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Explaining the Income-Distribution Puzzle in Happiness Research: Theory and Evidence

Barbara Dluhosch, Daniel Horgos
und Klaus W. Zimmermann

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Department of Economics
Fächergruppe Volkswirtschaftslehre

Autoren / Authors

Barbara Dluhosch
Helmut Schmidt University Hamburg – University FAF Hamburg
Department of Economics
Holstenhofweg 85, 22043 Hamburg, Germany
dluhosch@hsu-hh.de

Daniel Horgos
Helmut Schmidt University Hamburg – University FAF Hamburg
Department of Economics
Holstenhofweg 85, 22043 Hamburg, Germany
horgos@hsu-hh.de

Klaus W. Zimmermann
Helmut Schmidt University Hamburg – University FAF Hamburg
Department of Economics
Holstenhofweg 85, 22043 Hamburg, Germany
kwzi@hsu-hh.de

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Koordinator / Coordinator

Julia Freese
wp-vwl@hsu-hh.de

Helmut Schmidt Universität Hamburg / Helmut Schmidt University Hamburg
Fächergruppe Volkswirtschaftslehre / Department of Economics

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BARBARA DLUHOSCH
DANIEL HORGOS
KLAUS W. ZIMMERMANN

Zusammenfassung/ Abstract

The nexus between income and happiness is very much disputed. Many cross-sectional studies see a positive relationship, most longitudinal studies don't. Starting from the fact that the theoretical basis in happiness research has been comparatively weak, we develop a model that identifies distributional consequences of unemployment with their importance conditional per-capita income as at the heart of the matter. Our theory is backed by empirical evidence on OECD data: in low-income countries, well-being significantly depends on income, in high-income countries on the unemployment-related Gini. Insofar, our findings establish the income-satiation hypothesis of longitudinal studies also in cross-sectional perspective.

JEL-Klassifikation / JEL-Classification: D60, I31, J60

Schlagworte / Keywords: Happiness, Welfare Economics, Income Distribution, Unemployment

I. Introduction

There has been a long-standing debate on whether money (in terms of purchasing power) "buys" happiness. Though a traditional assumption in much of welfare economics, experimental and empirical studies have lately cast some doubts on whether this notion generally holds true. Based on happiness surveys, some even seem to yield contradictory results. Since the assumption that individuals strive for increasing their real income is one of the very foundations of economic analysis, the findings have puzzled much of the economics profession.[1]

In trying to explain apparently disparate results, a number of reasons have been put forward in the literature. A first group, such as recently Stevenson and Wolfers (2008) as well as Sacks, Stevenson and Wolfers (2010), consider the failure to establish a clear link between income and happiness a matter of poor data availability and measurement problems. By analyzing a much more comprehensive data set and by focusing on the magnitude of the gradient between income and happiness, they interpret the results as evidence of a close link between income and happiness, no matter whether in cross-sectional or longitudinal perspective, national or international.[2] A second group attributes seemingly contradictory results of econometric studies to omitted variables supposedly crucial for happiness. Following this line of argument, some have, for instance, pointed at the role of peer-group comparisons and inequality.[3] Others considered unemployment, either on a micro-level as individually experienced or on a macro-account in the form of unemployment rates as important intervening variables.[4]

In this paper we present evidence that the failure to establish a clear nexus between income and happiness is neither a purely technical issue nor a matter of omitted variables. Rather, we

[1] See, for instance, the excellent surveys by Frey and Stutzer (2002), Clark et al. (2008) or Easterlin (2010) on the latest results in happiness research. For some clarification of the relationship between real income, human development indicators, well-being and measurement problems due to the issue of subjectivity see Hammond et al. (2011).

[2] The Stevenson and Wolfers (2008) result did not remain undisputed though. According to Easterlin and Angelescu (2010) macroeconomic fluctuations may dominate the nexus in the short run, thus suggesting a positive relationship between income and happiness, which, however, disappears in a long-term perspective.

[3] On peer group effects, see, e.g., Frank (2005), Layard (2005), Luttmer (2005), Becchetti et al. (2008), Clark et al. (2008), and Van Praag (2011), and, with an eye on their implications for growth, Tsoukis (2007). Alesina et al. (2004) and Hopkins (2008) for example, examine the nexus between inequality and happiness, Graham and Felton (2006) with a particular focus on Latin America.

[4] E.g. Clark and Oswald (1994), Winkelmann and Winkelmann (1998) or Clark (2006) on the former and Di Tella et al. (2001; 2003), Wolfers (2003), Di Tella and MacCulloch (2008), Blanchflower (2009) on the latter. Ochsen (2011) goes into further detail with respect to aggregate unemployment by finding that its effect also depends in the average duration of unemployment. Accordingly, duration has a u-shaped impact: at a relative short duration, a positive flow effect partly compensates for the negative effect of levels, as is the case at a relative long duration. In the medium term however, unemployment displays its negative impact at the fullest as a severity effect dominates. Hence, upon closer examination, the structure of aggregate unemployment matters as well.

find evidence of a fundamental difference between two sets of countries, namely low- and high-income economies.[5] If taking account of the differences by appropriately segmenting the data, an international cross-sectional perspective reveals a satiation point with respect to income, as is found in many longitudinal studies. In countries with comparatively low income levels, average per-capita income has a significantly positive leverage on the mean reported happiness. Societal cleavages, which we measure by the (aggregate) unemployment-related Gini-coefficient in our theory, do not significantly affect happiness.[6] In countries with comparatively high income levels, by contrast, the nexus between per-capita incomes and subjective happiness scores is not significant. Instead, distributional issues as mediated by the aggregate unemployment rate replace per-capita income with respect to significance. The differences between the two groups cater to the satiation-point hypothesis: once a critical income level is reached, it is primarily the reduction of these societal cleavages that will further improve happiness of the societies' members. Notably, our approach differs in two respects from the existing literature on the subject. First, unlike the vast amount of studies that tackle the nexus between aggregate unemployment and the mean of happiness (see in particular footnote 4), we find that the associated societal cleavages do not unfold a significant (negative) effect throughout. Instead, its effect differs depending on subgroups with respect to average income level. Second, while the overwhelming majority of happiness-studies is purely empirical, we provide a theoretical explanation that is consistent with our empirical results.

Proceeding from theory to the empirics, we first offer an economic-theory explanation for the existence of a satiation point with respect to per-capita income and the group-wise impact of unemployment on subjective happiness. The theoretical underpinning suggests that the satiation-point with respect to income may even show up empirically when disaggregating cross-sectional data. Second, when taking the theory to the data, we indeed find empirical support for our theory in international data of countries with different income levels. In a completely pooled data set of OECD-countries, based on the Stevenson-Wolfers (2008) data, average per-capita income is clearly

[5]Our focus on fundamental differences is inter alia inspired by casual evidence from international happiness data that merits explanation. According to 2000/01 data of the World Value Survey and the World Bank's Development Indicators, Indonesia and Finland, for instance, attain comparable happiness indices, although per-capita income in Finland was almost tenfold. For more detail on the data see section IV.A. It also seems more than just an illustrating fact that Finland ranks top in suicide statistics (Cameron, 2005, 203-6) but is a rich and comparably "happy" country and obviously does not fit into the results by Di Tella et al. (2003, 812) finding "that higher levels of national reported well-being are associated with lower national suicide rates".

[6]Our cleavage concept is an import from political science and goes back to Lipset and Rokkan (1967). They identified a number of developments in the aftermath of the industrial revolution, which according to them constitute cleavages, such as, for instance, state/church, owner/worker and urban/rural. However, their concept is open for new cleavages to emerge (and old ones to dry up). In contemporary political science, having work or not is seen as a dominant modern cleavage of western civilization and, as will be shown, has a decisive influence on happiness.

positively correlated with happiness. However, once we split the data set into countries with low and high per-capita income, the satiation-point hypothesis comes to the forefront. Accordingly, what matters for happiness depends on the level of per-capita income. Given a particular income distribution due to unemployment, higher levels of income do not automatically translate into higher levels of well-being. This applies in particular to richer and not to developing countries. Hence, the picture is consistent with a satiation point as to income-generated happiness.

Our results also shed new light on the Easterlin paradox according to which cross-sectional data on happiness within and across countries seem to indicate that higher incomes are correlated with greater happiness while income growth in western developed countries apparently lacks a clear nexus with happiness.[7] As Layard (2003; 2005) and others in search of the Easterlin paradox have admitted, the positive income-happiness nexus in cross-sectional data of selected individual countries is primarily established at low incomes. Layard suggests a threshold level of 15,000 US-$ in GDP per capita. Due to compositional issues, comprehensive data sets, that is data sets with sub-sets across income categories merged, may fail to show a satiation point in cross-sectional perspective. This is most likely the case if one of the sub-sets outweighs the other by numbers. The use of comprehensive data sets and a unified set of variables may thus be misleading. The compositional effect also holds for international studies. Our segmented international data indicates that cross-sectional results may well be reconciled with longitudinal results showing no impact of income growth on happiness in developed countries.

In finding fundamental differences in what matters for subjective happiness as depending on the level of per-capita incomes our results are in line with earlier studies by Inglehart (1997). Though approaching the issue from a political science angle rather than presenting an economic theory explanation, he suspects that "...once a society has reached a certain threshold of development, one reaches a point at which further economic growth brings only minimal gains ... in subjective well being" (p. 64).

[7] See, e.g., Easterlin (1974; 2005). Easterlin (2009) himself summarizes his main findings as " [...] the seeming contradiction between the cross-section evidence ... and the time-series evidence. The cross-section evidence is that happiness and income are positively related. That's true on comparisons at a point in time among income groups within a country. It's also true of comparisons at a point in time of richer and poorer countries. The paradox is when you look at what happens within a country over time, as income goes up, happiness does not rise the way one would expect it to, on the ... [cross-section basis]". The Easterlin paradox also ties in with the well established fact that a lottery millionaire is not necessarily better off in terms of happiness than before having won in the lottery. See the seminal work by Brickman et al. (1978). Recent longitudinal studies by Gardner and Oswald (2007) or Apouey and Clark (2010) show more diverse effects, however, their focus is more specifically on physical and mental health.

The paper is organized as follows. In section II, we develop a theoretical model that explains why distributional cleavages, measured by the unemployment rate, do matter besides income, with their relative importance depending on the income level, however. In this model, individuals allocate resources between private and public goods along Samuelsonian-Musgravian lines (Samuelson, 1954; Musgrave and Musgrave, 1989). Actually, the difference in the allocation of resources between the two sectors is *the key* to explaining why market cleavages in terms of those employed and those not employed matter, thus providing a channel through which unemployment becomes significant for happiness at higher levels of income. By focusing on differences in consumption possibilities, we can relate subjective well-being to a number of parameters and, in particular, to income, its distribution and the unemployment rate. Examining theoretically the relationship between income and well-being in section III shows that at comparatively low levels happiness increases in income. However, once a critical income level is reached, only reductions in the unemployment rate further improve the happiness of the societies' members. In section IV we confront the major proposition distilled from our theoretical analysis with the data. Here, we proceed in two steps: first, we show that we can replicate the Stevenson and Wolfers (2008) cross-country result by means of an ordered probit estimation for the OECD-countries. Accordingly, income matters. Results prove to be robust even when splitting the data set into low- and high-income countries. However, when augmenting the data set with cleavages in the form of OECD information on unemployment as explanatory variable, results are found to be substantially different from that. As it turns out, neither is per-capita income generally important nor is the unemployment-based Gini-index. Rather, at low levels of income, it is income that matters while at high levels of income it is unemployment that becomes significant thus replacing GDP per capita as the main factor in subjective well-being. In effect, we are thus able to reconcile the cross-country experience with studies on longitudinal data showing no positive impact of per-capita income on subjective well-being in high-income countries. Section V concludes with an outlook on policy implications.

II. The Model

Consider an economy which produces private goods as well as (a single) public good in quantities X_P and X_G, and with the absolute value of the marginal rate of transformation between the two bundles of goods being unity. Consequently, with resources $\overline{R}$ in the model economy, production

possibilities can be described by the following (linear) transformation curve

$$X_P + X_G = \overline{R} \tag{1}$$

with the composition of output in equilibrium determined by individual preferences of the societies' members. Since according to the national income and production accounts aggregate output equals aggregate income in real terms, eq.(1) also yields national income, i.e. $X_P + X_G = Y$.

Suppose next that there are n individuals living in the society. However, with respect to employment and the distribution of aggregate income Y, the society is considered as being split into two (non-permeable) subgroups thus giving rise to a cleavage: the first sub-set of type i-individuals with index $i = 1, \ldots, m$ is made up of individuals which are employed and which qua assumption each earn the same income e; the second sub-set of type j-individuals with index $j = m + 1, \ldots, n$ is composed of individuals which are unemployed and therefore receive no market income. These assumptions concerning income imply that

$$Y = me \tag{2}$$

In order to focus on the implications of market cleavages and distributional matters due to unemployment as sharply as possible, we will presume that there is no redistribution scheme in place and thus no welfare state supplying social security benefits. Both of these assumptions may sound restrictive. However, they solely serve to simplify matters as they ensure that the model yields closed form solutions. Although they will certainly influence our graphical illustration (see section III below) of the model numerically, they do not affect our analysis in a qualitative sense. The same applies with respect to the equal-earnings assumption of those employed. Notably, all that is required is that there is a clear segmentation that gives rise to a societal cleavage in the sense that those unemployed have less disposable income than those employed (before and after any potential welfare payments). The income-cleavage due to unemployment is actually backed by empirical studies (see footnote 15 for details). Accordingly, budget constraints as well as consumption possibilities differ between the two groups of individuals. On account of these assumptions, the society with lower employment can be considered as being characterized by a higher cleavage-index (given a population size of n).

Generally speaking, this cleavage of a particular society can be measured by the Gini-coefficient. Ranking individuals (in this case groups) according to their earnings, with those employed on top and those unemployed last in line, we can construct a market-cleavage index G along the lines of Gini. This procedure yields

$$G = (n - m)/n \tag{3}$$

as the index corresponding with our framework.[8] Note that in contrast to its traditional account, the Gini-index can be directly inferred from the information on employment respectively unemployment, with $m/n = 1 - G$ the employment ratio and $1 - (m/n)$ the unemployment rate. This allows us in the empirical analysis to concentrate on unemployment as it is synonymous with inequality.

Despite differences in disposable income, we assume that all members of the society share the same preferences over private and public goods. In order to keep the model tractable, we let the well-being $U_{i,j}$ of a representative individual of each group depend on the (individual) consumption of public and private goods, according to the following function

$$U_{i,j} = \alpha\left(x_p\right)_{i,j} + \alpha\left(X_G\right)_{i,j} - \frac{1}{2}\beta\left(\left(x_p\right)_{i,j}^2 + \left(X_G\right)_{i,j}^2\right) \qquad \text{with} \quad i = 1, ..., m;\ j = m+1, ..., n \tag{4}$$

with $\left(x_p\right)_{i,j}, \left(X_G\right)_{i,j}$ denoting individual consumption of private respectively public goods of a type i, j-individual, and α, β preference-parameters identical across all individuals (independent of group membership). The assumption concerning the utility function is due to the fact that we basically use a partial equilibrium framework. Following the Samuelsonian-Musgravian tradition in public-goods analysis, the model contains a detailed demand side while the production side is rudimentarily modeled by imposing a simple transformation curve without details as regards factor markets. This is done in order not to put too much structure on the model that may additionally influence results. Eq.(4) yields linear demand functions for public and private goods familiar from partial equilibrium analysis. In line with the characteristics of (pure) public goods, i.e. non-excludability and non-rivalry in consumption, consumption of these goods is the same across all individuals, i.e. $\left(X_G\right)_i = \left(X_G\right)_j = X_G$ for all $i = 1, \ldots, m$ and $j = m+1, \ldots, n$. The supply of the

[8] Recall the general formula for the Gini-coefficient $G = 1 + \frac{1}{n} - \frac{2}{n^2\bar{e}}(e_1 + \ldots + me_m + (m+1)\,e_{m+1} + \ldots + ne_n)$ with $\bar{e}$ average earnings and $e_1 > \ldots > e_m > e_{m+1} > \ldots > e_n$. With individuals $(m+1)$ to n earning no income at all and other earnings equal, the expression shortens to $G = 1 + \frac{1}{n} - \frac{2}{nm}(1 + \ldots + m)$. Substitution of the sum of the arithmetic series $s_m := 1 + \ldots + m = \frac{m}{2}(1 + m)$ then yields $G = (n - m)/n$. Naturally, in case of $m = n$, G will be zero.

public good, though, is determined in the political process, regardless of individual earnings.[9] Consumption of private goods, by contrast, differs between the two sets of individuals i and j. In the extreme, this implies that j-type individuals do not consume any private goods as they receive neither market income nor transfers so that $\left(x_p\right)_j = 0$. The difference in consumption possibilities between the two groups which is ultimately reflected in parameter G becomes an important matter when considering the composition of output in our model society: with respect to public goods, all individuals articulate demand and vote on their supply via elections as if they would earn income, i.e. they possess sort of a "virtual purchasing power" although actually not earning any income; "voting" in the market place, on the contrary, depends on actual purchasing power, i.e. real disposable income. Notwithstanding well-known problems of aggregation, summing (4) over all individuals i, j yields aggregate happiness U_S

$$U_S = \sum_{i=1}^{m} U_i + \sum_{j=m+1}^{n} U_j \tag{5}$$

With individual preferences according to eq.(4), aggregate well-being is a function of preference parameters α, β, size of society n, individual income e in case of employment, and most importantly, the cleavage-index G of the society as well as the consumption of public goods X_G: solve eq.(1) for the individual consumption of private goods x_p by recalling that $X_P = mx_p$, $Y = me$ (since $\left(x_p\right)_1 = \left(x_p\right)_i = x_p$ and $e_1 = e_i = e$ for all $i = 1, \ldots, m$ qua assumption) and thus substitute x_p in eq.(4) of a representative i-type individual. By contrast, all j-type individuals, who are unemployed and thus have in the extreme no income at their disposal, extract utility from consuming the public good. Aggregation over all i- respectively j-type individuals according to eq.(5) and writing $n(1-G)$ instead of m by means of eq.(3) yields

$$U_S = ne\,(1-G)\left(\alpha - \frac{\beta e}{2}\right) + \left((n-1)\,\alpha + \beta e\right) X_G - \frac{1}{2}\beta \frac{\left(n^2\,(1-G)+1\right)}{n\,(1-G)} X_G^2 \tag{6}$$

Note that U_S/n yields the average subjective well-being that corresponds to the mean of happiness that is collected empirically in the World Values Survey. Well-being in our model-society thus depends on the market-cleavage index G, but also on government expenditure on public goods X_G. In the next paragraph, we will take a closer look at the determinants of the latter.

[9] As Buchanan and Tullock (1962, Ch.10) and, in more detail, Tullock (1976) have pointed out, this imposes an externality on the society at large.

We assume that the supply of the public good is determined according to preferences (4) via the political process where we suppose that decisions are made along Samuelsonian lines. Following Musgrave and Musgrave (1989), we thus effectively separate the decision on the quantity supplied from the financing – and therefore from its impact on the income distribution and its repercussion on demand. According to Samuelson (1954; 1955), public goods provision is efficient if the sum of the marginal rates of substitution between private and public goods over all members of society equals the marginal rate of transformation. The former can be obtained by totally differentiating utility of a representative individual (i.e. eq.(4)). By focusing on the general shape of indifference curves, we abstract from differences between the two types of individuals due to differences in budget restrictions – and thus from corner solutions. Dropping subscripts i, j (since all individuals share the same preferences and are thus treated equally politically), this procedure yields

$$\alpha dx_p + \alpha dX_G - \beta x_p \left(dx_p\right) - \beta X_G \left(dX_G\right) = 0 \tag{7}$$

when moving along a particular indifference curve. Solving for the marginal rate of substitution (dx_p/dX_G) and summing over all n members of society yields

$$\sum_i^n MRS_{x_p,X_G} = n\frac{-\alpha + \beta X_G}{\alpha - \beta x_p} \tag{8}$$

At the Samuelsonian optimum, the sum of the marginal rates of substitution between both categories of goods must equal the marginal rate of transformation between both sets of goods

$$\sum_i^n MRS_{x_p,X_G} = n\frac{-\alpha + \beta X_G}{\alpha - \beta x_p} = -1 \tag{9}$$

Substitution of x_p by $\left(Y - X_G\right)/m$, or $\left(Y - X_G\right) / \left(n\left(1 - G\right)\right)$ for that matter, according to eqs.(1), (2) and (3), and inserting me for Y, yields government expenditure on public goods, X_G, in a Samuelsonian political equilibrium

$$X_G = \frac{n\left(1 - G\right)\left(\left(n - 1\right)\alpha + \beta e\right)}{\left(1 + n^2\left(1 - G\right)\right)\beta} \tag{10}$$

Hence, government expenditure on the public good depends on individual earnings e and the cleavage index G. Eq. (6) in conjunction with eq. (10) thus implies that happiness is ultimately tied to the income level e and the societal cleavage index G as mediated by the unemployment rate.

Proposition. *Happiness depends on income and its distribution in a non-linear fashion with the latter depending on the unemployment rate. For low levels of GDP per capita, happiness strictly increases in income. However, when having reached a threshold level, GDP per capita is being replaced by distributional issues as the main driving force of happiness.*

Proof. Inserting eq.(10) into eq.(6) yields well-being as a function of earnings and market cleavages,[10] with the first derivative of U_S/n with respect to e larger than zero and thus happiness increasing in e for all e for which $e < \alpha\left(n^2(1-G)+1\right)/\left(\beta n^2(1-G)\right)$ holds. However, while not increasing in e beyond this threshold level with G held constant, happiness continues to increase as unemployment declines with $\partial(U_S/n)/\partial(1-G) = \left(e(\alpha-\beta e/2)+((n-1)\alpha+\beta e)^2/\left(2\beta\left(1+n^2(1-G)\right)^2\right)\right) > 0$ for all $2\alpha > \beta e$, as is assumed (see footnote 12). □

III. The Nexus between Happiness and Earnings: What Theory Suggests

The left hand panel of Fig. 1 displays the resulting nexus between happiness, income levels and market cleavages as measured by the distributional index G for parameter values $\alpha = 4$, $\beta = 0.42$ and $n = 20$.[11] The curves show the mean of happiness for various earnings-levels e, supposing that half the population (i.e. $G = 0.5$), three quarters (i.e. $G = 0.25$) or all of the population (i.e. $G = 0$) is employed. Obviously, happiness increases in e for all $e < \alpha\left(n^2(1-G)+1\right)/\left(\beta n^2(1-G)\right)$ and decreases in e otherwise.[12] Moving horizontally from left to right in the left hand panel of Fig. 1 shows that, within the income range indicated by the arrows on the e-axis, a poor society (with respect to individual incomes e) may actually enjoy the same level of happiness as a rich society – if unemployment and therefore the cleavage index is smaller in the former as compared to the latter (with size of society the same): consider, for instance, a society described by point A with e small and $G = 0.25$, i.e. we are on the left hand branch of the respective happiness curve. Yet, the same happiness-index is attained further to the right at points B and C, i.e. societies with higher individual income e but $G = 0.5$. Hence, the same mean of happiness can be reached with

[10] With $U_S/n = (1-G)\left((\alpha-0.5\beta e)e+0.5((n-1)\alpha+\beta e)^2/\left(\left(1+n^2(1-G)\right)\beta\right)\right)$.

[11] Naturally, the satiation point with respect to income moves if parameters other than the Gini are subject to change.

[12] Since we separated the decision on the expenditure side from the revenue side à la Musgrave and Musgrave (1989) when determining supply and demand for the public good, individual earnings e must not be too small as otherwise the public good cannot be financed. Therefore, we impose $Y > X_G$ which requires $e > \alpha(n-1)/\left(\beta n^2(1-G)\right)$. With the lower bound on e, the result of utility being positive despite $e = 0$ turns out to be purely virtual. In addition, we impose an upper bound with $e < 2\alpha/\beta$ in order to ensure that utility from the consumption of private goods is positive, i.e. $U_i\left(x_p\right) > 0$, for all n including $n \to \infty$. In Fig. 1 we therefore confined numerical values for e to the economically relevant range $0.905 < e < 19.05$ given the numerical values for α, β and n.

small income and more people employed and with high(er) income but fewer people employed. Obviously, the notion that "more income makes happier" does not necessarily hold true.

< Figure 1 about here >

The right hand panel of Fig. 1 displays the corresponding indifference curves as extracted from the left hand panel. Each of the three curves thus displays a constant mean of happiness. For example, we extracted iso-happiness curves for $U_1 = 500$, $U_2 = 600$, $U_3 = 700$. Moving along a particular curve such as, for instance, U_2 shows that societies can be quite diverse in terms of income levels and distribution while nevertheless sharing the same mean of happiness (e.g. compare points 1 and 3 or 2 and 4 for that matter). However, the iso-happiness curves are hump-shaped, implying that there is a satiation point with respect to income: moving horizontally across curves at a given cleavage index G shows that the mean of happiness increases with income levels provided income levels are sufficiently low. However, there is a limit to this. Having reached a threshold level (e.g. point 5), higher individual income does not result in more happiness – unless it is associated with lower unemployment, that is a lower G-index. The implications may also be illustrated by points 1 and 4: starting from an earnings level such as in point 1, society can tolerate more inequality with respect to unemployment and still remain on the same happiness level (i.e. $U_2 = 600$).

Economic theory thus provides an explanation for the puzzling pattern of international, that is cross-sectional, comparisons. According to many comparisons, richer societies are not necessarily happier.[13] This is exactly what our theoretical approach suggests: higher income does not yet imply that people are on average happier, unless more of them (supposing a given population size n) actively participate in the labor market (or G lower for that matter).[14] The inverted u-shape of the happiness curves also suggests that, if the data set is appropriately segmented, there is good reason to expect that per-capita income e emerges as a significant variable provided it still is comparatively low, however with cleavages insignificant; at higher levels of income, per-capita income e should be suppressed, though, with the cleavage-related index G becoming significant. The shape of the

[13] Points 1 and 2 might describe the situation in the two parts of Germany prior to 1990: in West-Germany, income was on average clearly higher, but was accompanied by remarkable and steadily increasing unemployment or inequality for that matter; in East-Germany, by contrast, income was by far lower, but fairly evenly distributed, with high "employment". It thus seems not only pure nostalgia that some East-Germans still remember their life during the times of the German Democratic Republic as considerably happier than in the re-united Germany – not least because in this society of "equals" (except for the nomenklatura) people stood together and built some sort of social capital in their opposition vis-à-vis the communist government which got lost after reunification. On empirical evidence with respect to happiness in the transition period see Guriev and Zhuravskaya (2009) or Easterlin and Plagnol (2008).

[14] Moreover, the "happiness-peak" in the left hand panel increases in G: $(\partial e/\partial G)\mid_{U=U_{max}} = \alpha/\left(\beta n^2 (1-G)^2\right) > 0$, i.e. the higher unemployment, the higher must be earnings.

happiness curves may also be the reason why, for instance, the Bangladeshis, despite being so poor, do quite well on the (international) happiness scale whereas a number of richer countries fall comparatively short in terms of happiness. On average, per capita income-levels are comparatively low in Bangladesh. Yet, earnings are fairly evenly distributed with many Bangladeshis earning the same low level of income. Hence, they may be better off according to our happiness metric as individuals in some developed countries that earn comparatively high incomes but for whom happiness is largely a matter of the society's cleavage. Hence, when it comes to the empirics, our theory suggests, that, in cross-country studies including a broad range of economies, GDP per capita may well exhibit a positive impact on happiness; however, whether this impact will turn out to be significant or not depends on the distribution of the countries in the income-happiness space (e.g. the composition of the sample).

IV. Empirical Evidence on the Impact of Earnings and Employment Cleavages

Before empirically testing the proposition distilled in the theory section, we will first briefly describe the data. Second, we present the econometric framework, including a discussion of the methodology and last but not least of the estimation results. Our theory nourishes the expectation

i) that we find a significant impact of GDP per capita on subjective well-being when considering representative data and between-country effects including all countries, provided the sample of countries is biased with respect to per-capita incomes, i.e. with sufficiently more of them on the upward sloping branch of Fig.1 (LHS). However, our theoretical results also suggest that when considering a threshold level and thus dividing the sample into low- and high-income countries

ii) that an increase in GDP per capita exerts a significantly positive effect on happiness for the subset of low-income countries, whereas

iii) for high-income economies, that is countries that exceed some specific income-satiation point, other variables become more important. Our theory suggests that unemployment emerges as a main variable which has been shown to be synonymous to inequality.[15] When taking societal cleavages resulting therefrom into account, the unemployment rate should become significant,

[15]This is consistent with a number of empirical studies according to which unemployment is in fact positively correlated with income-inequality. See, e.g., Nolan (1986), Galbraith (2008), and, with reference to the Gini-coefficient, Cysne (2009).

forcing GDP per capita into insignificance thus backing the satiation-point hypothesis even in a cross-sectional setting.

A. Data

Early empirical studies in economic happiness research were based on a small number of countries with quite different levels of GDP per capita. However, when examining the determinants of happiness in greater detail, a larger data set is needed, with greater heterogeneity in income and in happiness. In this respect, Stevenson and Wolfers (2008) provide an extensive empirical analysis re-assessing the Easterlin paradox. Using a comprehensive data set, they show a significant positive link between the level of subjective well-being and GDP per capita across countries. Consequently, S&W (2008) reject the existence of a "satiation point" beyond which richer countries show no significant effect of increases in per-capita income on well-being. Since they compiled an enormous data set combining several different indicators, their analysis includes a vast number of individual observations, including a large set of countries.[16] Putting our theory to a test requires an even wider data set though. Therefore, we employ the same data as in S&W (2008), but augment the data set with additional information on the labor market situation.

In effect, our empirical analysis draws on data from the World Values Survey, the World Development Indicators, and on information from the OECD's Labor Force Statistics.[17] In order to capture subjective well-being (that is the endogenous variable), information on life satisfaction from the World Values Survey is used. The World Values Survey asks: "Taking all things together, would you say you are: very happy; quite happy; not very happy; not at all happy?" The happiness variable is thus ordinally scaled (1 to 4), indicating individual happiness in increasing order. Besides several individual control variables,[18] our analysis considers GDP per capita and the unemployment rate as a measure of an economy's market cleavage as main explanatory variables of happiness. GDP per capita (in real terms, based on the year 2000, and converted at PPP) is calculated for each country

[16]The data and the complete analysis of S&W (2008) can be downloaded from the authors' homepage (http://bpp.wharton.upenn.edu/jwolfers/data.shtml# EasterlinData) and thus can be reconstructed quite easily.

[17]Detailed information on the World Values Survey can be obtained from the World Values Survey Association (http://www.worldvaluessurvey.org). The World Development Indicators are provided by the World Bank (http://www.worldbank.org/data). The OECD's Labor Force Statistics can be obtained from the OECD (http://www.oecd.org).

[18]For similar control variables (e.g. religion, political ideology, tolerance of outgroups, level of democracy, free choice) that performed well see Inglehart et al. (2008). On the importance of "social capital" see, for instance, Helliwell and Putnam (2005). An interesting discussion on the use of different indices to proxy well-being can be found in Wolff and Zacharias (2009). Van Praag and Ferrer-i-Carbonell (2004) examine the determinants of happiness theoretically as well as empirically, focusing inter alia on measurement issues.

using information from the World Development Indicators. In order to consider the core variable of our theoretical framework, market cleavage, we use the Labor Force Statistics of the OECD. Thereupon, information on the unemployment rate of several OECD economies is calculated and added to the data. The inclusion of the unemployment information requires to focus at the 4th wave of the World Values Survey (1999-2004) in particular. In order to achieve robust results and to control for a necessary amount of overall variance, several individual control variables, taken from the World Values Survey, are additionally considered. To this end, several dummy variables are included, indicating whether an individual is married, belongs to some form of labor union, is active in political parties or human rights organizations, is involved in youth work, in peace movements or engaged in sports activities. Additionally, we control for the number of children and individual employment status. Due to including these individual control variables as well as OECD information on unemployment rates, our data set comprises approx. $38,000$ observations and includes individuals of 21 countries.

B. Estimation and Results

Using the data described above, we estimate the determinants of individual happiness (h) performing an ordered probit model. The model is derived from the latent variable model

$$h^*_{ij} = \beta_1 \log(\text{GDP})_j + \beta_2 \text{unempl\_rate}_j + \gamma X_{ij} + \epsilon_{ij} \tag{11}$$

with "h^*_{ij}" as latent happiness of individual i living in country j. Regarding the four happiness categories, $h_{ij} = 1$ if $h^*_{ij} \leq \alpha_1$, $h_{ij} = 2$ if $\alpha_1 < h^*_{ij} \leq \alpha_2$, $h_{ij} = 3$ if $\alpha_2 < h^*_{ij} \leq \alpha_3$, $h_{ij} = 4$ if $h^*_{ij} > \alpha_3$, with threshold parameters $\alpha_1 < \alpha_2 < \alpha_3$. As main explanatory variables, "log(GDP)" indicate the log of real GDP per capita and "unempl_rate" the unemployment rate commensurate to inequality according to the economic theory as outlined in section II. The matrix X_{ij} consists of the individual control variables as described in section IV.A. Since the regression combines aggregated as well as individual variables, ϵ_{ij} is a clustered error term.[19] Moreover, happiness data by the World Values Survey is provided in several waves for selected years. Therefore, it is not possible to examine

[19]From a methodological point of view, regressing ordered individual information simultaneously on individual as well as aggregate information is by no means conventional. Thus, we implement an estimation procedure based on Chamberlain (1980) as well as Ferrer-i-Carbonell and Frijters (2004). This estimation procedure takes account of possible endogeneity problems between happiness and the exogenous variables of interest. Since individual information is explained by aggregated variables, contemporaneous correlation can not be assumed to bias estimation results.

a continuous time structure. In order to deal with this restriction, the data is pooled to run the ordered probit estimation. All regressions use the robust Huber / White / Sandwich estimator. Table 1 presents the estimation results when considering a threshold-level of 15,000 US-$ in GDP per capita for segmentation according to income groups.[20]

< Table 1 about here >

Our findings directly support the theoretical hypothesis as stated in the proposition above:

i) When estimating the determinants of subjective well-being with respect to the complete set of countries (Column 2), results are in line with the findings in Stevenson and Wolfers (2008). GDP per capita increases happiness across countries at a high statistically significant level of 1 percent. Due to the heterogeneity of the economies included, not all of the individual control variables significantly affect happiness. Being employed, married, and engaged in sport activities, as well as caring about youth work, however, significantly increase happiness. These control variables hold their sign and significance in most of the regression. The 37,437 observations and the statistically significant F-value at the 1-percent level indicate the overall robustness of this probit estimation. With income significantly affecting individual happiness across countries over all income levels, these first results seem to be hard to reconcile with the notion of a satiation point. Similar to S&W (2008), income seems to be crucial for the level of happiness attained, just as in earlier cross-sectional studies by Easterlin. The significant positive impact of GDP per capita on individual happiness also holds when additionally controlling for the aggregated unemployment rate (Column 3).

ii) Columns 4 and 6 present results when the whole data set is simply divided into two groups, low- and high-income economies, at a threshold level of 15,000 US-$ in GDP per capita. Evidently, the cross-sectional income hypothesis is robust with respect to the partitioning of countries into groups. Real GDP per capita significantly increases subjective well-being in low- and high-income economies at the 1-percent level. The significant F-values again indicate the robustness of the results. The various individual control variables nevertheless yield

[20] The World Bank country classification, which draws on the World Bank Atlas method (http://data.worldbank.com/about/country-classifications), suggests different income levels to distinguish between countries in empirical analyses: 1,005 US-$ or less for low-income economies, 1,006 US-$ - 12,275 US-$ for middle-income economies, and 12,276 US-$ and more for high-income economies. In this contribution, however, we are not able to apply this typical three-type classification. The inclusion of the countries' unemployment rate constrains our data to OECD countries (that are middle or high-income economies) only. Regarding the specific literature on happiness research, Inglehart and Klingemann (2000) as well as Layard (2003) suggest a threshold level of 15,000 US-$ GDP per capita. In line with the happiness literature, we thus apply a two-type classification distinguishing economies at the income level of 15,000 US-$.

interesting differences across groups. For instance, in low-income economies the number of children significantly reduces individual happiness; in high-income economies the effect is not significant though. By contrast, being a member of a labor union and caring about human rights significantly increases happiness in high-income economies but does not significantly affect well-being in low-income economies. Effects even differ in sign between the two subgroups. This result might be due to a much higher risk and more crucial effects when facing these issues in low(er)-income economies. Focusing again on GDP per capita as the main variable of interest, results thus do not seem to be indicative of differences as regards the determinants of happiness for economies with different income levels.

iii) However, as formally shown in sections II and III, and as condensed in the theoretical proposition, we can expect empirical results to differ substantially from those previously obtained when additionally controlling for market-cleavages by use of an unemployment variable. The estimation outcomes presented in Columns 5 and 7 directly support our theoretical prediction. Now, they clearly reflect the essence of the satiation point hypothesis, notably, in a cross-sectional setting: the estimated coefficients show that, when considering unemployment as additional control variable, per-capita income still increases happiness in low-income economies at a statistically significant level of 1 percent while the cleavage due to unemployment is not significantly affecting individual well-being (Column 5). By contrast, when considering high-income economies, the unemployment rate enters in a statistically significant manner at the 10-percent level as decreasing happiness, whereas GDP per-capita is insignificant and thus not crucial for subjective well-being if exceeding a satiation level of $15,000$ US-$ (Column 7). A cleavage in terms of unemployment-inequality thus replaces per-capita income as the main macro-indicator for subjective well-being. Notably, results are robust and not driven by the assumption of a specific satiation point of 15,000 US-$ in GDP per capita: Table 2 in the Appendix presents the empirical results when raising the threshold-level to 20,000 US-$ and 25,000 US-$.[21]

[21]Considering the interplay between GDP per capita and the unemployment rate, it is important to note that there is no problem of multicollinearity in our data. When calculating the correlation between these two variables ($-.0177$) it gets obvious that they are not highly correlated. Even when distinguishing between low (.2172) and high income economies ($-.4901$), correlation is in both cases lower than .5. Thus, it is important to include both variables in the regression and to distinguish between the different effects. The positive correlation between the unemployment rate and happiness for low-income economies (even when not significant, see Column 5 in Table 1) might relate to development or transition stages: often, in developing countries income (significantly affecting happiness) increases in tandem with societal cleavages.

Hence, the satiation-point hypothesis even stands up in a cross-sectional perspective. Though a totally different approach, our findings on other factors being important rather than per-capita income once a satiation-point has been reached are compatible with those of Inglehart et. al. (2008) who observe from a political-science angle that what matters most for individuals depends on the level of human development. However, the vast majority of the economic literature on happiness is atheoretical or employs ad-hoc hypotheses when it comes to what exactly determines happiness. Our approach, by contrast, goes further in that we provide an economic-theory explanation for the fading impact of income on overall happiness at higher per-capita income. Drawing on the theory of public versus private goods revealed that there is a satiation-point with respect to per-capita income. While income is an important issue in happiness at lower levels of income, it is not significant at higher levels of income. Instead, we could identify unemployment synonymous with inequality as significant, provided incomes are sufficiently high. The satiation-point hypothesis has been largely observed in longitudinal studies focusing on a particular country. Here, we provide a theoretical foundation for the satiation-hypothesis which even finds support in cross-sectional data comprising different countries.[22]

V. Conclusions

The Easterlin paradox essentially consists of three seemingly opposing empirical trends: i) those with higher income are happier within a given society, ii) as are those living in a rich as compared to a poor society, however, iii) one does not automatically become happier if the society gets richer, at least beyond a certain level of income. Rather, a number of longitudinal studies in economic happiness research suggest that there is sort of a satiation-point with respect to income.

In this paper, we reconciled the cross-sectional perspective with the satiation-point perspective advanced by longitudinal studies, notably, both by means of theory and empirics. Starting from the fact that the theoretical basis in happiness research is comparably weak, we developed a model which displays happiness as a function of income and its distribution, operationalized via the Gini-index as the unemployment rate. The theoretical result is striking in that it offers an economic

[22]Naturally, with respect to the empirical results, two caveats concerning data and sampling are in order. First, although the data set contains observations from more than 30,000 individuals, it still is a sample. Other data sets or different subsamples may support, validate, or even conflict with our findings. This caveat is especially important as for various reasons (labor-market issues, data availability etc.) the sample refers to OECD countries. Second, even when cross-country differences are partly captured by aggregated exogenous variables, heterogeneity in individual responses to the happiness question may bias results. However, both of these issues pertain to empirical happiness research in general.

explanation for the puzzle why a poor and a rich country may attain identical happiness indices: as income increases, happiness follows an inverted u-shaped curve. Provided per-capita income levels are sufficiently low, people are happier if per-capita incomes are higher. Once a certain level in per-capita incomes is reached though, per-capita incomes become less important. Instead, individual happiness is determined by the society's cleavage with respect to the income distribution as mediated by the unemployment rate. This threshold phenomenon becomes manifest in the empirical analysis: in low-income countries, per-capita income significantly increases happiness while unemployment does not exert a negative impact. Not so for high-income countries. Here, the unemployment rate drives income into insignificance and becomes itself significant in displaying a negative coefficient. These results stand in contrast to previous cross-sectional results with income as dominant matter and which gave rise to the notion of a paradox as they seemed to conflict with longitudinal studies displaying a satiation-point beyond which income is not crucial for people to feel happy. Hence, we have cross-sectional theory and empirics on our side showing that in high-income countries income alone has no significant impact on well-being. However, our findings carry the story even a little further by revealing that the unemployment rate as an indicator of a societal cleavage replaces income as the main source of well-being – or subjective malaise for that matter.

The paper lends itself to a number of extensions. One result clearly emerging from the analysis is that higher incomes do not necessarily translate into more happiness in the developed world. The policy question as to whether governments should stop fostering income growth and instead concentrate on "softer" policy areas such as health policy (e.g. psychic diseases), family policy (e.g. divorces) and "social" policy in the sense of increasing social capital (missing social contacts) as the main candidates for "happiness policy", cannot be answered that easily though. People have grown accustomed to a steadily growing income as an element of being content with their lives, or, to put it differently: they may have "priced in" a certain amount of growth in their answers when it comes to happiness surveys; a standstill could thus be perceived as a step backwards. Notwithstanding these problems, the question should probably be re-framed in such a way as to which role economic policy can play in these fields and where it could have the greatest impact when addressing the well-being of individuals by means of these "softer" policies.

Up to now, we know as a "hard" fact that in rich societies with growing incomes the unemployment rate should be lowered in order to keep people at the same level of happiness, or phrased in a

more general way: ceteris paribus, a more equal income distribution involving less unemployment caters to happiness. Smaller cleavages with respect to these issues can be interpreted psychologically as a kind of insurance against insecurity, self-doubt and angst. If economic policy can play an important role and since, frequently, its role is exerted via government expenditures, the additional question arises whether government's share in GDP itself can be a determinant of happiness. It may well be that certain types of expenditures (as mentioned above) increase happiness, but it may also be that a bigger share of government in GDP is a drain on happiness. Particularly with regard to this last issue there may be a cleavage among the "atlantic values" that continental Europe and the US have in common. It should be mentioned too, as pointed out in the "The Economist" (2010), that even the Declaration of Independence does not guarantee the government the duty or the right to pursue the happiness of its citizens, it only says that it should secure the citizens' unalienable right to pursue it for themselves, which is clearly not the European stance.

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Figure 1. The Nexus Between Happiness and Earnings: Theoretical Considerations

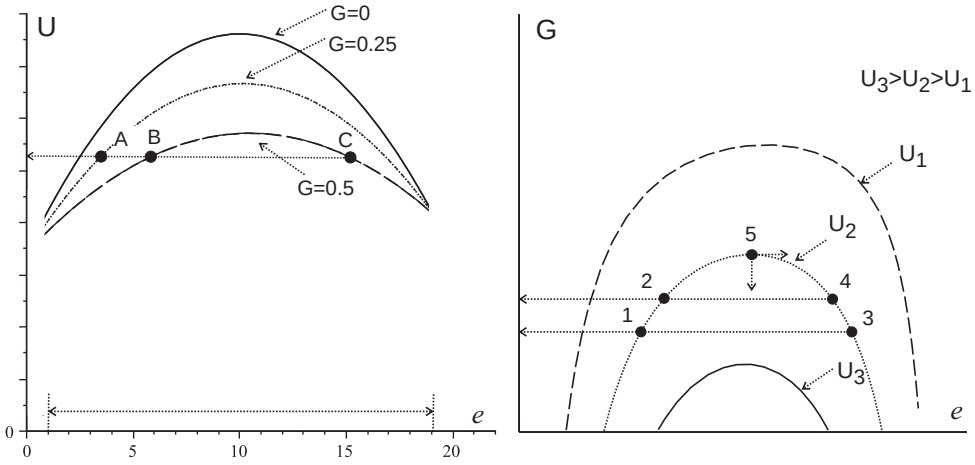

Table 1. Determinants of Subjective Well-Being (OECD-countries)

– log GDP with threshold level of 15,000 US-$ in GDP per capita –

	all economies		low income economies (GDP < 15,000)		high income economies (GDP > 15,000)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDP per capita (log)	.6668***	.6605***	.5758***	.4852***	.7110***	.5359
	(10.10)	(5.60)	(5.27)	(2.90)	(3.09)	(1.57)
unemployment rate	-	−1.6490	-	.6226	-	−2.8623*
		(−1.56)		(.38)		(−1.79)
employment status (indiv)	.1305***	.1160***	.1614***	.1086	.1176***	.1182***
	(4.67)	(3.48)	(3.49)	(1.45)	(3.58)	(4.28)
married	.3078***	.3561***	.2940***	.3770***	.3206***	.3572***
	(10.69)	(10.33)	(6.66)	(5.79)	(7.67)	(9.54)
number of children	−.0353***	−.0281**	−.0659***	−.0657***	−.0177	−.0182
	(−2.66)	(−1.97)	(−4.22)	(−4.69)	(−.93)	(−1.02)
sport activities	.2117***	.1979***	.2173***	.1311*	.2083***	.2001***
	(7.58)	(7.36)	(2.96)	(1.66)	(6.96)	(7.54)
unpayed professional work	.0506	.0695	.1492**	.0872	.0161	.0625
	(1.03)	(1.24)	(2.21)	(.89)	(.24)	(.95)
political party	.0411	.0172	−.0385	−.2280	.0528*	.0373
	(1.03)	(.43)	(−.33)	(−1.44)	(1.79)	(1.16)
labor union	.0864**	.0682	−.0029	−.0931*	.1213**	.0977*
	(1.95)	(1.45)	(−.05)	(−1.76)	(2.06)	(1.91)
human rights	.1412**	.1245**	−.0517	−.1528	.1384**	.1158***
	(2.22)	(2.37)	(−.31)	(−.71)	(2.19)	(2.48)
youth work	.2025***	.1922***	.2090***	.0819	.2076***	.2212***
	(5.10)	(4.71)	(2.89)	(1.12)	(4.44)	(4.42)
peace movement	−.1050	−.0327	−.1376	.0331	−.0870	−.0302
	(−1.12)	(−.37)	(−.63)	(.17)	(−.86)	(−.31)
obs	37,437	27,749	16,570	8,847	20,867	18,902
Prob>chi2	.0000	.0000	.0000	.0001	.0000	.0000
Clustered Errors	YES	YES	YES	YES	YES	YES

Dependent variable: life satisfaction (ordinal 1 - 4)
(z-Statistics in parentheses)
* / ** / *** significant at 10 / 5 / 1 percent

APPENDIX

Table 2. Determinants of Subjective Well-Being (OECD-countries)

– log GDP with threshold levels 20,000 US-$ and 25,000 US-$ in GDP per capita –

	low income economies (GDP < 20,000)		high income economies (GDP > 20,000)		low income economies (GDP < 25,000)		high income economies (GDP > 25,000)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GDP p. c. (log)	.6092***	.5158***	.6330	−.1942	.6148***	.5372***	.5712	−.1702
	(6.65)	(3.75)	(1.62)	(−.71)	(7.61)	(3.96)	(1.24)	(−.54)
unempl. rate	-	.2796	-	−5.2649***	-	.3762	-	−5.7947**
		(.22)		(−2.94)		(.34)		(−2.42)
empl. status (ind)	.1298***	.0989*	.1456***	.1128***	.1331***	.1083*	.1373***	.1035***
	(3.11)	(1.64)	(4.82)	(5.35)	(3.36)	(1.86)	(4.44)	(5.26)
married	.3045***	.4042***	.3238***	.3648***	.3006***	.3860***	.3329***	.1035***
	(7.59)	(6.82)	(7.26)	(9.08)	(7.78)	(6.84)	(6.80)	(5.26)
num. of child.	−.0719***	−.0769***	−.0017	−.0097	−.0691***	−.0716***	.0033	−.0084
	(−4.89)	(−4.24)	(−.10)	(−.85)	(−4.98)	(−4.30)	(.19)	(−.71)
sport act.	.1596***	.0855	.2305***	.1958***	.1638***	.0978	.2259***	.1964***
	(2.87)	(1.40)	(7.54)	(8.54)	(3.09)	(1.57)	(6.92)	(8.49)
unp. prof. work	.1109	.1755*	.0072	.0070	.0978	.1467	.0140	.0183
	(1.29)	(1.73)	(.14)	(.14)	(1.17)	(1.44)	(.25)	(.37)
political party	−.0130	−.1256	.0564*	.0068	−.0112	−.1179	.0538	.0030
	(−.16)	(−.94)	(1.71)	(.19)	(−.14)	(−.97)	(1.53)	(.08)
labor union	.0043	−.0811	.1327**	.0349	.0094	−.0669	.1249*	.0313
	(.09)	(−1.52)	(1.97)	(.76)	(.19)	(−1.24)	(1.67)	(.68)
human rights	−.0392	−.0100	.1475**	.1121***	−.0563	−.0420	.1566***	.1146***
	(−.47)	(−.16)	(2.34)	(2.68)	(−.80)	(−.79)	(2.50)	(2.89)
youth work	.1439***	.0467	.2477***	.2549***	.1377***	.0424	.2558***	.2619***
	(2.52)	(.70)	(5.40)	(5.09)	(2.52)	(.74)	(5.43)	(5.02)
peace move.	−.0376	.1957*	−.1129	−.0880	−.0109	.2006**	−.1271	−.1135
	(−.22)	(1.73)	(−1.00)	(−.77)	(−.07)	(2.19)	(−1.03)	(−.92)
obs	20,607	10,919	16,830	16,830	21,774	12,086	15,663	15,663
Prob>chi2	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Clustered Errors	YES	YES	YES	YES	YES	YES	YES	YES

Dependent variable: life satisfaction (ordinal 1 - 4)
(z-Statistics in parentheses)
* / ** / *** significant at 10 / 5 / 1 percent

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