the latter.

Controls : age, age square, lagged life satisfaction, health evaluation, marital status, household size, nationality, years of education, round dummies. \*significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%, standard errors in parenthesis.

**Table D**  
**Individuals do Perceive their Rank in the Distribution of Income**  
**Regressions of Perceived Economic Rank on a 7-Step Ladder <sup>1</sup>**

	(1)	(2)	(3)
	Max. Likelihood Ordered Logit <sup>2</sup>	Max. Likelihood Ordered Logit <sup>2</sup>	Fixed-Effects (Within) Linear Estimation
Individual Income Decile	.168*** (.0058)		.0552*** (0.0046)
STARKH <sup>3</sup>		-8.75e-06* (4.65 e-06)	
Intercept			3.0405*** (0.027)
_cut1	-1.002 (.0413)	-1.855 (0.296)	
_cut2	.0619 (.0386)	-.835 (0.230)	
_cut3	1.121 (.0392)	.168 (0.207)	
_cut4	2.079 (.0416)	1.087 (0.222)	
_cut5	3.798 (.0501)	2.768 (0.037)	
_cut6	5.008 (.0705)	3.969 (0.0614)	
Number observations	19156	18978	19156
Number groups			4089
Wald chi2(1)	841.51	3.55	
Pseudo R2	0.0204	0.0001	
Log likelihood	-33006	-33370	
R-sq. within			0.0094
R-sq. between			0.1595
R-sq. overall			0.0689
F			142.40

<sup>1</sup> Initially, responses are given on a 9 steps ladder, but we aggregate the three upper steps together.

<sup>2</sup> Individual clusters are defined, i.e. we control for the auto-correlations of the residuals of observations relating to the same individual.

<sup>3</sup> The STARKH index measures the average distance between my income and those of richer people in the country. The same result hold for regional measures of Stark indices.

Controls : age, age square, health evaluation, believer, gender, marital status, household size, nationality, years of education, mother tongue, region dummies, occupation dummies, round dummies. Standard errors in parenthesis. \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

## **Annex II**

### **Descriptive statistics of the RLMS balanced panel**

**Round 5 – Round 9**

**(1994-2000)**

**Table E1 - Attitudinal variables**

	Round 5	Round 6	Round 7	Round 8	Round 9	Total
<b>Life satisfaction<sup>1</sup></b>						
Not at all satisfied	837	1074	1217	1539	969	5636
%	23	29	32	38	24	29
Less than satisfied	1620	1440	1454	1410	1569	7493
%	44	39	38	35	39	39
Both yes and no	748	777	761	697	885	3868
%	20	21	20	17	22	20
Satisfied	458	445	395	418	622	2338
%	13	12	10	10	15	12
Total	3663	3736	3827	4064	4045	19335
%	100	100	100	100	100	100
<b>Income expectations<sup>2</sup></b>						
Much worse	874	848	808	1102	345	3977
%	25	25	24	33	10	23
Somewhat worse	825	743	706	787	522	3583
%	24	22	21	23	16	21
The same as now	1257	1383	1477	1161	1832	7110
%	36	41	43	34	55	42
Better	498	433	423	329	639	2322
%	14	13	12	10	19	14
Total	3454	3407	3414	3379	3338	16992
<b>Concerned about getting necessities for family?<sup>3</sup></b>						
Very concerned	2120	2204	2282	2650	2077	11333
%	58	59	60	66	51	59
A little	763	778	812	796	937	4086
%	21	21	21	20	23	21
Both yes and no	266	287	312	244	417	1526
%	7	8	8	6	10	8
Not too concerned	380	335	283	261	435	1694
%	10	9	7	6	11	9
Not at all	147	134	124	95	180	680
%	4	4	3	2	4	4
Total	3676	3738	3813	4046	4046	19319
%	100	100	100	100	100	100
<b>Income Expectations</b>						
Optimistic	1699	1591	1514	1889	867	7560
%	49	47	44	56	26	44
Pessimistic	1755	1816	1900	1490	2471	9432
%	51	53	56	44	74	56
Total	3454	3407	3414	3379	3338	16992
<b>Concerned about job loss?<sup>4</sup></b>						
Very concerned	890	866	853	964	704	4277
%	41	40	41	49	36	41
A little	408	478	497	414	456	2253
%	19	22	24	21	23	22
Both yes and no	184	217	195	171	193	960
%	8	10	9	9	10	9
Not very concerned	341	328	277	224	339	1509
%	16	15	13	11	17	15
Not at all	364	290	268	176	268	1366
%	17	13	13	9	14	13
Total	2187	2179	2090	1949	1960	10365
%	100	100	100	100	100	100
<b>Confident to find job?<sup>5</sup></b>						
Absolutely certain	245	242	180	144	182	993
%	12	11	9	8	10	10
Fairly certain	220	256	211	145	291	1123
%	10	12	11	8	16	11
Both yes and no	244	267	257	207	298	1273
%	11	13	13	11	16	13
Fairly uncertain	594	555	560	481	505	2695
%	28	26	28	26	27	27
Absolutely uncertain	822	794	784	845	567	3812
%	39	38	39	46	31	39
Total	2125	2114	1992	1822	1843	9896
%	100	100	100	100	100	100

<sup>1</sup>To what extent are you satisfied with your life in general at the present time? <sup>2</sup>“Do you think that in the next 12 months, you and your family will live better than today or worse?” <sup>3</sup>“How concerned are you about the possibility that you might not be able to provide yourself with the bare essentials in the next 12 months?” <sup>4</sup>“How concerned are you that you might lose your job?” <sup>5</sup>“Imagine this not very pleasant scene: the enterprise where you work for some reason will close tomorrow, and all workers will be laid off. How certain are that you will be able to find work, no worse than your present job?”, continued next page.

**Table E1 continued**

	<i>Round 5</i>	<i>Round 6</i>	<i>Round 7</i>	<i>Round 8</i>	<i>Round 9</i>	<i>Total</i>
<b>Health evaluation</b>						
Very good health	54	73	54	97	74	352
%	1	2	1	2	2	2
Good health	913	1075	1087	972	882	4929
%	22	26	27	24	22	24
Average health	2427	2261	2266	2254	2313	11521
%	60	56	55	55	57	56
Bad health	594	588	601	655	651	3089
%	15	14	15	16	16	15
Very bad health	89	74	76	104	162	505
%	2	2	2	3	4	2
Total	4077	4071	4084	4082	4082	20396
%	100	100	100	100	100	100
<b>Economic rank <sup>6</sup></b>						
1	486	493	523	691	417	2610
%	13	13	14	17	10	14
2	576	662	634	755	597	3224
%	16	18	17	19	15	17
3	914	874	872	969	961	4590
%	25	24	23	24	24	24
4	782	769	766	786	820	3923
%	21	21	20	20	20	20
5	701	704	749	639	889	3682
%	19	19	20	16	22	19
6	132	161	140	111	229	773
%	4	4	4	3	6	4
7-8-9	68	50	73	52	111	354
%	2	1	2	1	3	2
Total	3659	3713	3757	4003	4024	19156
%	100	100	100	100	100	100
<b>Power rank <sup>7</sup></b>						
1	1231	1075	1031	1249	948	5534
%	34	29	28	32	24	29
2	654	687	727	815	748	3631
%	18	19	20	21	19	19
3	669	750	778	781	742	3720
%	18	20	21	20	19	20
4	497	515	492	485	580	2569
%	14	14	13	12	15	14
5	414	485	501	437	630	2467
%	11	13	14	11	16	13
6	95	102	96	89	162	544
%	3	3	3	2	4	3
7-8-9	63	54	78	51	135	381
%	2	1	2	1	3	2
Total	3623	3668	3703	3907	3945	18846
%	100	100	100	100	100	100
<b>Respect rank <sup>8</sup></b>						
1	114	73	72	86	75	420
%	3	2	2	2	2	2
2	102	81	97	118	79	477
%	3	2	3	3	2	3
3	200	241	193	239	180	1053
%	6	7	5	6	5	6
4	407	469	391	375	378	2020
%	11	13	11	10	10	11
5	1027	983	1059	1056	943	5068
%	29	27	30	28	25	28
6	483	581	562	589	649	2864
%	14	16	16	16	17	16
7-8-9	1231	1174	1213	1315	1531	6464
%	35	33	34	35	40	35
Total	3564	3602	3587	3778	3835	18366
%	100	100	100	100	100	100

<sup>6</sup>Economic rank: “ please imagine a 9 steps ladder where on the bottom, the first step, stand the poorest people, and on the highest step, the ninth, stand the rich. On which step are you today?”, <sup>7</sup>Power rank: “and now please imagine a 9 steps ladder where on the bottom, the first step, stand people who are completely without rights, and on the highest step, the ninth, stand those who have a lot of power. On which step are you ?” <sup>8</sup>Respect rank: “and now another 9 steps ladder where on the bottom, the first step, stand people who are absolutely not respected, and on the highest step, those who are very respected. On which step of this ladder are you?”

**Table E2 - Income variables**

<b>Total real income</b>	<b>Nb observations</b>	<b>Mean</b>	<b>Std.dev.</b>
Round 5	4081	8260	7550
Round 6	4081	6481	6239
Round 7	4081	6219	7283
Round 8	4081	4846	4944
Round 9	4081	6068	7970
<b>Total real expenditure</b>			
Round 5	4081	10949	10275
Round 6	4081	9121	9372
Round 7	4081	8156	9688
Round 8	4081	6042	7200
Round 9	4081	7020	8107
<b>Income overhang Starkh</b>			
Round 5	4067	182	378
Round 6	4053	239	711
Round 7	4008	734	8451
Round 8	4020	254	777
Round 9	4062	346	4405
<b>Income overhang Starkl</b>			
Round 5	4066	50	38
Round 6	4053	61	143
Round 7	4008	113	1208
Round 8	4018	53	19
Round 9	4062	68	532
<b>Income last month<sup>1</sup></b>			
Round 5	3561	167904	227529
Round 6	3765	314045	508328
Round 7	3757	396623	769885
Round 8	4004	483	768
Round 9	3986	1230	1780

<sup>1</sup>in 1998 (round 8), a monetary reform divided all prices by 1000.

**Table E3 - Time varying socio-demographic characteristics**

	Round 5		Round 6		Round 7		Round 8		Round 9	
	Freq,	Percent								
<b>Marital status</b>										
Never married	362	10,1	468	12,5	540	14,0	711	17,4	649,0	15,9
Married	2 572	71,7	2 612	69,6	2 583	67,1	2 609	63,8	2 579,0	63,1
Divorced	264	7,4	251	6,7	264	6,9	259	6,3	270,0	6,6
Widower	391	10,9	422	11,2	460	12,0	510	12,5	592,0	14,5
Total	3589	100	3753	100	3847	100	4089	100	4090	100
<b>Household head</b>										
Active male	3063	74,8	3015	73,6	2988	73,0	2864	69,9	2743	67,0
Active women	372	9,1	379	9,3	395	9,6	403	9,8	426	10,4
Retired male	421	10,3	446	10,9	458	11,2	550	13,4	601	14,7
Retired female	240	5,9	256	6,3	255	6,2	279	6,8	326	8,0
Total	4096	100	4096	100	4096	100	4096	100	4096	100
<b>ILO primary job</b>										
Unemployed	1890	46,24	1897	46,31	1994	48,68	2137	52,2	2115	51,69
Legislators, senior managers, officials	31	0,76	69	1,68	17	0,42	52	1,27	129	3,15
Professionals	406	9,93	342	8,35	385	9,4	376	9,18	354	8,65
Technicians	314	7,68	313	7,64	326	7,96	320	7,82	279	6,82
Clerks	161	3,94	157	3,83	160	3,91	134	3,27	130	3,18
Services and market workers	146	3,57	160	3,91	136	3,32	138	3,37	159	3,89
Skilled agr. and fish. Workers	12	0,29	7	0,17	13	0,32	11	0,27	11	0,27
Craft and related trades	416	10,18	373	9,11	354	8,64	287	7,01	287	7,01
Operators and assemblers	425	10,4	441	10,77	408	9,96	375	9,16	377	9,21
Elementary unskilled occupat.	275	6,73	317	7,74	283	6,91	252	6,16	237	5,79
Army	11	0,27	20	0,49	20	0,49	12	0,29	14	0,34
Total	4087	100	4096	100	4096	100	4094	100	4092	100
<b>ILO second job</b>										
Legislators, senior managers, officials	2	2,63	16	21,62	3	3,61	5	6,1	7	8,24
Professionals	19	25	14	18,92	22	26,51	21	25,61	22	25,88
Technicians	12	15,79	3	4,05	12	14,46	8	9,76	12	14,12
Clerks	2	2,63	7	9,46	3	3,61	2	2,44	2	2,35
Services and market workers	10	13,16	13	17,57	7	8,43	13	15,85	11	12,94
Skilled agr. and fish. Workers	0	0	0	0	0	0	0	0	2	2,35
Craft and related trades	9	11,84	2	2,7	16	19,28	13	15,85	8	9,41
Operators and assemblers	6	7,89	19	25,68	2	2,41	6	7,32	4	4,71
Elementary unskilled occupat.	16	21,05			18	21,69	14	17,07	17	20
Army	76	100	74	100	83	100	82	100	85	100

**Table E4 - Time invariant characteristics (or quasi)**

	<b>Min</b>	<b>Max</b>
Birth year	1902	1985
Age (round9)	15	98
	<b>Freq.</b>	<b>Percent</b>
<b>Nationality</b>		
Russian	3038	82
CIS	468	13
Rest of the World	192	5
<b>Russian speaking</b>		
No	902	22
Yes	3179	78
<b>Russian mother tongue?</b>		
No	905	22
Yes	3191	78
<b>Settlement type</b>		
Urban	2493	61
Rural	1588	39
<b>Born in Russia ?</b>		
No	2097	51
Yes	1984	49
<b>Believer (round 9) ?</b>		
No	1197	29
Yes	2899	71
<b>Orthodox ?</b>		
No	1000	25
Yes	3081	76
<b>Region</b>		
Moscow & St Petersburg	155	4
Northern and North Western	257	6
Central and Central Black-Earth	834	20
Volga-Vaytski and Volga Basin	893	22
North Caucasian	556	14
Ural	674	17
Western Siberia	418	10
Eastern Siberia and Far Eastern	294	7
<b>Gender</b>		
Male	1676	40,92
Female	2420	59,08
<b>Highest diploma (Round 9)</b>		
No diploma	34	0,83
Primary	522	12,76
Professional primary	202	4,94
Short secondary	492	12,02
Long secondary	976	23,85
Secondary + professional	475	11,61
Superior technical	787	19,23
University	604	14,76
	<b>Mean</b>	<b>Std. deviation</b>
Household size	3,23	1,58
Years of education	11	4
Years of experience	24	15

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