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# **The emerging aversion to inequality: Evidence from long subjective data**

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## ***Abstract***

This paper provides evidence of a change in the relationship between individual satisfaction with the state of country's economy and income inequality during transition from a command to market economic system. Using data from a series of extensive and frequent surveys of Polish population, we identify a structural break in this relationship. In the beginning of transition, an increase in income inequality is interpreted by population as a positive signal of increased opportunities; this sentiment is particularly strong among older people and people with right-wing political views. Later in the transition period, increased inequality becomes an important reason for dissatisfaction of the public with the country's economic situation and reforms, as people become more skeptical about the legitimacy of income generation process. We also provide direct evidence from opinion polls of a change in the public sentiment about income inequality.

JEL: C25, D31, D63, I30, P20, P26.

Key words: inequality, subjective well-being, growth, breakpoint, transition.

## **1. Introduction**

Reform fatigue and disenchantment seem to have appeared in transition countries of Central and Eastern Europe, which abandoned command economy and embarked on a new development path based on market liberalization. The rise of populist parties relying on popular discontent with reforms was observed in a number of countries at the end of the last century despite the significant achievements in establishing democratic and market institutions, continuous economic growth, and NATO and the European Union accession (Desai and Olofsgård, 2006; Denisova et al. 2008; Krastev, 2007). This contrasts with the remarkable popular support for reform and high expectations in the initial period. In Poland, for instance, the initial strong consensus for reforms faded away in the middle of the 1990s, giving way to disappointment. The criticism of some of transition outcomes, such as corruption, growing inequality and a high price paid by the losers of transition, progressively became the dominant theme of public discourse. Popular discontent was associated with increasing distrust of political elites, viewed as corrupt and self-interested. We argue that in Poland, as in many other transition countries, the backlash of reforms is partly due to the rise in income inequality and the perception that the process of income distribution is flawed and corrupt (Brainerd, 1998; Milanovic, 1998, 1999; Kornai, 2006).

As one of the central features of former socialist regimes – income equality – was replaced by sharp income differentiation, it is no surprise that the subjective perception of inequality is one of the key elements of the public attitudes towards reforms. In theory, income inequality may affect subjective welfare for several reasons, including pure inequality aversion and more sophisticated mechanisms involving the externalities of corruption and criminality (Alesina et al., 2004; Fong, 2001; Alesina and Perroti, 1996). Yet inequality can also improve subjective welfare in certain contexts. This has been suggested by Hirschman and Rothschild (1973). The authors argue that societies experiencing rapid development may initially show tolerance for higher inequality, because they interpret it in terms of greater opportunities. This is also the idea of Alesina et al. (2004): “... *in the U.S., the poor see inequality as a ladder that, although steep, may be climbed...*” This tolerance for inequality may, however, wither away over time: if expectations are not met, supporters of the development process may become its enemies. After such a

“turning point,” side-effects of development, and in particular, an increase in inequality, may swamp the subjective benefits of growth.

The dynamic scenario sketched by Hirschman and Rothschild, including the downturn in public satisfaction and adherence to reforms, might actually be taking place in the former socialist bloc. While the beginning of transition was perceived as a big reshuffling of cards with high uncertainty, after more than fifteen years, citizens of transition countries have acquired a more precise idea of the new economic regime and of their own prospects in the new society. Depending on how fair the process of social change and the resulting income distribution appears to their citizens, some transition countries may find themselves in the second part of the roadmap sketched by Hirschman and Rothschild.

The objective of this paper is to test Hirschman and Rothschild’s conjecture, using a series of repeated cross-sections of exceptional frequency and length that cover the entire transition experience in Poland. We mainly focus on self-declared satisfaction with the state of the Polish economy (henceforth “country satisfaction”), which is both a satisfaction domain and a political attitude. We explore the relationship between income inequality and country satisfaction over time between 1992 and 2005, when Poland experienced sustained economic growth. We identify a break in the relationship between country satisfaction and income inequality at the end of 1996. In the first period (1992-1996), we observe a positive association between these variables, whereas in a second period (1997-2005), this relationship becomes negative. In order to interpret this break in the relationship, we also examine other satisfaction variables available in the survey. In the first period, inequality is associated with higher expectations, which is not true anymore in the second period, suggesting that it lost its informational value in the eyes of the population. In addition, people’s self-declared satisfaction with their personal situation is negatively and significantly associated with income inequality after 1996, whereas there was no statistically significant relationship in the earlier period. Additional evidence on the evolution of public opinion suggests that the changing tolerance for inequality coincided with the growing perception that high incomes are unmerited and often reflect corruption.

This paper is related to different strands of economic literature. First, the subjective perception of the country's situation touches upon the political economy of development. Several papers have underlined the sociopolitical instability that results from income inequality (Alesina and Perotti, 1996; Perroti, 1996). Income distribution concerns have also been shown to discourage individuals' adhesion to the deepening of market reforms or development policies, calling for fiscal policies that hamper economic growth (Alesina and Rodrik, 1994; Persson and Tabellini, 1994). Acemoglu and Robinson (2000, 2002) have argued that in Nineteenth Century Europe, the extension of voting rights that led to unprecedented redistributive programs can be viewed as a strategy by the elite to avoid political discontent and revolution, which was in turn fed by the inequalities rising from economic development and industrialization. Analyzing country satisfaction is a means to address these issues with the tools of the happiness literature, i.e., using subjective variables.

This paper also contributes to the literatures on the relationship between income distribution and happiness and on the subjective foundations of the demand for redistribution (see, for instance, Senik, 2005, Clark et al., 2008). Most studies in this field find that individuals' attitude towards income inequality depends on their beliefs and preferences regarding the factors of economic success and failure. Prospects of upward mobility make people more tolerant for inequality (Alesina et al., 2004; Alesina and la Ferrara, 2005), but fairness considerations also play an important role in explaining the degree of inequality aversion (Alesina and Angeletos, 2005; Fong, 2001). In sum, people dislike inequality and suffer from it, when they view income differences as unmerited.

The subjective welfare effect of inequality during the process of transition has been studied extensively. For instance, Sanfey and Teksoz (2007) find that income inequality has a positive effect on life satisfaction in transition countries, whereas the impact is negative in other countries from the World Values Survey. Guriev and Zhuravskaya (2009) investigate a weaker relationship, *ceteris paribus*, between GDP and life satisfaction in transition countries, as compared to non-transition countries. They identify inequality as one of the culprits of the lower satisfaction in transition countries. Several papers treat the experience of transition as a "natural experiment" in order to assess the negative welfare effects of inequality (e.g., Ravallion and

Lokshin, 2001) and income comparisons (Ferrer-i-Carbonell, 2005; Senik, 2004, 2008). Alesina and Fuchs-Schuendeln (2007) document the slow convergence of preferences for state intervention in East-Germany, after the shock of the German reunification. We follow this usage of transition as a country-wide experiment. Starting from a situation of relatively egalitarian distribution of income (notwithstanding other forms of inequality), transition to a market economy makes it possible to trace the relationship between unfolding inequality and subjective satisfaction, as we assume that most changes are perceived as exogenous shocks by citizens of the former socialist bloc.

The following section presents the data, section 3 discusses the empirical strategy, and section 4 presents the results. Last, section 5 concludes.

## **2. Data**

The data are constructed from individual-level surveys carried out by CBOS in Poland.<sup>1</sup> We exploit 84 surveys of representative samples of the Polish adult population, with samples of 1000-1300 individuals per survey, covering the period 1992-2005 (six surveys per year). Even though some variables are available in earlier years, we choose 1992 as our starting date, the year that GDP growth resumed after two years of a significant decline. We focus on the period of sustained economic growth, during which the fall in satisfaction with country's economic performance is most puzzling. In addition, our main variable of interest is missing in many dates before 1992.

A standard set of questions was asked in each survey: gender, age, education, residential location, labor market status, and occupation. In terms of income, the best documented and most complete measure available is net total monthly household income per capita. This includes all of the revenues from the individual's main job, including bonuses, rewards, various additional remunerations, revenues from other jobs, including sporadic contracts, disability and old-age pensions, and other revenues and transfers. People were asked to indicate their net monthly



average income per capita over the last three months. We use this notion of income, deflated using the monthly consumer price index published by the Polish Central Statistical Office (GUS).

The data also contain specific attitudinal questions. We mainly hinge on a satisfaction question (country satisfaction), which reflects the subjective attitude of the respondents concerning the general economic situation of the country. Given the context, this question also captures the feeling of the respondent towards the reform policy.

Country satisfaction: *How do you evaluate the economic situation in Poland?* Respondents could tick one out of five possible answers: *very good/good/neither good nor bad /bad/ very bad.*

In addition, we also use two other subjective questions that concern the personal situation of the respondents:

Private satisfaction: *How are your life and your family's life?* The proposed answers were: *Very good/ good /neither good nor bad/bad /very bad.*

Private expectations: *Do you think that in the coming year, you and your family will live: much better than now/a little bit better/the same as now/a little bit worse/much worse.*

All these variables were recoded so that higher numbers indicate greater satisfaction. We match the CBOS data to macroeconomic indicators taken from official sources (Central Statistical office, GUS): at the national level we use yearly GDP, the yearly GDP deflator, and the consumer price index; the monthly unemployment rate is measured at the regional level. We compute the Gini coefficient of income inequality using the successive surveys of the dataset. This measure of inequality is of “high quality” as defined by Deininger and Squire (1996): it is calculated on the basis of successive representative samples of the population and takes into account all sources of revenues.

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<sup>1</sup> The sample design is explained at [http://www.cbos.pl/EN/About\\_us/design.shtml](http://www.cbos.pl/EN/About_us/design.shtml)

The descriptive statistics for all variables are presented in Tables A1 - A3 in the Appendix. Over the 1992-2005 period, the economy grew at an average rate of 4.4 percent. More precisely, average GDP growth rate reached 5.3 percent between 1992 and 1997, and then fell to 3.7 percent after 1997. In the meantime, there was a rise in unemployment and inequality. The rate of unemployment rose from 13% in 1992 to 18% in 2005 (Table A3 in the Appendix). Income inequality as measured by the Gini coefficient was 0.32 at the beginning of 1992, but reached 0.38 by the end of 2005 (Table A1 in the Appendix).

Figure 1 displays yearly averages of the main variables of interest: country satisfaction, private expectations, private satisfaction, real GDP and the Gini coefficient. Although real GDP has been rising since 1992, satisfaction with the country's economic situation improved only up to 1997, and then declined substantially until 2002, with a slight improvement after this date. The patterns of private satisfaction and expectations exhibit similar movements, albeit with a smaller amplitude. Eventually, the final level of all satisfaction variables remains higher in 2005 than it was in 1992.

### **3. Empirical strategy**

We consider the relationship between country satisfaction and income inequality, as in Alesina, di Tella and MacCulloch (2004), who study the effect of income inequality in Europe and in the United States. We adopt the same specification in terms of statistical model and control variables. In contrast to Alesina et al. (2004), who perform a comparative static analysis of the relationship between income inequality and satisfaction in different environments, we are interested in the dynamic evolution of this relationship in one country.

More precisely, we test for the presence of a structural break in this relationship, without imposing any specific date for the discontinuity, treating the breakpoint as endogenous. As Wald tests constructed with breaks treated as parameters do not possess standard large sample asymptotic distributions, we use the *sup-Wald* test based on the maximum of a sequence of Wald statistics, with critical values from Andrews (1993). The basic regression we estimate is:

$$S_{it} = a_T \text{Gini}_t + b_1 \mathbf{X}_{it} + b_2 \gamma_T + b_3 \theta_j + b_4 \text{inflation}_t + b_5 \text{unemployment}_{vt} + e_{it} \quad (1)$$

where  $S_{it}$  is the country satisfaction of individual  $i$  at date  $t$ ,  $\text{Gini}_t$  is an inequality measure calculated for each representative cross-section<sup>2</sup>;  $\mathbf{X}_{it}$  represents the socio-economic characteristics of individual  $i$  at date  $t$  consisting of age, age-squared, gender, education, occupation, labor market status, household income per capita and residential location;  $\gamma_T$  are year dummies capturing the general macroeconomic and other circumstances that affect all individuals in a given year;  $\theta_j$  are region dummies for seven regions (North, West, Centre-West, Centre, East, South-East and South-West); and  $e_{it}$  is the error term. We also control for monthly inflation rate and monthly unemployment rate at the voivodeship level<sup>3</sup>, in order to separate the influence of income inequality from other macroeconomic determinants of country satisfaction. These variables are commonly used as macroeconomic determinants of satisfaction (see for example di Tella, MacCulloch and Oswald, 2003).

As the satisfaction variables are ordinal, we estimate equation (1) using the ordered logit model. We pool individual observations from different surveys over time. We adjust standard errors to allow for clusters by cross-section (i.e., by  $t$ ). Clustering is important because it takes into account intra-survey correlation of individual responses.

We test the hypothesis that the coefficient on the Gini index ( $a_t$ ) is the same over the entire period. Consequently, we use a partial structural change model, constraining the coefficients of the other explanatory variables to remain the same over all of the periods. Specifically:

$$H_0: a_T = a^* \text{ for all } T$$

$$H_1: a_T = a_1 \text{ for } T = 1992, \dots, T^B$$

$$a_T = a_2 \text{ for } T = T^B+1, \dots, 2005$$

We consider different potential breaks, i.e. different values of  $T^B$  from 1993 to 2004, trimming

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<sup>2</sup> Below we also consider cross-sectional variations in Gini coefficient.

the sample at about 15%. We choose to leave one year of observations at the beginning and at the end of each tested sample, which implies leaving about 15% of the sample either before or after the break (trimming at 15 %). We compute the Wald statistic for each value of  $T^B$  in order to test whether the regression coefficient on the Gini estimated over the sub-period  $[1992, T^B]$  is equal to that estimated over the sub-period  $[T^B+1, 2005]$ . We calculate the Wald statistic over all possible breakpoints and compare the maximal value with the relevant critical value (taken from Andrews 1993). If the *sup Wald* statistic exceeds the critical value, the test rejects the null hypothesis of equal coefficients. We then divide the sample into two parts at the estimated breakpoint and carry out a parameter constancy test for each sub-sample. If the hypothesis of no break in the sub-samples is not rejected, we estimate equation (1) separately for each sub-sample.

In order to understand which groups drive the average result, we exploit cross-sectional variations. We also run a series of robustness tests in order to exclude alternative explanations of the downturn in country satisfaction and to check that our results are robust to the use of alternative indices of income inequality. In order to enrich the picture of the changing perception of income inequality, we also explore the relationship between income inequality and other indicators of satisfaction available in the surveys. Finally, we use several public opinion polls that illustrate the changing attitudes of the population towards income differentiation.

## **4. Results**

### **Structural break in the relationship between country satisfaction and income inequality**

First, we pool the data and estimate the country satisfaction controlling for all variables as in equation (1). The results are shown in Table A4 in the Appendix. The difference between columns 1 and 2 is that the latter includes two macroeconomic variables: the regional rate of unemployment and the monthly rate of inflation. We observe that men, richer and more educated people, students, and higher occupations are more satisfied with the country's situation. Country satisfaction is U shaped in age. Pensioners, farmers, unqualified workers and those who live in rural areas are less satisfied than employees (the reference group). Comparison of the two

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<sup>3</sup> Voivodeship (województwo, in Polish) is an administrative unit.

columns shows that the coefficients on the individual characteristics are robust to the inclusion of macroeconomic indicators. Unemployment is negatively associated with country satisfaction whereas the coefficient of inflation is statistically insignificant. The coefficient of income inequality remains insignificant.

We then try to identify a discontinuity in the relationship between income inequality and country satisfaction. As explained in section 3, we test the hypothesis of no break in the pooled sample. The results are displayed in Table 1. In column (1) the numbers are the values of  $\chi^2$  corresponding to Wald statistics for all possible breakpoints. In columns (2) and (3) we show the coefficients of the Gini index obtained for the periods before and after each potential break. Each row of the table corresponds to the year, which divides the sample into two parts. Country satisfaction is estimated then separately for each sub-sample. When the break point is situated in 1996, the two coefficients on the Gini index, before and after the break, are significant at 1 % and have opposite signs. This does not happen for any other year-break.

The critical value from Andrews (1993) for one parameter and trimming at 15% is 8.85 at the 5% level. Hence, as the sup-Wald equals 18.44, we identify the break at the end of 1996. However, because in 2000 the value of the  $\chi^2$  is also greater than the critical value, we check for the possible existence of a second break in the period 1997-2005. This time we apply trimming at 25% (the critical value is 7.93). The test is unable to accept the hypothesis of no break in the second sub-period. In order to make sure that the second break, although statistically insignificant, does not affect our results, we test the persistence of the break in 1996 keeping only the observations before 2000. The sup-Wald test in 1996 is now 16.71 (with trimming at 20% the critical value is 8.45).

Consequently, we divide the whole sample into two sub-periods: 1992-1996 and 1997-2005. Table 2 shows the estimation results for equation (1) over the two sub-samples. In panel A we observe that when the sample is divided into two periods, the coefficient on income inequality is statistically significantly positive before 1997 (column 2) and then significantly negative after that date (column 3). If one admits the interpretation of the coefficient on the Gini index as the causal effect of income inequality on satisfaction, as do Alesina et al. (2004), then table 2 suggests that the perception of inequality changes around the year 1997: after that date

individuals are less inclined to consider themselves satisfied with reforms and, more generally with the economic situation of their country, when inequality is high, even after controlling for individual income, a number of personal characteristics, inflation and unemployment, year and region. But before that date, inequality interpreted as a measure of higher opportunities, is positively correlated with subjective evaluation of reforms. More specifically, before the break, a one percentage point increase in the Gini index leads to a 0.9 percentage point decrease in the probability of considering the country economic situation as bad; after the break the same increase in the Gini index leads to a one percentage point increase in the probability of such answer.

In panel B and C we verify that the results are robust to the use of alternative measures of inequality. One could argue that people have more local views of the income distribution and that the Gini coefficient calculated at the country level is a less precise measure of the level of inequality that the one people perceive in their closer environment. Thus, in panel B we report results based on a measure of income inequality calculated for different residential locations: large cities (over 100 000 inhabitants), smaller cities and rural areas. In panel C we measure income inequality based on our data as the standard deviation of log household income for each cross section. The results in panel B and C confirm the pattern observed in panel A: inequality measures are positively associated with the satisfaction variable in the first period, and turn out to be significantly negative in the second period.

We must emphasize that we are not trying to test whether the setback in attitudes is due to an external exogenous shock. Rather, the implicit model that we have in mind is a cumulative process of disappointment, which at a certain point goes beyond a critical threshold (exhaustion of patience). Quoting Hirschman and Rothschild (1973, p. 552): *“The turning point in attitudes is not caused by a sudden shock. It comes about “purely as a result of the passage of time – no particular outward event sets off this dramatic turnaround”. [In] “the easy early stage [...] everybody seems to be enjoying the very process that will later be vehemently denounced and damned as one consisting essentially in “the rich becoming richer”.* However, if we wanted to indicate some specific events that could have contributed to the turning point in the relationship between income inequality and country satisfaction, we could refer to the fact that 1997 coincides

with the announcement by the newly-appointed government of a wave of second-generation welfare-state reforms (concerning health, pensions and education), which was met with some reluctance by the population. It is likely that this has contributed to the “reform fatigue” of the population, by reinforcing the perception of the costs imposed by reforms.

### Who is most affected by inequality?

Different segments of the population may differ in their perception of income inequality. In this section, we investigate attitudes of which particular groups drive the average result (established above). First, as income inequality is initially interpreted in terms of increased opportunities, the effects should be more pronounced for those individuals who had a longer experience of the socialist regime and who have experienced the transition process from the start. Thus, we expect older people to have higher expectations at the beginning of the transition and to be more disappointed afterwards. Table 3 reports the results separately for the sample of two cohorts, i.e. those who were born before 1970 and, therefore, were at least 23 years old in 1992 and those who were born in 1970 or after. It shows that it is older people who are initially more likely to see income differentiation in terms of opportunities. Indeed, the coefficient on the Gini index is statistically significantly positive (column 1) in the regression on the sub-sample of older people, whereas it is not significant in the regression on the sub-sample of younger people (column 3). In the second period, however, the coefficient on the Gini index is negative and statistically significant for both groups. The initial positive attitude of older people towards income inequality has vanished, leaving place to a general aversion for inequality.

Second, we expect to see a difference in the perception of inequality depending on the ideological self-identification of individuals. Alesina et al. (2004) observed that left-wing Europeans were more affected by income inequality, as compared to right-wingers. The notions of left and right are not completely clear in the countries having experienced communism for 45 years, but we rely on the self-definition of individuals who answered the following question: “Please, describe your political opinions using the scale from 1 (left) to 7 (right).” We classified as left-wingers the respondents who replied ‘1’ and as right-wingers those who chose ‘7’ (left and right represents each about 5 percent before the break and 10 % after the break). Table 4 shows that in Poland, the

initial positive association between income inequality and satisfaction is statistically significant for right-wingers (who probably see income differentiation as a source of incentives and efficiency), but not for left-wingers (who are less likely to share this view. After 1996, a statistically significant negative association between income inequality and country satisfaction is observed in both groups.

Overall, these results suggest that the initial perception of income differentiation was more positive in groups which had longer experience of socialism or defined themselves as right-wingers. This evidence is consistent with the hypothesis that initially income differentiation in transition was taken as a sign of opportunity and efficiency, as these two groups of the population were more likely to welcome the reform at the onset of transition.

### Possible alternative explanations

Due to the limitation of the data, we are unable to establish the direction of causality in the relationship between income inequality and country satisfaction. However, our objective is to assess the association between income inequality and satisfaction and to establish the existence of a break in this relationship over time. Hence, we need to rule out alternative potential explanations of the evolution in country satisfaction. The first natural suspect is time trend itself. As income inequality is rising along the whole considered period, the coefficient on the Gini index could be hiding the pure effect of time. This could happen if, the level of inequality notwithstanding, with the passage of time, people who initially had high expectations become disappointed. The inclusion of year dummies partly takes care of this issue. Alternatively, we have included a time trend in the estimation of equation (1). The results concerning the changing impact of income inequality were not altered (the coefficient on the Gini index was 5.569 (with standard deviation of 2.100) in the first period, and -13.725 (with standard deviation of 4.342) in the second period).

Second, we considered the possibility that the results are driven by seasonal variations of country satisfaction. Table 5 shows that including monthly dummies in the basic regression does not affect the results.



Third, the changing tolerance for inequality could be due to the reduced importance of the welfare state. The public attitude towards inequality certainly depends on the extent of redistribution and social protection. Keane and Prasad (2002), following Garner and Terrel (1998), argued that in Poland at the beginning of transition substantial social transfers compensated for increasing wage inequality. The mechanisms of social transfers were thus critical in ensuring political support for reform. Their period of observation stops in 1997, but official statistics show that the share of social expenditure in GDP has remained stable at around 23% since 1997. Hence, the changing tolerance for inequality does not seem to be associated with the withering away of the welfare state.

Finally, we asked whether a similar break is observable in the relationship between country satisfaction and other macroeconomic variables. We, thus, carried the same test for the presence of a structural break in the relationships between (1) unemployment rate and country satisfaction and (2) inflation rate and country satisfaction. We find that the coefficients on unemployment remain negative in all sub-periods defined by consecutive breaks, whereas the coefficients on inflation remained statistically insignificant in almost all periods. Therefore, we conclude that our main result is not driven by a change in public opinion regarding other major macroeconomic indicators.

To sum up, our results prove to be immune to several potential alternative explanations.

### Other indicators of satisfaction

In order to complete the picture and provide more evidence on personal satisfaction during the transition process, we now turn to the relationship between two other subjective variables and income inequality over time. As shown in Figure 1, private satisfaction and private expectations follow a similar pattern as country satisfaction, but of smaller amplitude. Although more flat than for country satisfaction, these curves present the same downward inflexion at some point around the mid-1990's. In addition, we observe a slight upturn around 2001 at the time when inequality receded. The level of private satisfaction and expectations is always higher than the level of country satisfaction. Interestingly, all curves share a common feature that the level of satisfaction

and expectations is higher in 2005 than it was initially in 1992.

We first check whether the estimate of private satisfaction yields results that are consistent with those in the literature with respect to the usual individual level correlates of well-being (see for example Di Tella et al., 2003). As expected, we find a U-shaped relationship between age and satisfaction, and a positive correlation with income, education, and higher occupations. Men are happier than women, a frequent observation in Central and Eastern Europe and in Latin America (Graham and Pettinato, 2002; Guriev and Zhuravskaya, 2009; Easterlin, 2008). People who live in rural areas are more satisfied and optimistic about their future standard of living than are inhabitants of urban agglomerations, who, in turn, are more satisfied than those who live in large cities. By contrast, individuals who live in rural areas view the situation of the country in a more pessimistic way.

Concerning the impact of inequality, following Hirschman's scenario, we expect that rising inequality will end up deterring not only individuals' appreciation of the country's situation, but also their satisfaction with their own situation, as well as their expectations concerning their private situation.

Columns 3 and 4 of Table 6 show individuals' expectations regarding their living conditions. Our measure of inequality is associated with higher expectations up to 1997, but it remains uncorrelated with it thereafter. This suggests that inequality is initially interpreted as an opening of new opportunities, but in the later stages of transition loses this significance in the eyes of the population. Concerning private satisfaction, columns 1 and 2 show that it is initially weakly correlated with inequality. In the second period, however, the coefficient on the Gini index becomes statistically significant and negative. We conclude that the interpretation of income inequality has changed over the period under consideration, with a visible turning point in 1997.

This changing pattern of private satisfaction, in association with the rise in income inequality, may constitute an element of the famous Easterlin puzzle, i.e. the flatness of the average happiness score in developed countries, in spite of sustained GDP growth after the Second World War (Easterlin 2001). This empirical finding has stimulated an important subjective happiness

literature (see Clark et al., 2008), although it is still disputed (Stevenson and Wolfers, 2008). Two main potential explanations have been proposed: adaptation effects and comparison effects. Other attempts to explain the Easterlin paradox consist in looking for omitted variables in the estimation of the relationship between income and subjective well-being (Di Tella and MacCulloch, 2008). The findings of this paper suggest that income distribution may constitute one of these missing variables that weaken the welfare effect of growth.

### Direct evidence from opinion polls

In order to find some direct evidence that the attitude towards income inequality is changing over time, we finally use several public opinion polls ran by the Public Opinion Research Center survey (CBOS, 2003). Figure 2 illustrates the weakening tolerance for income inequality, especially after 1997. Egalitarian attitudes gain in popularity, as attested by the rising percentage of people who consider that “the government should reduce differences between high and low wages” and that “inequalities of income are too large in Poland”. By contrast, the percentage of people who consider that “energetic entrepreneurs should be remunerated well in order to ensure the growth of the Polish economy”, that “future well-being in Poland requires remunerating well those who work hard”, or that “economic inequalities are necessary for economic progress”, have significantly decreased. The same pattern is visible in the data from the New Europe Barometer surveys.<sup>4</sup> These data show that, in Poland, the proportion of individuals who declare that “incomes should be made equal so that there is no great difference in income” rather than “individual achievement should determine how much people are paid; the more successful should be paid more” rose from 24% in 1992 to 32% in 1998, and 54% in 2004.

Figure 3, we use another survey (CBOS, 2004) to illustrate the share of population who consider corruption as an important problem. This sentiment increased sharply, from 32 percent in 1991 to 75 percent in 2004. Overall, it appears that the perception of the Polish population concerning fairness and efficiency of the distribution of income, deteriorated during the period under observation, with a visible turning point around 1997.

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<sup>4</sup> New Europe Barometer Surveys, Centre for the Study of Public Policy, University of Aberdeen.  
<http://www.abdn.ac.uk/cspp/nebo.shtml>

These results suggest that the parallel processes of income growth and inequality were initially well accepted by Poles, who might have seen them as a promise of future shared gains. However, by the late mid-1990s, high expectations seem to have given way to more negative attitudes, fed by the rising intolerance for income inequality, the continued growth in GDP notwithstanding.

## **5. Conclusion**

This paper provides evidence of a change in relationship between income inequality and individuals' views of the economic situation of the country, which can partly be interpreted as a measure of support for reforms. The results suggest that income inequality was initially perceived as a positive signal of increased opportunities. However, after several years of rapid economic transformation, unfulfilled expectations and diminishing patience brought about a change in attitudes and growing inequality started to undermine satisfaction. Individuals seem to have become disappointed with transformation and skeptical about the legitimacy of the enrichment of reform winners. Various public opinion surveys confirm the changing popular opinions about the degree of corruption in the country and the desirability of high pay-offs in certain professions. Hence, the turning point in the tolerance for income inequality seems to come with the increasingly wide perception that the process that generates income distribution is itself unfair.

The findings of this paper constitute a link between the literature on subjective well-being and the political economy literature focusing on inequality and growth. It provides evidence in support of a hypothesis put forth by Acemoglu and Robinson (2000, 2002) and Perotti (1996) that growth, which is accompanied by inequality, generates dissatisfaction and, as such, carries the menace of social instability.

The results obtained in this paper offer a number of lessons for developing and transition countries: if it is important for governments to rapidly exploit the initial "window of opportunity" for reforms, it is also crucial that they adopt redistributive policies early on in the process, in order to ensure durable popular support for reforms. But the lesson can be extended to developed countries, as it stresses the importance to ensure that the functioning of the market and the process of income distribution are perceived as fair and transparent.

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Fig. 1. Satisfaction variables, real GDP and the Gini coefficient, 1992-2005 (yearly averages)

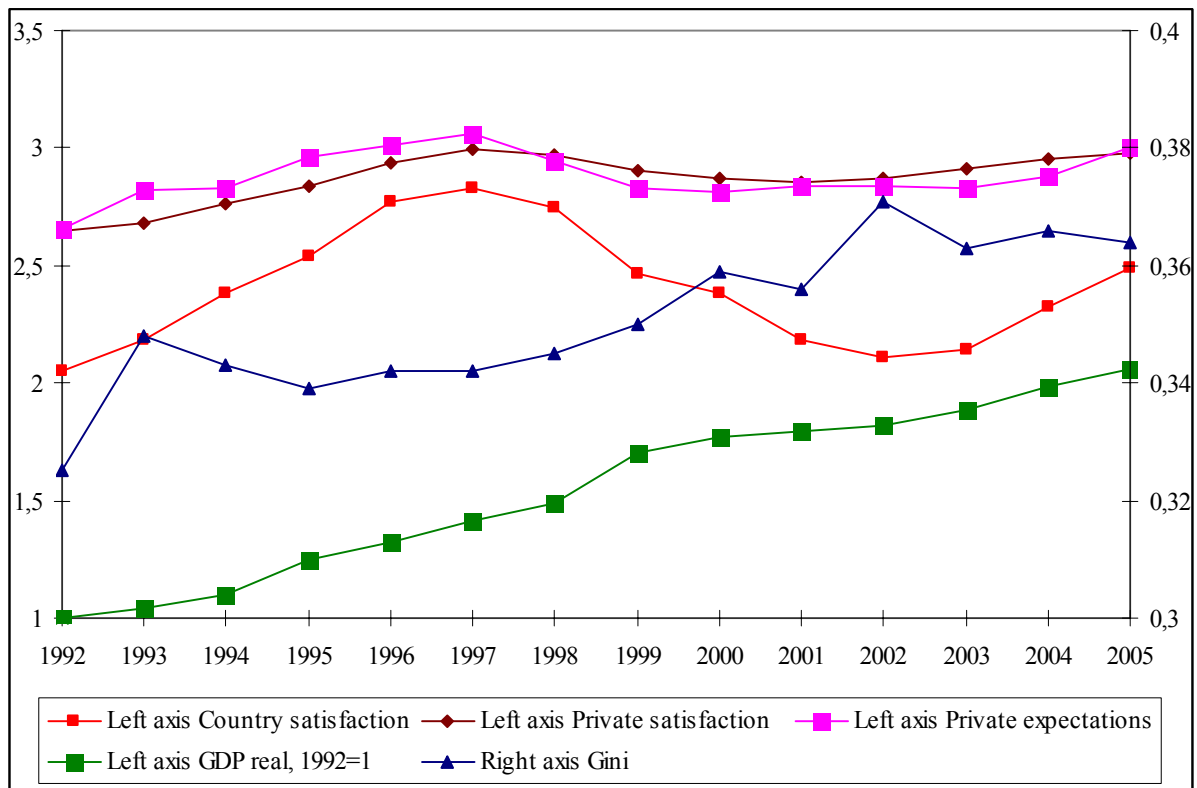
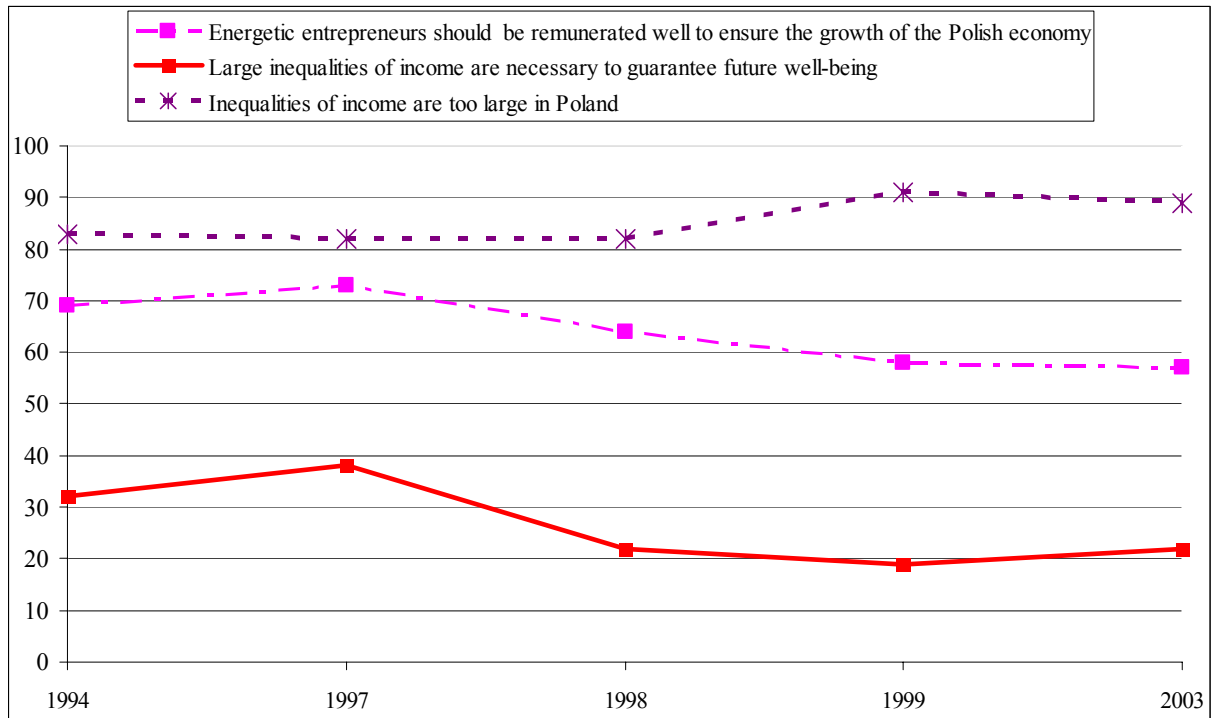


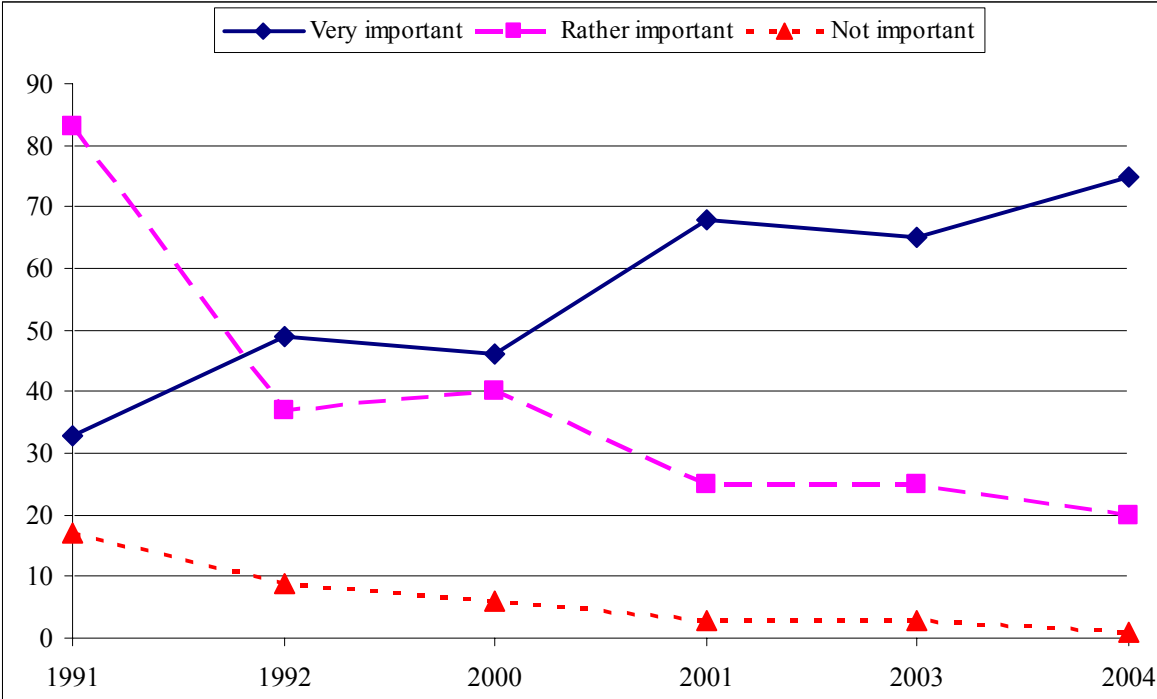


Figure 2. Opinions concerning income inequality, Poland 1994-2003 (%)



Source: CBOS (2003). Percentage of people who agree with the above statements

Figure 3. “In your opinion, how important is the corruption problem in Poland?” (%)



Source: CBOS (2004). Percentage of people who answer positively the following question: “In your opinion, how important is the corruption problem in Poland: very important/rather important/not very important/not important”.

Table1. Test of a break in the relationship between income inequality and country satisfaction

	Wald test	Gini index before the break	Gini index after the break
	(1)	(2)	(3)
1992			
1993	7.09	5.685*** [1.668]	-1.394 [2.056]
1994	3.98	4.418** [2.034]	-1.586 [2.223]
1995	6.31	4.358*** [1.644]	-3.299 [2.592]
1996	18.44	5.828*** [1.732]	-6.116*** [2.177]
1997	8.10	3.583* [1.891]	-6.040** [2.821]
1998	7.00	3.202* [1.833]	-6.155** [3.035]
1999	5.54	2.804 [1.802]	-5.828* [3.203]
2000	14.12	3.312* [1.700]	-8.910*** [2.810]
2001	3.42	1.231 [1.928]	-7.861* [4.526]
2002	0.83	0.631 [1.869]	-6.053 [7.075]
2003	1.96	0.791 [1.845]	-10.747 [8.033]
2004	0.53	0.074 [1.855]	4.600 [5.943]
2005			

The numbers in column (1) are values of chi2 corresponding to Wald statistics for all possible breakpoints. We test the existence of a break, trimming at 15%. The critical value from Andrews (1993) for one parameter and trimming at 15% is 8.85 at the 5% level. In columns (2) and (3) we show the coefficients of the Gini index obtained for the periods before and after each break.

Table 2. Country satisfaction and income inequality before and after the break. Ordered logit

	1992-1996	1997-2005
<b>Panel A</b>		
Gini	5.906*** [1.815]	-6.443*** [2.183]
Log household income	0.330*** [0.024]	0.330*** [0.021]
Inflation	0.022 [0.023]	0.082** [0.037]
Unemployment	-0.008*** [0.003]	-0.017*** [0.004]
Observations	30520	43061
Chi2	52297	9210
Pseudo R2	0.06	0.06
<b>Panel B</b>		
Gini by residential location	2.052*** (0.571)	-2.382*** [0.881]
Chi2	48193	6756
Pseudo R <sup>2</sup>	0.055	0.057
<b>Panel C</b>		
Standard deviation of household income	0.001*** [0.000]	-0.001*** [0.000]
Chi2	12338	8309
Pseudo R <sup>2</sup>	0.056	0.057

The dependent variable, country satisfaction, scores the answers to the following questions: How do you assess current economic situation in Poland? Answers from 1 “very bad” to 5 “very good” (Country satisfaction). Controls in panel A include gender, age, age-squared, education, residential location (except in panel B), labor market status, occupation, region dummies, and year dummies. In Panels B and C log household income, inflation and unemployment are also included. Gini coefficients and standard deviation of household income are calculated for each successive representative cross-section. All standard errors (in brackets) are clustered by cross-section. \*, \*\* and \*\*\* denote significance at the 10, 5 and 1% levels respectively.

Table 3. Country satisfaction and income inequality: cohort effects. Ordered logit.

	Born before 1970		Born after 1969	
	1992-1996 (1)	1997-2005 (2)	1992-1996 (3)	1997-2005 (4)
Gini	6.351*** [1.802]	-6.386*** [2.265]	1.237 [2.834]	-6.791*** [2.410]
Log household income	0.335*** [0.028]	0.365*** [0.022]	0.295*** [0.065]	0.232*** [0.035]
Regional unemployment	-0.009*** [0.003]	-0.018*** [0.004]	-0.005 [0.009]	-0.011* [0.006]
Inflation rate	0.021 [0.023]	0.088** [0.040]	0.034 [0.032]	0.049 [0.039]
Observations	27851	34818	2669	8243
chi2	644537	11502	5378140	1761
Pseudo R2	0,05	0,06	0,06	0,05
log likelihood	-31910	-40627	-2955	-9488

Controls include gender, age, age-squared, education, residential location, labour market status, occupation, region dummies, and year dummies. All standard errors (in brackets) are clustered by cross-section. \*, \*\* and \*\*\* denote significance at the 10, 5 and 1% levels respectively.

Table 4. Country satisfaction and income inequality: left and right. Ordered logit.

	Left		Right	
	1992-1996 (1)	1997-2005 (2)	1992-1996 (3)	1997-2005 (4)
Gini	0.871 [4.117]	-6.063** [2.944]	12.341** [4.820]	-8.523** [4.336]
Log household income	0.598*** [0.114]	0.210*** [0.072]	0.241** [0.111]	0.374*** [0.073]
Inflation	0.106*** [0.041]	0.039 [0.062]	0.028 [0.043]	0.113** [0.054]
Unemployment	-0.011 [0.015]	-0.006 [0.011]	0.002 [0.011]	-0.006 [0.010]
Observations	1081	3035	1564	3168
chi2	18803	1106	17005	1681
Pseudo R2	0.10	0.07	0.02	0.08
log likelihood	-1293.81	-3580	-1946	-3797

Controls include gender, age, age-squared, education, residential location, labour market status, occupation, region dummies, and year dummies. All standard errors (in brackets) are clustered by cross-section. \*, \*\* and \*\*\* denote significance at the 10, 5 and 1% levels respectively.

Table 5. Country satisfaction: controlling for seasonality. Ordered logit.

	1992-1996	1997-2005
Gini	6.289*** [2.061]	-6.061*** [1.669]
Inflation	0.085*** [0.031]	-0.046 [0.047]
Unemployment	-0.010*** [0.003]	-0.017*** [0.004]
_Imonth_2		0.015 [0.117]
_Imonth_3	-0.026 [0.103]	-0.322*** [0.112]
_Imonth_5	0.096 [0.116]	-0.266** [0.105]
_Imonth_6	0.187** [0.081]	
_Imonth_7	0.319*** [0.117]	-0.363*** [0.128]
_Imonth_9	0.086 [0.089]	-0.214* [0.115]
_Imonth_10	0.427*** [0.106]	
_Imonth_11	0.266** [0.109]	-0.217** [0.110]
_Imonth_12	0.522*** [0.121]	
Observations	30520	43061
chi2	20463.40	11758.02
Pseudo R2	0.06	0.06
log likelihood	-34853	-50140

Controls include gender, age, age-squared, education, residential location, labour market status, occupation, region dummies, and year dummies. All standard errors (in brackets) are clustered by cross-section. \*, \*\* and \*\*\* denote significance at the 10, 5 and 1% levels respectively.

Table 6. A reversal in private expectations and satisfaction

	Private satisfaction		Private expectations	
	1992-1996 (1)	1997-2005 (2)	1992-1996 (3)	1997-2005 (4)
Gini	0.750 [1.042]	-2.814** [1.378]	8.408*** [2.326]	0.009 [1.352]
Inflation	0.014 [0.010]	0.010 [0.028]	0.017 [0.034]	0.015 [0.043]
Unemployment	0.001 [0.002]	-0.002 [0.003]	-0.003 [0.003]	-0.003 [0.004]
log household income	1.274*** [0.034]	1.291*** [0.019]	0.309*** [0.033]	0.361*** [0.021]
Observations	32357	45335	67550	27115
chi2	47168	26666	2707	3855
Pseudo R2	0.10	0.12	0.03	0.02
log likelihood	-34829	-47974	-77419	-32698

The dependent variables are the answers to the following questions: Do you think that in a year your life and the life of your family will be: Answers from 1 “much worse” to 5 “much better than now” (Private expectations); How do you and your family live? Answers from 1 “very bad” to 5 “very good” (Private satisfaction). Controls include gender, age, age-squared, education, residential location, labor market status, occupation, regional dummies, time trend, and year dummies. Gini coefficients are calculated for each successive representative cross-section. All standard errors (in brackets) are clustered by cross-section. \*, \*\* and \*\*\* denote significance at the 10, 5 and 1% levels respectively.

## Appendix

Table A1: Subjective variables, household income and the Gini coefficient: mean values of variables for each cross-section.

Dates (year_month)	Country satisfaction	Private Expectations	Private satisfaction	Household income	Gini coefficient
1992_01	2.002	2.679	2.753		
1992_05	1.944	2.531	2.613	5.454	0.323
1992_07	2.036	2.849	2.640	5.528	0.331
1992_09	2.060	2.742	2.635	5.569	0.312
1992_10	2.147	2.707	2.652	5.515	0.339
1992_12	2.108	2.453	2.610	5.467	0.320
1993_01	2.124	2.637	2.659	5.516	0.353
1993_03	2.126	2.641	2.677	5.528	0.355
1993_05	2.085	2.741	2.713	5.527	0.324
1993_07	2.124	2.700	2.628	5.490	0.325
1993_09	2.272	3.046	2.663	5.486	0.379
1993_11	2.347	3.169	2.720	5.532	0.347
1994_01	2.343	2.924	2.788	5.488	0.351
1994_03	2.235	2.704	2.703	5.407	0.345
1994_06	2.437	2.886	2.738	5.471	0.357
1994_07	2.462	2.861	2.769	5.514	0.347
1994_09	2.379	2.733	2.818	5.510	0.337
1994_11	2.426	2.859	2.749	5.542	0.323
1995_01	2.521	2.928	2.832	5.546	0.339
1995_03	2.430	2.952	2.809	5.519	0.336
1995_05	2.526	2.904	2.851	5.573	0.306
1995_07	2.599	2.963	2.847	5.569	0.353
1995_09	2.574	2.931	2.841	5.566	0.339
1995_11	2.606	3.117	2.868	5.683	0.358
1996_01	2.943	3.137	2.975	5.650	0.364
1996_03	2.786	3.041	2.911	5.574	0.348
1996_05	2.702	2.988	2.938	5.614	0.329
1996_07	2.699	2.953	2.923	5.668	0.336
1996_09	2.724	2.941	2.959	5.675	0.329
1996_11	2.771	3.006	2.925	5.691	0.342
1997_01	2.745	3.072	2.906	5.726	0.371
1997_03	2.687	3.028	2.987	5.728	0.344
1997_05	2.840	3.048	3.023	5.807	0.332
1997_07	2.895	3.029	3.074	5.749	0.324
1997_09	2.939	3.141	3.005	5.794	0.352
1997_11	2.866	3.052	2.985	5.801	0.328
1998_01	2.771	2.929	3.000	5.720	0.337
1998_03	2.769	2.965	2.942	5.706	0.354
1998_05	2.774	2.988	2.967	5.797	0.337
1998_07	2.721	2.957	2.991	5.822	0.339
1998_09	2.746	2.878	2.943	5.834	0.352
1998_11	2.699	2.923	2.997	5.823	0.353
1999_01	2.706	2.889	2.945	5.805	0.347
1999_03	2.457	2.830	2.879	5.735	0.363
1999_05	2.471	2.828	2.912	5.818	0.342
1999_07	2.396	2.749	2.875	5.823	0.345



Table A1 continued.

Dates (year_month)	Country satisfaction	Private Expectations	Private satisfaction	Household income	Gini coefficient
1999_09	2.330	2.814	2.882	5.879	0.353
1999_11	2.431	2.840	2.941	5.856	0.350
2000_01	2.490	2.848	2.874	5.800	0.372
2000_02	2.427	2.781	2.889	5.755	0.365
2000_05	2.320	2.792	2.904	5.827	0.365
2000_07	2.339	2.751	2.826	5.775	0.337
2000_09	2.375	2.854	2.882	5.814	0.359
2000_11	2.348	2.834	2.830	5.779	0.354
2001_01	2.383	2.844	2.896	5.787	0.328
2001_03	2.201	2.770	2.809	5.791	0.368
2001_05	2.198	2.781	2.842	5.783	0.351
2001_07	2.098	2.841	2.864	5.840	0.377
2001_09	2.147	2.879	2.846	5.811	0.340
2001_11	2.077	2.899	2.870	5.811	0.378
2002_01	2.071	2.834	2.881	5.831	0.361
2002_03	2.056	2.791	2.849	5.779	0.375
2002_05	2.071	2.788	2.835	5.824	0.379
2002_07	2.035	2.839	2.864	5.885	0.389
2002_09	2.160	2.876	2.910	5.820	0.366
2002_11	2.247	2.885	2.906	5.852	0.357
2003_01	2.249	2.867	2.914	5.832	0.373
2003_03	2.111	2.836	2.880	5.822	0.355
2003_05	2.060	2.873	2.900	5.864	0.363
2003_07	2.134	2.804	2.882	5.806	0.356
2003_09	2.188	2.887	2.997	5.819	0.360
2003_11	2.120	2.683	2.917	5.778	0.369
2004_01	2.257	2.864	2.920	5.822	0.372
2004_03	2.121	2.772	2.934	5.802	0.381
2004_05	2.370	2.924	2.982	5.882	0.367
2004_07	2.323	2.891	2.942	5.786	0.351
2004_09	2.451	2.939	3.007	5.811	0.369
2004_11	2.445	2.902	2.961	5.773	0.355
2005_01	2.541	2.981	2.980	5.737	0.363
2005_03	2.415	2.966	2.926	5.747	0.351
2005_05	2.525	3.073	2.965	5.809	0.362
2005_07	2.371	2.903	2.989	5.782	0.369
2005_09	2.471	2.974	2.971	5.776	0.365
2005_11	2.588	3.123	3.037	5.778	0.377

Country satisfaction: How do you assess current economic situation in Poland? Answers from 1 “very bad” to 5 “very good”; Private expectations: Do you think that in a year your life and the life of your family will be: Answers from 1 “much worse” to 5 “much better” than now; Private satisfaction: How do you and your family live? Answers from 1 “very bad” to 5 “very good”. Household income is the logarithm of net total monthly household income per capita, deflated by the monthly CPI. Gini coefficients are calculated for each successive representative cross-section.

Table A2. The socio-demographic structure of the sample, yearly averages.

Panel A

Year	Female	Age	Secondary education	Rural areas	Urban areas	Large cities
1992	0.55	46.77	0.34	0.42	0.52	0.28
1993	0.55	47.93	0.35	0.42	0.52	0.28
1994	0.48	47.89	0.37	0.40	0.53	0.28
1995	0.55	48.24	0.37	0.40	0.51	0.29
1996	0.55	47.61	0.39	0.37	0.55	0.28
1997	0.57	47.53	0.41	0.37	0.52	0.31
1998	0.56	47.74	0.41	0.37	0.53	0.30
1999	0.56	48.17	0.43	0.37	0.52	0.30
2000	0.55	48.13	0.45	0.37	0.50	0.32
2001	0.56	47.86	0.44	0.36	0.49	0.32
2002	0.55	48.46	0.46	0.35	0.46	0.35
2003	0.55	47.82	0.46	0.37	0.47	0.33
2004	0.52	46.89	0.46	0.41	0.51	0.29
2005	0.53	46.73	0.44	0.37	0.51	0.30

Urban areas are defined as having no more than 100 000 inhabitants. Large cities are defined as having over 100 000 inhabitants.

Panel B

Year	Unemployed	Pensioners	Farm	Not working	Unqualified workers	Qualified workers	Higher occupations	Self-employed
1992	0.08	0.34	0.11	0.07	0.06	0.14	0.06	0.03
1993	0.05	0.44	0.09	0.03	0.04	0.10	0.06	0.04
1994	0.04	0.45	0.09	0.02	0.04	0.10	0.06	0.04
1995	0.06	0.43	0.08	0.04	0.04	0.10	0.06	0.04
1996	0.08	0.37	0.07	0.06	0.04	0.10	0.07	0.04
1997	0.08	0.35	0.06	0.06	0.04	0.10	0.08	0.04
1998	0.07	0.37	0.06	0.05	0.04	0.09	0.07	0.04
1999	0.08	0.37	0.06	0.05	0.04	0.09	0.07	0.04
2000	0.09	0.37	0.06	0.05	0.03	0.08	0.07	0.04
2001	0.12	0.37	0.05	0.05	0.03	0.08	0.06	0.04
2002	0.13	0.37	0.05	0.04	0.03	0.07	0.07	0.04
2003	0.12	0.35	0.05	0.05	0.03	0.07	0.07	0.04
2004	0.12	0.34	0.06	0.05	0.03	0.07	0.07	0.04
2005	0.11	0.33	0.05	0.05	0.04	0.08	0.05	0.03

Higher occupations include directors, presidents and managerial staff in public administration, liberal professions with higher education, engineers, school directors, physicians, and lawyers.

Table A3. Macroeconomic variables: yearly averages

Year	Nominal GDP	Real GDP growth	Unemployment rate	Gini coefficient (our data)	Gini coefficient UNICEF data
1992	114243	102.6	13.1	0.325	0.274
1993	155780	103.8	14.9	0.348	0.317
1994	210377	105.2	16.5	0.343	0.323
1995	306318	107.0	15.2	0.339	0.321
1996	385448	106.2	14.4	0.342	0.328
1997	469372	107.1	11.6	0.342	0.334
1998	549467	105.0	10.0	0.345	0.326
1999	665688	104.5	11.9	0.350	0.334
2000	744378	104.3	13.9	0.359	0.345
2001	779564	101.2	16.1	0.356	0.341
2002	808578	101.4	17.7	0.371	0.353
2003	843156	103.9	18.0	0.363	0.356
2004	924538	105.3	19.6	0.366	-
2005	982565	103.6	18.2	0.353	-

Source: Polish Central Statistical Office (GUS). Gini coefficients calculated using yearly average household income in our data. The estimates of the Gini coefficient from the UNICEF Database (IRC TransMONEE 2005) are based on interpolated distributions from grouped data from household budget surveys reported to the MONEE project.

Table A4. Country satisfaction, ordered logit.

	(1)	(2)
Gender	-0.061*** [0.021]	-0.062*** [0.021]
Age	-0.031*** [0.003]	-0.032*** [0.003]
Age squared	0.000*** [0.000]	0.000*** [0.000]
Log household income	0.334*** [0.016]	0.329*** [0.016]
Education	0.117*** [0.024]	0.115*** [0.024]
Unemployed	-0.032 [0.028]	-0.030 [0.027]
Pensioners	-0.110*** [0.023]	-0.107*** [0.023]
Farm	-0.173*** [0.034]	-0.170*** [0.034]
Unqworkers	-0.086** [0.034]	-0.086*** [0.033]
Qualified workers	-0.019 [0.031]	-0.021 [0.031]
Not working	0.133*** [0.039]	0.129*** [0.038]
Higher occupations	0.189*** [0.038]	0.189*** [0.038]
Self-employed	0.040 [0.047]	0.039 [0.047]
Students	0.211*** [0.041]	0.209*** [0.041]
Rural areas	-0.152*** [0.022]	-0.154*** [0.023]
Large cities	-0.022 [0.025]	-0.037 [0.025]
West	-0.076** [0.031]	-0.087*** [0.031]
Centre West	-0.017 [0.030]	-0.064** [0.031]
Centre	-0.132*** [0.029]	-0.202*** [0.030]
East	-0.204*** [0.039]	-0.247*** [0.039]
South-East	-0.083*** [0.030]	-0.150*** [0.032]
South-West	0.149*** [0.031]	0.058* [0.034]

Table A4, continued

cut1:Constant	-0.405 [0.614]	2.616 [2.450]
cut2:Constant	2.066*** [0.612]	5.088** [2.449]
cut3:Constant	4.077*** [0.614]	7.101*** [2.449]
cut4:Constant	8.618*** [0.625]	11.643*** [2.467]
Gini	0.074 [1.865]	0.087 [1.834]
Unemployment		-0.012*** [0.002]
Inflation		0.032 [0.023]
Observations	73581	73581
chi2	4633.67	4531.66
Pseudo R2	0.05	0.05
log likelihood	-85275.60	-85242.27

Country satisfaction answers the following question: How do you assess current economic situation in Poland? Answers from 1 “very bad” to 5 “very good”; Gini coefficients are calculated for each successive representative cross-section. Yearly dummies included. Omitted variables: men, less than secondary education, urban areas (with less than 100 000 inhabitants), employees, and north region. All standard errors (in brackets) are clustered by cross-section.\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.