

Ambition and Jealousy: Income Interactions in the ‘Old’ Europe versus the ‘New’ Europe and the United States

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Using individual-level data from a large number of countries, this paper examines how self-reported subjective well-being depends on own income and reference income, where reference income is defined as the income of one’s professional peers. It uncovers a divide between ‘old’—low-mobility—European countries on the one hand, and ‘new’ European post-Transition countries and the United States on the other. The relative importance of comparisons (‘jealousy’) versus information (‘ambition’) seems to depend on the degree of mobility and uncertainty in the considered countries.

INTRODUCTION

In modern democracies, income inequality is certainly one of the issues that most strongly divide the population into constituencies for different political parties. On what grounds are these political attitudes based: self-centred interest or concern for others? benevolence or envy? This paper is part of a series investigating the subjective perception of income distribution (e.g. Piketty 1995; Benabou and Ok 2001; Alesina *et al.* 2001, 2004; Alesina and Angeletos, 2005; Alesina and Ferrara, 2005; Corneo and Gruner 2000; Ravallion and Lokshin 2001; Fong 2001, 2006; see Senik 2005a for a survey). From a subjective point of view, income distribution has two dimensions. One concerns income inequality in general, i.e. the distribution of aggregate income. The other is the gap between one’s own income and that of some relevant *other*: when the income of, say, my colleagues rises above mine, what is the consequence for my welfare? This paper is dedicated to that question.

The central idea here is that the difference between one’s own income and that of a reference group can be interpreted in two different ways, and accordingly, can have two opposite welfare effects: relative deprivation versus welfare-enhancing ‘anticipatory feelings’ (Caplin and Leahy 2001). Hirschman (1973) dubbed the latter the ‘Tunnel Effect’. The idea is that individuals may derive positive flows of utility from observing other people’s faster progression if they interpret this movement as a sign that their own turn will come around soon (for instance if the other lane of cars starts progressing towards the exit while their own lane remains immobile during a traffic jam¹). The objective of this paper can therefore be described simply as to elucidate empirically the following question: when it comes to one’s relative position on the income ladder, which is the dominant passion—jealousy or ambition?

It is important to distinguish between these two different types of social interaction (see Manski and Straub 2000), as they imply different policy measures. Comparison effects furnish an argument for measures equalizing income or consumption, whereas the prospect of mobility does not. Income comparisons have many other consequences that cannot be derived from informational learning; in particular, they call into question the relevance of growth as an objective of economic policy, and as an aggregate measure of welfare (Frank 1997; Lungqvist and Uhlig 2000; Cooper *et al.* 2001; Easterlin 1995; see

Luttmer 2005 for a more extensive list). Whether ambition dominates jealousy or otherwise is thus a matter of interest for economic policy.

This paper argues that both types of interaction always coexist, but that their respective importance depends on the degree of mobility and uncertainty in the economic environment, as perceived by a country's inhabitants. It concentrates on the perception of one's *professional* reference income, defined as the typical income of the group of people who share the same productive characteristics. It relies on a comparative microeconomic approach, with over a million observations, based on subjective satisfaction variables.

In the past, the use of subjective data has often raised surprise or suspicion. This literature has now gained its 'lettres de noblesse' in the *Journal of Economic Literature* (Frey and Stutzer 2002), the *Journal of Economic Perspectives* (Di Tella and MacCulloch 2006) and the *American Economic Review* (Frijters *et al.* 2004; Kahneman *et al.* 2004); I refer to these articles, the recent survey by Clark *et al.* (2006), and the book by van Praag and Ferrer-i-Carbonell (2004) for a discussion of the reliability of subjective questions.

To date, the existing evidence regarding comparison income, based on subjective data, has essentially been obtained from single-country studies in stable industrialized capitalist economies. Existing studies mostly confirm that income utility is relative, starting with van de Stadt *et al.*'s (1985) work with Dutch panel data, followed by Clark and Oswald's (1996) study using the *British Household Panel Survey*, and Ferrer-i-Carbonell's paper (2004) based on the *German Socio-Economic Panel*. In American data, McBride (2001), Blanchflower and Oswald (2004) and Luttmer (2005) find support for the relative income hypothesis. By contrast, a companion paper by Senik (2004) using Russian data rather corroborates Hirschman's conjecture.

The present paper proposes to extend this research using a comparative approach. It uses two types of variability: time variability (country panel data whenever available) and differences between Eastern Europe, Western Europe and the United States. The time dimension is necessary to control for idiosyncratic cultural effects. Country differences are interpreted as exogenous differences in terms of income volatility and mobility. The question is whether these differences are relevant 'parameters' of the relationship between welfare and reference income. In the case of Poland, the time dimension also coincides with a structural change that is exploited as an identification strategy.

I find that the effect of reference income is negative in 'old' European countries, whereas it is positive in post-Transition economies and in the United States. Together with the evidence brought by Alesina *et al.* (2004), this suggests that attitudes towards income distribution divide Eastern Europe and the United States on one side, and 'Old Europe' on the other. I show that these findings are related to the degree of perceived income mobility in these economies.

The next section presents the structure of the identification strategy. Section II details the statistical procedure, and Section III presents and discusses the results. Section IV concludes.

I. IDENTIFYING HIRSCHMAN EFFECTS

The objective of the paper is to identify the channels leading from reference income to individual welfare. I try to disentangle information from comparison effects, and to show

that the relative importance of these two effects depends on the type of economic environment that individuals perceive.

(a) *Disentangling ambition from jealousy*

Jealousy, i.e. relative utility, implies that one's own utility derives not from one's own consumption alone, but rather from a combination of absolute and relative consumption $U(C, C/C^*)$, where C^* denotes some measure of the consumption of relevant others. If this is the case, the indirect utility function can also be written as $V(Y, Y^*)$, where Y^* is the income of my reference group, and we expect the second partial derivative to be negative.

Jealousy, however, is not the only way to look at other people's incomes. Ambition can sometimes be a more powerful passion. Following Hirschman (1973), consider a society composed of two individuals (or groups of individuals). The indirect utility of individual A depends on her own income Y^A , her expected income E^A and agent B's income Y^B . Suppose that A's expectations depend partly on B's observed income. The utility function of A is then $U^A = V(Y^A, E^A(Y^B), Y^B)$. The sign of $\partial V/\partial Y^A$ is unequivocal. It is also clear that $\partial V/\partial E^A$ is positive, which reflects the depreciation rate of agent A. However, the sign of the partial derivative $\partial V/\partial Y^B$ is ambiguous:

$$(1) \quad \partial V/\partial Y^B = [(\partial V/\partial E^A)(\partial E^A/\partial Y^B)] + V_3.$$

The first term of (1) is positive: this represents the information effect of B's income, Y^B , on A's utility. The term V_3 represents the direct effect of Y^B on V ; its sign depends on how A feels about B. If, in line with relative income theory, her feelings are dominated by envy rather than compassion, then this term will be negative. Hence the effect of an increase in B's income, everything else equal, is *a priori* unknown, and depends on the relative importance of the information and comparison effects. Empirically, the sign of $\partial V/\partial Y^B$ can be interpreted as a measure of the relative importance of these two effects.

To test the importance of jealousy versus ambition, the idea here is simply to run a standard regression of individual satisfaction (U^A) on the usual socio-demographic factors plus reference income Y^B and individual income Y^A . The test refers to the sign of the coefficient on Y^B . If the coefficient on Y^B is negative, I conclude that the effect of V_3 dominates—i.e., comparisons dominate information; if the coefficient on Y^B is positive, I infer that the information effect $[(\partial V/\partial E^A)(\partial E^A/\partial Y^B)]$ dominates V_3 . Of course, if the coefficient on Y^B turns out not to be statistically significant, it is still possible that there are non-market income interactions that are too small to show up as statistically significant or that there are opposing non-market interactions that have a net effect of approximately zero.

(b) *The influence of the economic context*

The prediction of Hirschman's model is that the informational value of reference income should be higher in more mobile and uncertain environments, such as those in 'New Europe' and the United States, as opposed to countries of 'Old Europe'. In other words, the nature of the environment is a parameter of $\partial V/\partial E^A$. I endeavour to test this prediction by comparing the effect of reference income on satisfaction in these three different environments.

I distinguish three different economic contexts: Eastern Europe, Western Europe and the United States. I assume that for the majority of the inhabitants, living in either area is

not the result of self-selection; this is particularly clear for the citizens of Eastern Europe, who at the beginning of the period considered, i.e. the early 1990s, had only recently acquired the right to move, and whose environment had been radically and suddenly transformed by the ‘transition’ to capitalism.

The three groups of countries can be characterized in the following stylized way. First, Eastern post-Transition countries have economies with a great deal of uncertainty: macroeconomic uncertainty about GDP and employment, and microeconomic uncertainty about the adaptation of individual firms and workers to changing demands for their specific products or skills. This translates into a high degree of volatility in individual incomes. By way of contrast, Western European economies are far more stable and predictable. Western Europe and the United States, in turn, are taken to differ in their degree of perceived income mobility (cf. section IV(a)). Alesina *et al.* (2004) have shown that this translates into different attitudes towards income inequality across the Atlantic Ocean. Here, I test whether this influences the perception of one’s professional reference group’s income.

For Poland, the panel data include both the pre-transition (1987–90) and post-transition (1994–2000) periods. This prolonged time span permits analysis of the effect of the sudden and exogenous increase in volatility brought about by the overnight implementation of the shock therapy on 1 January 1990 (Sachs 1993). The Polish context thus offers a sort of ‘natural experiment’, in the sense that the conditions in which people react to the income of their professional peers changed abruptly over the course of the period of observation. This constitutes an ideal setting in which to capture the role of the environment in the relation between reference income and subjective wellbeing.

II. A TWO-STAGE ESTIMATION STRATEGY

Given one’s own level of income, how does the income of one’s professional group influence one’s welfare? In order to weigh comparison and information effects, I follow the structure of Hirschman’s model transposed to the individual level. For each individual i , I thus distinguish own income Y_{it} and the income of the individual’s reference group \hat{Y}_{it} , which are equivalent to Y^A and Y^B in equation (1).

The method consists of two stages. In the first, I estimate the ‘reference income’ of each individual in the sample, where reference income is interpreted in a professional sense, i.e. as the typical income of people who share the individual’s productive characteristics. In a second stage I plug this estimated value, i.e. predicted reference income, into the Satisfaction regression, controlling for the usual socio-demographic variables.

The role of expectations is tested only indirectly, through the interpretation of the sign of the reference income variable in the Satisfaction regression. This is because most data-sets currently available do not include a variable that can proxy expectations. However, in the Russian survey (RLMS), the presence of such a variable allows me to check that the channel from reference income to Life Satisfaction really does work via Expectations.

(a) *The first-stage estimation of reference income*

‘Reference income’ is defined as the typical income of one’s professional peers, i.e. of people who share one’s productive skills and position. It is constructed as the post-

estimation prediction of the typical income of each individual in the sample, based on their productive characteristics. This definition of the reference income is justified in two ways: first, people with the same skills and occupation offer a natural benchmark for comparison; and second, in the context of learning from others, one can learn about one's own prospects by observing the average destiny of one's professional peers, i.e. the average pay for people with the same skills as oneself. Hence the 'professionally equivalent' is a suitable reference category with which to test the information *v.* relative income conjectures. This obviously would not be the case for other types of groups such as neighbors.

Following Clark and Oswald (1996), I thus estimate, for each available year*country, the logarithm of the typical real income of an individual, based on his sex, education, years of experience, occupation, region, industry and part-time/full-time contract (when available). It is important to use individual income (instead of household income) in order to capture the part of the income that is due to the characteristics of the individual and not to his family situation (transfers).²

I run this estimation over the whole sample of individuals, excluding those who do not report an individual income, following the idea that comparisons and extraction of information are based on the actual, observed income of relevant individuals, and not on an econometric reconstitution of what that income would have been, had the latter fully participated in the labour market. However, I have checked that correcting for participation bias using Heckman's (1979) maximum likelihood estimator, with gender and the presence of a young child as selection variables, does not change the results (Senik 2004).

In the first-stage estimation, therefore, I estimate an earnings equation of the form

$$(2) \quad Y_{it} = a_0 \text{sex}_i + a_1 \text{education}_{it} + a_2 \text{experience}_{it} + a_3 \text{occupation}_{it} + a_4 \text{industry}_{it} + a_5 \text{region}_i + a_6 \text{full-time}_{it} + \varepsilon_{it}$$

I then construct reference income as the predicted \hat{Y}_{it} for each individual*year*country.

This exercise can be understood as taking seriously the question of whether, within one's own total income, there are really two separate components: the 'social' component \hat{Y}_{it} , which is the typical income that one can expect, given one's skills and occupation, and the 'personal' or residual part that results from one's own personal circumstances ($\varepsilon_{it} = Y_{it} - \hat{Y}_{it}$), these two parts playing a separate role in the genesis of satisfaction. De facto, another specification of the econometric model consists in regressing Satisfaction on Reference Income and Residual Income (ε_{it}), the latter reflecting the effect of the strictly 'personal' part of Own Income. (A Working Paper version of this article shows that this specification leads to the same results: Senik 2005b.)

(b) The second-stage estimation of individual welfare

In the second stage, I include the first-stage predicted individual income (\hat{Y}_{it}) in a Wellbeing equation. I regress Satisfaction on socio-demographic variables together with estimated reference income, own individual income and individual fixed effects (when panel) or time dummies (for repeated cross-sections). Depending on the data-set, I use life satisfaction, financial satisfaction or satisfaction with one's economic situation; the latter are considered to be acceptable proxies for economic wellbeing or welfare (Ravallion and Lokshin 2001).

To avoid multicollinearity, I exclude some of the right-hand side variables in the first-stage estimation from the second-stage Life Satisfaction regression, except age, age-squared, education and gender (which have an obvious influence on both variables, but for different reasons). I assume that the purely productive characteristics on the right-hand side in the first-stage estimation essentially influence Life Satisfaction via reference income. Of course, it cannot be excluded that occupation and industry do have direct impacts on life satisfaction, because of procedural utility for instance (e.g. Frey and Benz 2003). However, I believe that, to a first approximation, the effect of professional variables on life satisfaction passes via one's actual and potential income. I have checked that the results are robust to different specifications of the second-stage regression, which include more professional variables such as experience, occupation or industry.

As reference income, \hat{Y} is a prediction from the first-stage estimation; the conventional standard errors from the second-stage estimation are unreliable. I thus systematically report bootstrapped standard errors, based on 1000 replications.

As described in the Appendix, satisfaction variables are measured on 4- to 9-point scales, depending on the data-set. One well-known difficulty with subjective data is the implementation of panel data techniques to deal with individual heterogeneity which respect the ordinal nature of the satisfaction variable (there being no accepted general method for estimating ordered probit or logit with fixed effects). In a former version of this paper (Senik 2005b), I estimated conditional fixed-effect logit models. This requires satisfaction to be recoded into two categories (satisfied/dissatisfied), implying a substantial loss of information. In this version, I present fixed-effects or simple OLS regressions of satisfaction. Ferrer-i-Carbonell and Frijters (2004) show that controlling for fixed effects is more important than respecting the ordinality of the variables. In addition, OLS produces coefficients that are easier to interpret in terms of orders of magnitude. The results are robust to the choice of specification, and I refer to the working paper version (Senik 2005b) for the ordinal results. Finally, to make the results comparable across surveys, I standardize the measure of subjective wellbeing; i.e. I divide it by its standard deviation (which implies treating it as a continuous variable).³

As my main interest lies in the influence of reference income, it is important to control for actual individual income. A standard caveat is that own income is likely to be endogenous to satisfaction for two possible reasons. The first is unobserved individual heterogeneity, say 'personality'. This should be dealt with by panel techniques. The second risk is that income and satisfaction may vary together, owing to an omitted variable (say health, or a macroeconomic shock). Including time dummies rules out the risk of endogeneity for reference income, which is a social category, defined for each year. But admittedly, the problem is left unsolved for own income, as time dummies do not deal with personal omitted variables such as health shocks. I check that the results are robust to the inclusion of the subjective health variable, but I acknowledge the risk that some other individual time-varying unobserved variable might bias the results. Robustness tests (Tables 4–7) somewhat mitigate the problem.

Where available, I also control for household expenditure in order to correct for possible measurement errors of the income variable. As is often the case, I use the natural logarithm of income: in the particular case of my model, this reflects the concavity of the utility function. The individual welfare function that I estimate hence depends on log real individual income (Y_{it}), log reference income (\hat{Y}_{it}), log real household expenditure (H_{it}), time dummies (I_t —for repeated cross-sections and panels), time-invariant individual

fixed effects (v_i —for panels), time-varying socio-demographic characteristics (X_{it}) and an error term u_{it} :

$$(3) \quad S_{it} = b \cdot X_{it} + b_1 \cdot \hat{Y}_{it} + b_2 \cdot Y_{it} + b_3 \cdot H_{it} + v_i + I_t + u_{it}.$$

The main interest of the paper lies in the coefficient b_1 on \hat{Y}_{it} and the way this varies across groups of countries and depends on individual perceptions of income mobility.

(c) Data

The choice of databases is guided by the requirement that they include satisfaction variables and, if possible, be panel. For ‘Western’ European countries, I use eight waves of the European Community Household Panel (ECHP), which was run annually from 1994 to 2001 and contains 14 European countries in a harmonized format⁴ (919,000 observations). I also exploit an additional separate larger database with 90,000 observations, the French component (same years), provided by the national statistical office (INSEE).

Concerning the ‘Eastern’ part of the sample, I draw on household surveys from six different countries: Russia, Poland, Hungary, Estonia, Latvia and Lithuania. The three former are panel, while the latter are cross-section. For Russia I use rounds 5–9 (1994–2000) of the Russian Longitudinal Monitoring Survey (RLMS), a representative stratified sample of Russian dwelling units that includes 11,130 individuals. For Hungary I use the TARKI Hungarian Household Panel, which runs from 1992 to 1997 (six waves) with 8237 individuals. To the best of my knowledge, there is no panel survey of Baltic households including subjective data. I make use of the NORBALT II survey of Estonia, Latvia and Lithuania which was run in 1999 on a representative stratified sample of the national population. The total Baltic sample comprises 10,539 non-missing observations. For Poland I exploit the national representative household survey run by the national statistical office. Part of the national survey is organized as a panel that is renewed every four years. I use three separate panels: the first, 1987–90, contains over 11,000 observations; the second, 1994–96, has 9618 observations; and the third, 1997–2000, has 6104 observations (1654–2498 individuals per year). The data pertaining to the years 1991–93 were not made available to me.

For the United States I draw on the General Social Survey (GSS), conducted by the National Opinion Research Center at the University of Chicago since 1972, which includes 1500–3000 individuals per year, for a total of 43,698 observations and contains Happiness and other attitudinal questions. The GSS is a representative sample of English- or Spanish-speaking American adults. This is not panel data, but I am not aware of any American panel data that includes the necessary information together with a satisfaction question.

Finally, I use the first wave of the European Social Survey (2003), which contains objective and attitudinal information about citizens of 21 countries of the European Union, including four ‘Eastern’ formerly Socialist countries.

In this way I perform a comparative test of the welfare impact of reference income using a total of 1,157,000 observations, split into 1,009,000 for the 15 European countries of the European Community Household Panel, 104,000 for Transition countries (Russian, Hungarian and Polish household panels and the three Baltic country household surveys), and 44,000 for the United States (General Social Survey, 1972–2002). Descriptive statistics for all of the databases are presented in the Appendix.

III. RESULTS

The results are consistent with a setup *à la* Hirschman: information effects are dominant in Transition countries, whereas comparison effects are pervasive in stable European countries. Moreover, information effects are also dominant in the American context. Depending on the information available in each database, I run robustness tests to ascertain the cognitive effect of reference income.

For lack of space, I do not reproduce the entire regressions, but I am willing to send them to any interested readers. The structure of satisfaction equations is well known and stable (Di Tella *et al.* 2003): Satisfaction depends strongly on Age and Age-squared, Marital status, Income and Gender, and more ambiguously on Education.

(a) The East–West Divide inside Europe

Tables 1 and 2 show the positive influence of Reference Income on individual satisfaction in post-Transition countries, using fixed-effect OLS models when panel data are available (Table 1—Russia, Poland and Hungary) and simple OLS models when only cross-section data are available (Table 2—Baltic countries).

For simplicity, the tables show only the Income Satisfaction regressions. However, the same results hold for other categories of subjective satisfaction. In Hungary, for

TABLE 1
SATISFACTION AND REFERENCE INCOME IN EASTERN EUROPE

	Russia	Hungary	Financial satisfaction (Poland)		
	Life satisfaction 1994–2000	Income satisfaction 1992–97	1988–89	1994–96	1997–2000
Log (Reference Income)	0.186*** [0.035]	0.118*** [0.007]	– 0.124*** [0.047]	0.285*** [0.130]	0.532*** [0.182]
Log (Individual Income)	0.121*** [0.014]	0.049*** [0.006]	0.086*** [0.021]	0.206*** [0.021]	0.242*** [0.033]
No. observations	10,728	21,372	11,031	9600	4288
No. persons	3072	5823	3700	4804	2300
R-squared	0.026	0.033	0.009	0.028	0.057
Log likelihood	– 10.879	– 20.990	– 4915	– 2858	– 1603

Notes

Fixed-effects OLS estimates of standardized satisfaction.

Controls: age, age square, household size, marital status, children, education, log household expenditure. Excluded: employment status, industry, occupation, region.

Russia, Life Satisfaction: ‘To what extent are you satisfied with your life in general at the present time? Very satisfied . . . not at all satisfied’ (5 modalities).

Hungary, Income Satisfaction: ‘Please tell me on a scale from 1 to 10 how satisfied you are with your income?’

Poland, Financial Satisfaction: ‘How do you evaluate your financial situation: 1 Very good, 2 Good, 3 Normal, 4 Bad, 5 Very bad?’

Reference Income is calculated on the basis of individual monthly wage.

Standardized satisfaction variables.

Bootstrapped standard deviation of log (reference income) (1000 replications).

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

TABLE 2
SATISFACTION AND REFERENCE INCOME IN BALTIC COUNTRIES

	All Baltic (1)	Estonia (2)	Latvia (3)	Lithuania (4)
	<i>Economic satisfaction, 1999</i>			
Log (Reference Income)	0.184*** [0.048]	0.364*** [0.065]	0.166** [0.073]	0.207** [0.096]
Log (Individual Income)	0.363*** [0.024]	0.344*** [0.026]	0.350*** [0.031]	0.459*** [0.044]
No. observations	5466	2666	1588	1215
R-squared	0.157	0.158	0.133	0.138

Notes

OLS estimates of standardized satisfaction

Controls: age, age square, gender, household size, marital status, children, native, education, log household expenditure, country dummies in column 1.

Excluded: employment status, industry, occupation, region and part-time/full-time.

Cluster (country) column (1).

Economic Satisfaction: 'Considering the total situation of your household, please tell me which of the following statements best describes your situation: "we are among the well-offs . . . we are poor"' (5 modalities).

Reference income is calculated on the basis of individual monthly wage.

Standardized satisfaction variables.

Bootstrapped standard deviation of log (reference income) (1000 replications).

For significance values see Table 1.

instance, Reference Income exerts a positive influence on satisfaction with future perspectives, with life and with standard of living; it also improves financial expectations. In Baltic countries too, Reference Income exerts a positive influence on satisfaction with economic situation over the previous 12 months, on expectations of improvement in the household's economic situation over the next 12 months, and even on the tolerance for inequality.

A spectacular result is obtained with Polish data (Table 1). Up until 1990, Poland was still a socialist regime (notwithstanding partial reforms); hence a regime with extremely little change and uncertainty in terms of occupations and income. Transition began abruptly in January 1990, with the so-called 'shock therapy' involving *inter alia* the overnight liberalization of prices and transactions. This triggered a dynamic process of change in the income distribution and individual prospects (Sachs 1993). As an illustration, I calculated a mobility index, defined as the average square number of deciles change across years (see Atkinson *et al.* 1992 for a discussion of this indicator). The value of this index rises from about 2 before 1990 to about 4.5 thereafter (Senik 2005b, table A.XI). In order to take this sharp evolution into account, I drop the year 1990 and run the regressions on the three separate sub-periods. I obtain a negative sign for the coefficient of reference income with the panel 1987–89, and a positive coefficient for the two subsequent panels (Table 1). I interpret this contrast between the sub-periods of the Polish panel as a powerful illustration of the fact that Reference Income becomes valuable information when instability rises.

By contrast, Table 3 shows that in stable European countries the sign of Reference Income is predominantly negative with the exception of Ireland and Spain, where it is significantly positive. These results, which confirm those of Clark and Oswald (1996) and Ferrer-i-Carbonnell (2005), suggest that comparison effects most often dominate information effects in the 'old Europe'. As a complement to this result I used French data, for which I have more subjective variables, from a separate French source (INSEE):

TABLE 3
 SATISFACTION AND REFERENCE INCOME IN STABLE EUROPE (ECHP 1994–2000)
 'INDICATE ON A SCALE FROM 1 TO 6 YOUR DEGREE OF SATISFACTION OF YOUR FINANCIAL SITUATION'

	UK	Ger- many	Denmark	Nether- lands	Belgium	Luxem- bourg	France	UK	Ireland	Italy	Greece	Spain	Portugal	Austria	Finland
Log (Reference Income), by wave and country	-0.011 ^{***} [0.002]	0.027 ^{***} [0.009]	-0.004 [*] [0.002]	0.010 ^{***} [0.002]	-0.006 ^{***} [0.002]	-0.063 ^{***} [0.022]	0.008 [0.005]	-0.018 ^{***} [0.006]	0.026 ^{***} [0.007]	0.005 [0.004]	-0.002 [0.007]	0.025 ^{***} [0.005]	0.005 [0.005]	-0.013 ^{***} [0.006]	-0.041 ^{***} [0.002]
Log (Monthly Wage)	0.042 ^{***} [0.005]	0.054 ^{***} [0.009]	0.055 ^{***} [0.007]	0.069 ^{***} [0.006]	0.035 ^{***} [0.006]	0.144 ^{***} [0.021]	0.077 ^{***} [0.006]	0.047 ^{***} [0.007]	0.015 ^{**} [0.007]	0.009 ^{**} [0.004]	0.019 ^{***} [0.006]	0.020 ^{***} [0.005]	0.038 ^{***} [0.005]	0.108 ^{***} [0.008]	0.064 ^{***} [0.005]
No. observ- ations	40,845	15,034	22,900	42,000	21,077	2986	42,174	12,087	21,124	50,700	30,697	42,257	43,945	23,046	21,929
No. indivi- duals	8697	6147	5257	9818	4707	1186	9436	6081	6460	11456	7594	11401	9587	5666	6504
R-squared	0.05	0.055	0.084	0.066	0.051	0.163	0.054	0.055	0.046	0.051	0.11	0.061	0.065	0.066	0.069
Log likelihood	-54,732	-19,756	-29,179	-54,267	-26,378	-3811	-55,311	-15,533	-27,869	-67,847	-41,543	-57,301	-58,450	-30,202	-28,838

Notes

Fixed effects OLS estimates of standardized satisfaction.

Controls: age, age-squared, household size, marital status, children, education.

Excluded: employment status, industry, occupation, part-time/full-time, tenure.

Reference Income is calculated on the basis of individual monthly wage.

Standardized satisfaction variables.

Bootstrapped standard deviation of log (Reference Income) (1000 replications).

For significance values see Table 1.

TABLE 4
THE HIGHER EFFECT OF REFERENCE INCOME FOR YOUNGER PEOPLE IN EASTERN EUROPE

	Russia 1994–2000 Life sat.	Hungary 1992–98 Income sat.	Baltic 1999 Economic sat.	Poland 1994–96 Financial sat.	Poland 1997–2000 Financial sat.
Log (Reference Income)	0.157*** [0.030]	0.122*** [0.005]	0.190** [0.056]	0.460*** [0.065]	0.575*** [0.090]
Log (Individual Income)	0.126*** [0.013]	0.096*** [0.009]	0.366*** [0.020]	0.594*** [0.022]	0.487*** [0.028]
Young*Log (Reference Income)	0.102** [0.042]	0.015** [0.008]	– 0.082 [0.119]	0.280*** [0.100]	0.208* [0.113]
Young	0.589** [0.268]	– 0.045 [0.094]	0.604 [0.624]	– 1.797*** [0.667]	– 1.291 [0.832]
No. observations	10,728	17,094	5466	8062	4288
R-squared	0.101	0.120	0.153	0.257	0.255

Notes

OLS estimates of standardized satisfaction.

Controls: age, age-squared, gender, household size, marital status, children, native, education, log (household expenditure), country dummies for Baltic countries, year dummies for the others.

Excluded: employment status, industry, occupation, region and part-time/full-time for Baltic countries.

Reference Income is calculated on the basis of individual monthly wage.

*Young' is defined as less than 41 years.

Standard errors clustered by individual.

Standardized satisfaction variables.

Bootstrapped standard deviation of log (Reference Income) (1000 replications).

Russia, *Life Satisfaction*: 'To what extent are you satisfied with your life in general at the present time? Very satisfied . . . not at all satisfied' (5 modalities).

Hungary, *Income Satisfaction*: 'Please tell me on a scale from 1 to 10 how satisfied you are with your income'

Baltic, *Economic Satisfaction*: 'Considering the total situation of your household, please tell me which of the following statements best describes your situation: We are among the well-off . . . We are poor' (5 modalities).

Poland, *Financial Satisfaction*: 'How do you evaluate your financial situation: 1 Very good, 2 Good, 3 Normal, 4 Bad, 5 Very bad?'

For significance values see Table 1.

I found that not only does financial satisfaction decrease with reference income, but so also do other subjective variables, such as the probability of declaring that one's 'situation has improved compared to last year', and that 'household resources are sufficient to live on' (see Senik 2005b for the corresponding tables). This comparison effect is attenuated for individuals in the upper part of the reference group: comparisons are more effective upwards. A similar asymmetry was revealed by Ferrer-i-Carbonnell (2004) in German data.

If Reference Income is taken to provide information about one's perspectives, then its impact should be greater for younger people, whose future perspectives last longer. This is confirmed in Table 4, which shows that in most cases the positive impact of reference income is indeed higher for people under the age of 41. The positive impact of reference income is also higher for individuals who experience particularly high income volatility over time, i.e. those whose standard deviation of real individual income across rounds of the survey is superior to the mean country-level standard deviation (Table 5).

Finally, the Russian survey allows me to check that Reference Income is used as information via the subjective Expectations question: 'Do you think that in the next 12 months you and your family will live better than today or worse? (much worse/worse/. . ./

TABLE 5
THE HIGHER EFFECT OF REFERENCE INCOME IN PRESENCE OF HIGH VOLATILITY

	(1)	(2)	(3)	(4)
	Life satisfaction Russia 2000	Income satisfaction Hungary 1996	Financial satisfaction Poland 1996	Financial satisfaction Poland 2000
Log (Reference Income)	0.312*** [0.084]	0.157*** [0.021]	0.989*** [0.116]	0.767*** [0.117]
Log (Individual Income)	0.023 [0.038]	0.063* [0.036]	0.352*** [0.047]	0.418*** [0.046]
High volatility* Log (Reference Income)	-0.026 [0.111]	0.017** [0.007]	0.212*** [0.042]	0.018** [0.007]
No. observations	960	822	2666	1763
R-squared	0.096	0.212	0.258	0.228

Notes

OLS estimates of standardized life satisfaction.

Subsample of men; regression on the last year of the panel.

Controls: age, age-squared, gender, household size, marital status, children, native, education, log (household expenditure), year dummies, volatility.

Excluded: employment status, industry, occupation, region.

Reference Income is calculated on the basis of individual monthly wage.

Volatility is measured as the standard deviation of individual income across all years of the panel. 'High volatility' is defined as above average.

Standard errors clustered by individual.

Standardized satisfaction variables.

Bootstrapped standard deviation of log (reference income) (1000 replications).

Russia, Life Satisfaction: 'To what extent are you satisfied with your life in general at the present time? Very satisfied ... not at all satisfied?' (5 modalities).

Hungary, Income Satisfaction: 'Please tell me on a scale from 1 to 10 how satisfied you are with your income.

Poland, Financial Satisfaction: 'How do you evaluate your financial situation: 1 Very good, 2 Good, 3 Normal, 4 Bad, 5 Very bad?'

For significance values see Table 1.

much better'; 5 response categories). I verify that this proxy for expectations is indeed influenced by Reference Income, and that, in turn, it influences Satisfaction. I run a two-stage least squares regression of standardized Life Satisfaction on Expectations instrumented by Reference Income. In the first-stage regression of Expectations, the coefficient on reference income was 0.0326 with a standard error of 0.008; in the second-stage regression of standardized Life Satisfaction, the coefficient on instrumented Expectations was 3.76 with a standard error of 1.12. Hence Reference Income does seem to influence Life Satisfaction via Expectations. I refer interested readers to a companion paper dedicated to the role of expectations, which develops this point in more detail (Senik 2006).

As an additional check,⁵ I use the first round of the European Social Survey (ESS 2003), which covers 21 European countries, including four 'Eastern' formerly socialist countries. The ESS is not panel and there are not many observations for each country, so I construct Reference Income as average labour income by country*occupation (ISCO 1-digit level); there are not enough observations per country to construct more precise categories. I then regressed Happiness on Reference Income controlling for age, age-squared, gender, household income, household size, employment status and education and country dummies. Of course this is a very crude test, but it turns out that Reference

TABLE 6
SATISFACTION AND REFERENCE INCOME IN THE UNITED STATES: GSS, 1972–2000

	(1) Happy	(2) Life exciting	(3) Happy	(4) Life exciting
Log (Reference Income)	0.037* [0.019]	0.052** [0.023]	0.050*** [0.016]	0.249*** [0.019]
Log (Individual Income)	0.062*** [0.008]	0.053*** [0.009]	0.122*** [0.007]	0.133*** [0.009]
Young*Log (Reference Income)			0.013 [0.020]	0.045* [0.024]
Young			– 0.127 [0.186]	0.542** [0.230]
No. observations	20,714	13,878	27,879	18,656
R-squared	0.074	0.063	0.081	0.067

Notes

OLS estimates of standardized satisfaction;

Controls: age, age-squared, gender, household size, marital status, children, native, education, log (household expenditure), year dummies.

Excluded: employment status, industry, occupation, region.

'Happy': 'General happiness: very happy/pretty happy/not too happy'; 'Life exciting': 'Life is dull/routine/exciting';

'Young' is defined as less than 41 years.

Reference Income is calculated on the basis of individual monthly wage.

Standardized satisfaction variables.

Bootstrapped standard deviation of log (Reference Income) (1000 replications)

For significance values see Table 1.

Income is positive and significant only for the former Transition countries: the Czech Republic, Hungary, Poland, Slovenia (and Israel—curiously);⁶ in the other countries of 'Old Europe' the coefficient is insignificant! A possible interpretation is that this average professional income is relevant as a source of information in Eastern countries, but is not precise enough to play the role of a comparison benchmark in Western Europe.

In summary, the data from post-Transition countries support the interpretation of reference income as a source of information: younger people and those more exposed to uncertainty give a higher value to the information conveyed by the income of their professional peers. Hence the difference between Eastern and Western Europe seems to pertain to the higher volatility and uncertainty with which Easterners are confronted. The experience of Poland, i.e. the fact that the sign of the coefficient on Reference Income changes at the beginning of the Transition period, strengthens this interpretation.

I now turn to the American environment, which is not as volatile as that of Eastern Europe, but where income mobility is considered to be higher than in Western Europe.

(b) *Hirschman in America*

A surprising result is that in the United States happiness, and the feeling that 'life is exciting' rather than 'life is dull' (two possible answers to the satisfaction question in the GSS survey), increase with the income of one's professional peers (Table 6). For space reasons, I present the regression results using pooled data (1972–2001) including year dummies, but I have checked that the result holds in separate regressions year by year. Column (4) shows that the effect of reference income is greater for the young (under 41 years old).

TABLE 7
THE GREATER EFFECT OF REFERENCE INCOME ON MORE MOBILE PEOPLE IN THE UNITED STATES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Happy	Life exciting	Happy	Life exciting	Happy	Life exciting	Happy	Life exciting
Log (Reference Income)	0.100*** [0.016]	0.248*** [0.020]	0.124*** [0.030]	0.354*** [0.038]	-0.06 [0.057]	0.288*** [0.072]	0.016 [0.055]	0.295*** [0.064]
Log (Individual Income)	0.065*** [0.008]	0.053*** [0.010]	0.065*** [0.008]	0.053*** [0.010]	0.114*** [0.032]	0.046 [0.039]	0.062*** [0.008]	0.048*** [0.009]
Upward mobility/parents*	0.054 [0.047]	0.194*** [0.068]						
Log (Reference Income)	0.42 [0.454]	1.799*** [0.650]						
Downward mobility/parents*			-0.025 [0.030]	-0.112*** [0.042]				
Log (Reference Income)			-0.177 [0.292]	-1.048 [0.404]				
Downward mobility/parents								
<i>R</i> has opportunity to advance*					0.031*** [0.011]	0.001 [0.014]		
Log (Reference Income)					0.206*** [0.027]	0.097*** [0.032]		
<i>R</i> has opportunity to advance							0.091 [0.058]	-0.03 [0.073]
<i>R</i> has no opportunity to advance*							-1.115** [0.560]	0.16 [0.704]
log (Reference Income)							22.421 [0.560]	14.949 [0.704]
<i>R</i> has no opportunity to advance							0.076	0.049
No. observations	19,964	13,367	19,964	13,367	1450	947		
<i>R</i> -squared	0.073	0.048	0.073	0.048	0.107	0.063		

Notes

OLS estimates of standardized satisfaction (GSS, 1974–2000).

Controls: age, age-squared, gender, household size, marital status, children, native, education, log (household expenditure), year dummies. Excluded: employment status, industry, occupation, region.

Reference Income is calculated on the basis of individual monthly wage

Upward mobility: 'Respondent's living standard compared to parents: much better ... much worse'; 5 modalities. Available for years 1994, 1996, 1998, 2000, 2002.

Has opportunity to advance: 'Respondent has the opportunity to advance: strongly agree ... strongly disagree', 5 modalities. This variable is available for years 1982 and 1998.

Modalities 1 + 2 and 4 + 5 have been aggregated together in order to proxy the respondent's experience of mobility and perspectives of mobility (upward v. downward).

'Happy': 'General happiness: very happy/pretty happy/not too happy', 'Life exciting': 'Life is dull/routine/exciting'.

Standardized satisfaction variables.

Bootstrapped standard deviation of log (Reference Income) (1000 replications).

For significance values see Table 1.

If the interpretation of this Europe–USA divide lies in the difference in social mobility, then the positive effect of reference income should be larger for those whose perception of mobility is greater. I do indeed find that, when respondents declare that their living standard is higher than that of their parents, the effect of reference income on the feeling that ‘life is exciting’ is stronger (column (2) in Table 7). The positive welfare effect of reference income is also greater for American respondents who believe that they ‘have the opportunity to advance’ (column (5)). Symmetrically, for those who have experienced downward social mobility, the effect of reference income is weaker (column (4)).

These observations differ somewhat from those in Luttmer (2005), who provides empirical evidence of relative deprivation effects in the United States. However, Luttmer looks at the welfare effect of the average earnings of one’s neighbours (and shows that it is negative): it is clear that the informational content of this income category differs from that of one’s professional group.

(c) Ruling out the measurement error interpretation

A standard worry about the coefficient estimates on Reference Income is that they are biased upwards, as they serve as a proxy for own true income when Own Income is measured with error. A more prosaic interpretation of the results is thus that in New Europe and the GSS data income is measured with relatively greater error than in Western European Surveys (although there is nothing about the databases that inclines me to adhere to this view). I present three arguments against this interpretation.

The first two arguments are based on the recourse to consumption variables, under the assumption that measurement error in consumption and income are uncorrelated (cf. Ravallion and Lokshin 2000). First, simply introducing Household Expenditure in the Satisfaction regression, together with Own Income and Reference Income, should correct part of the measurement error in Own Income. Accordingly, whenever available, I included this variable in the list of the regression controls.

Second, I instrumented Own Income using Household Consumption and checked that the coefficient on reference income remained positive (as well as that on Own Income). The data (here RLMS) pass this test: both instrumented log Own Income and log Reference Income are significantly positive in the Life Satisfaction regression.⁷

Third, in a previous version of this paper I ran the Life Satisfaction regressions on Reference Income and Residual Income ($Y_{it} - \hat{Y}_{it}$), instead of on Reference Income (\hat{Y}_{it}) and Own Income (Y_{it}). If measurement error was driving the results, one would expect the magnitude of the coefficient on Residual Income to be lower when the coefficient of Reference Income was higher. It is obvious from the tables in Senik (2005b) that this prediction does not hold.⁸

The positive influence of Reference Income on Life Satisfaction thus seems to be robust, which is unlikely to result from measurement error in own income.

This set of results suggests that, in post-Transition countries and the United States, the typical income of one’s professional peers is used as a source of information rather than as a benchmark for comparison. By contrast, in Western Europe comparison effects are dominant. This certainly reflects differences in the perceived economic environment. Americans and Eastern Europeans⁹ perceive a higher degree of mobility (and uncertainty for the latter), which gives a higher value to information. Of course, mobility is not the same as uncertainty; however, both can have the effect of neutralizing people’s aversion to income differences by emphasizing the informational content of the income distribution.

These different attitudes towards relative income are associated with a different tolerance for income inequality across the former Iron Curtain. An illustration is given by the tax structure in Europe. On average, the marginal top personal income tax rate is almost 14 points higher in Western Europe¹⁰ than in post-Transition countries (see Senik 2005b, table A.XII). Taxes on profits are also much lower in post-Transition countries. A wave of low and flat tax rates has recently spread over Eastern countries—coinciding with a period of dramatic rise in income inequality (see Senik 2005b, table A.XIII). The interpretation offered by the present paper is that this lower demand for income equality is typical of the period of transformation that the ‘New Europe’ is experiencing, during which informational effects are predominant. This might shed some light on the Kuznets curve, suggesting that one of the reasons why income inequality grows during the early stage of development is because agents have a lower aversion to it, and hence do not demand redistributive tax policies.

IV. CONCLUSIONS

Using mostly panel data and over one million observations, this paper shows that the average income in one’s professional group affects individual subjective wellbeing negatively in ‘old’ European countries, whereas the correlation is positive in post-Transition economies. In Poland the relative importance of these effects reversed with the beginning of Transition: comparison effects dominated until 1989, whereas information effects have been predominant from 1990 onwards. It is remarkable that Americans react positively to a rise in their professional reference income, which makes them closer to Eastern Europeans than to Western Europeans.

Together with the evidence brought by Alesina *et al.* (2004), Alesina and La Ferrara (2005) and Alesina and Angeletos (2005), this suggests that attitudes towards income distribution divide New European countries and the United States from ‘Old Europe’. At a time of ongoing European enlargement, this discovery of divergence in preferences is of interest. Of course, this gap may vanish as the mobility and uncertainty characterizing countries of the New Europe diminish. Can a society keep a high degree of mobility over a long period? In the United States this is still an open and debatable question, even though it seems to be the belief of the many Americans.

Beyond these national differences, one general lesson of this paper is the importance of income non-market interactions. Another lesson is that GDP growth remains an objective and an indicator of welfare, especially in Transition countries. With respect to this issue, this paper shows that one’s welfare not only improves with one’s own income, but that it sometimes also increases with the growth of other people’s income.

APPENDIX: SPECIFICATIONS USED FOR THE FIRST-STAGE ESTIMATION OF REFERENCE INCOME

- **ECHP countries:** log (personal income in PPP or personal wage in PPP) is regressed on gender, age, age-squared, education, industry, occupation, full-time/part-time, status (employee/self-employed/etc.), and tenure.
- **GSS (United States):** log (linearized real personal income) is regressed on age, age-squared, occupation, industry, education, region, nationality, and gender.
- **Hungary (TARKI):** log (real individual income) is regressed on age, age-squared, gender, diploma, employment status, industry, and foreigner (*v.* national). Clustered at the household level.

- **Poland 1987–89:** log (real individual income) is regressed on age, age-squared, gender, diploma, employment status, occupation, and region.
- **Poland 1994–96:** log (real individual income) is regressed on age, age-squared, gender, diploma, employment status, and occupation.
- **Poland 1997–2000:** log (real individual income) is regressed on age, age-squared, gender, diploma, employment status, occupation, and industry.
- **Russia:** log (real individual income) is regressed on age, age-squared, gender, occupation, employment status, industry, region, and tenure. Clustered at the household level.
- **Baltic countries:** log (real individual income) is regressed on age, age-squared, gender, education, occupation, employment status, industry, region, nationality, and part-time/full-time.

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NOTES

1. The same reasoning can apply concerning the effect of income inequality in general: the prospect of upward mobility can dominate inequality aversion for inequality, depending on the degree of mobility expected by individuals (e.g. Benabou and Ok 2001; Piketty 1995).
2. The regressions are run for each year of each country, so there is no need to cluster, except at the household level when many individuals inside the same household may be interviewed. The regressions are simple OLS. All specifications are based on individual income, which is essentially labour income. The specifications used for the first-stage estimation of reference income are given in the Appendix.
3. I am grateful to an anonymous referee for this suggestion.
4. In principle, the survey itself is harmonized, in the sense that the same questions, with the same response categories, are asked of households in the different countries. Some countries withdrew from the project after a number of years. This was the case for the United Kingdom, where there are only three years of true ECHP data (1994–96). To make up for this defecation, the ECHP data include the national British Household Panel Survey for the years 1995–2001. Some years are missing for other countries as well: data from Germany and Luxembourg are available only for the years 1994–96; 1994 is missing for Austria; and 1994 and 1995 are missing for Finland.
5. I am grateful to an anonymous referee for this suggestion.
6. The coefficients on the log (Average Group Income) are: 0.885*** [0.364] for the Czech Republic, 0.7*** [0.217] for Hungary, 0.546*** [0.251] for Poland, and 0.783*** [0.238] for Israel. The coefficients for the other countries are not significant. Average group income is constructed as average labour income by country*occupation (ISCO 1-digit). The controls include age, age-squared, gender, household size, marital status, children, native, education, log (household income), occupation and country dummies. Standard errors were clustered by country. The satisfaction variable was standardized.
7. I run a fixed-effects two-stage least squares regression of Life Satisfaction. In the first-stage regression of log (Own Income), the coefficient on log (Household Expenditure) is 0.174*** [0.0104]; in the second-stage fixed-effects IV regression of Life Satisfaction, the coefficient on log (Own Income) is 0.889*** [0.095] and that on log (Reference Income) is 0.275*** [0.071]. The number of observations was 13,239 with 3420 groups. Other controls were age, age-squared, household size, marital status, children and education level. The entire regression results are available on request.
8. I thank two anonymous referees for suggesting these tests.
9. Table A.XI in Senik (2005b) presents the average square number of deciles change experienced by individuals over two years. It is remarkable that the value of this indicator is much higher in transition countries than in European countries. Based on real individual income, the average mobility indicator is about 11 in Russia, 7 in Hungary and 5 in post-reform Poland, as against 2 or 3 in ECHP countries. (Note, however, that income mobility and inequality in transition countries are certainly somewhat overstated by measurement errors, as argued in Luttmer 2002.)
10. Of course, countries of the ‘Old Europe’ itself are not perfectly identical in terms of preference for income redistribution. However, even the most liberal of them have higher taxes than do Transition countries.

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