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Income, Leisure, and Happiness

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Abstract

The income-leisure trade-off, whilst prominent in textbooks, is largely absent in the income-happiness debate. Multilevel or hierarchical linear modeling is introduced and used to investigate the income-leisure-happiness nexus. Leisure has a positive effect on happiness, but lowers the effect of per-capita GDP on self-reported happiness. This is in contrast to existing within-country evidence, and a likely explanation is that per-capita income proxies for leisure—the two are positively correlated. Further at odds with this previous research, no sex differences are found with respect to the effect of income and leisure on happiness.

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1. Happiness, income, and leisure

Easterlin's (1974) early findings on the income-happiness relation are rather paradoxical: he found that within nations higher income is associated with higher happiness scores (though at a decreasing rate), whilst cross-country and time-series evidence for developed countries shows that self-reported happiness rises hardly, if at all, as per-capita GDP increases. In the literature on the economics of happiness the debate on the relation between income and self-reported happiness takes center stage (recent contributions are Di Tella and MacCulloch, 2008; Krueger, 2008; Stevenson and Wolfers, 2008; see Clark et al., 2008 for an overview).[1] Surprisingly, this work typically neglects the textbook trade-off between leisure and (wage) income. Pouwels et al. (2008) is a notable exception. In a within-country analysis that uses data from the German Socio-Economic Panel they find that not including hours worked tends to underestimate the happiness effect of income by 25%. There are important sex differences, however: the underestimation only holds for men, and only for men does hours worked have an adverse impact on self-reported happiness.

This paper offers a cross-country perspective on the neglected direct effect of leisure (or hours worked) on happiness and its indirect effect, with leisure affecting the level of per-capita income. The empirical analysis includes leisure and assesses the effect of GDP on happiness relative to that of output per hour, for men and women combined and separately. The paper further introduces multilevel or hierarchical modeling (e.g. Gelman and Hill, 2007)—widely used in disciplines such as medicine and geography but largely absent in economics—to account for clustering and further study the cross-level interaction effect between sex and income.

2. Data and empirical strategy

Data on self-reported happiness comes from the World Values Survey and is combined with data on GDP, annual leisure, and labor productivity from The Conference Board and

[1] For (further) evidence on income and other (economic) determinants of happiness, see Frey and Stutzer (2002), and Layard (2005).

Groningen Growth and Development Center (2008).[2] The happiness measure comes from the item asking people how happy they are with their life as a whole, for which the following answers are available: 1, "not at all happy"; 2, "not very happy"; 3, "quite happy"; and 4, "very happy". As is common in the psychological literature and to facilitate the ease of interpretation of the findings, this happiness variable is treated as a continuous variable, noting that this drops some information but will not substantially affect our results (Ferrer-i-Carbonell and Frijters, 2004). Next to happiness, sex, health status, income scale (1-10), marital status, employment status, and age squared are included as individual-level control variables. Dropping all missing observations, the dataset for the empirical analysis comprises 101,071 individuals residing in 40 countries. Levels of per-capita GDP vary between $2,800 and $27,700; productivity between $3 and $30 per hour worked (1990 PPP); leisure between 1,500 and 2,500 hours per year. These three variables are scaled (GDP divided by 10,000; productivity by 10; and leisure by 1,000), and the natural logarithm is taken to account for diminishing marginal utility.

The empirical model is a multilevel model. Multilevel modeling has important advantages over regular techniques. First, it controls for clustering of the observations—individuals nested in countries, which in case of standard techniques would lead to underestimation of standard errors (e.g. Moulton, 1990).[3] Second, it allows for more efficient inference than is possible with complete pooling or no pooling of the data. Finally, with multilevel modeling we can separate the happiness effect of individual and contextual factors and estimate them simultaneously, also dealing with cross-level interaction effects in an appropriate manner. Applications of multilevel modeling to happiness data are Lucas et al. (2003) who use it to distinguish within- and between-subject effects in an individual panel, and Subramanian et al. (2005) who separate the happiness effects of individual factors from the effect of people's communities.

Letting H_{ij} denote the happiness of an individual i (Level 1) residing in country j (Level 2), the complete empirical model is given by:

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[2] For more information and downloadable data files, see http://www.worldvaluessurvey.org and http://www.conference-board.org/economics/database.cfm.

[3] The intraclass correlation for this dataset equals 0.146 meaning that 14.6% of all variance between individual levels of happiness is due to country-level factors.

$$
\begin{aligned}
&\text{Level 1:}\\
&\quad H_{ij} = \beta_{0j} + \beta_{1j} S_{ij} + \beta_{2j} x_{ij} + \varepsilon_{ij}\\
&\text{Level 2:}\\
&\quad \beta_{0j} = \gamma_{00} + \gamma_{01} z_j + u_{0j}\\
&\quad \beta_{1j} = \gamma_{10} + \gamma_{11} z_j + u_{1j}\\
&\quad \beta_{2j} = \gamma_{20} + u_{2j}\\
&\text{Complete:}\\
&\quad H_{ij} = \gamma_{00} + \gamma_{01} z_j + \gamma_{10} S_{ij} + \gamma_{11} z_j * S_{ij} + \gamma_{20} x_{ij} + \left(u_{0j} + u_{1j} S_{ij} + u_{2j} x_{ij} + \varepsilon_{ij} \right)
\end{aligned}
\qquad , \qquad (1)
$$

where z_j denotes level-2 explanatory variables, S_{ij} depicts the individual's sex (if applicable), and x_{ij} denotes level-1 explanatory variables. This general model is a varying intercepts (γ_{00}; fixed effects), varying-coefficients (random effects) model. In the regression analysis fixed effects are always included. Some regressions also include random effects. This is particularly the case when the interaction between sex and income/leisure and productivity is analyzed.

The terms in brackets constitute the random part of the model and the other terms the fixed part. The difference between a multilevel model and a traditional model is captured by the error terms in the random part. There is a "normal" residual error term (ε_{ij})—familiar from classic regression analysis, but also an aggregate-level error term (u_{0j}). In addition, total error is a function of the value of the level-1 explanatory variables. The model is estimated using maximum likelihood procedures.

3. Results

A first step is to assess the effect of income, productivity, and leisure on average happiness. Figure 1 below gives the results. Happiness increases with income and with productivity, though at a diminishing rate. Taking natural logarithms, simple OLS regression reveals that productivity is a better predictor than per-capita income ($R^2 = 0.409$ vs. $R^2 = 0.358$; $n = 86$ & $p = 0.000$ for both). Leisure by itself is not statistically significantly correlated with happiness ($R^2 = 0.01$; $p = 0.362$).

[Insert Figure 1 about here]

Tables 1 and 2 present the results of the multilevel analysis, for women and men separately and combined. The effect of GDP and productivity on happiness remains. Moving from $2800 to $27,700 per-capita income adds about 0.54 [= 0.24 * (10.2 - 7.95)] to the happiness score; similarly moving from $3 to $30 per hour worked adds roughly 0.68 [= 0.29 * 93.43 - 1.09)] to average happiness. Again, productivity is a better predictor of happiness than is GDP (loglikelihood-ratio equals 12.7 or more), even when annual leisure is added as a further explanatory variable. More strikingly, the happiness effect of income does not increase but rather decreases when leisure is included. At the country level, GDP captures part of leisure's contribution to happiness—the two are statistically significantly positively correlated ($r = 0.258$; $p = 0.017$), and income's role in happiness is not underestimated as it is within countries. Rather, between countries the effect of income on happiness is overestimated when leisure is not controlled for.

[Insert Table 1 about here]

Overall, women report themselves happier than men do. The gap is about 0.05 on the 1-4 happiness scale. Women appear to value leisure more than men do, but only in the separate regression model. Setting the effect of sex on happiness random over countries improves the model highly statistically significantly [likelihood ratio test: $P(X^2_{df=1} > 120.5) = 0.000$]. There is no statistically significant interaction effect between sex and any of the country-level explanatory variables, however.

[Insert Table 2 about here]

4. Concluding remarks

Some within-country evidence suggests that the effect of income and happiness is underestimated because the negative happiness effect of time spent working is not included. This paper introduced multilevel modeling to re-assess the relation between income and happiness across countries, taking into account the classic labor-leisure trade-off. Results show that a country's productivity is a better predictor of individual happiness than is per-capita GDP. Notwithstanding, the effect of per-capita income is not underestimated, rather the other way around. When annual leisure is included, it has a positive effect on happiness

but also lowers the effect of income. This finding suggests that between countries the effect of income is overestimated, because income proxies for amount of leisure consumed, which increases with income. Using the opportunities multilevel modeling offers to deal with cross-level interactions sex differences were also assessed. No substantial interaction effect was found, however.

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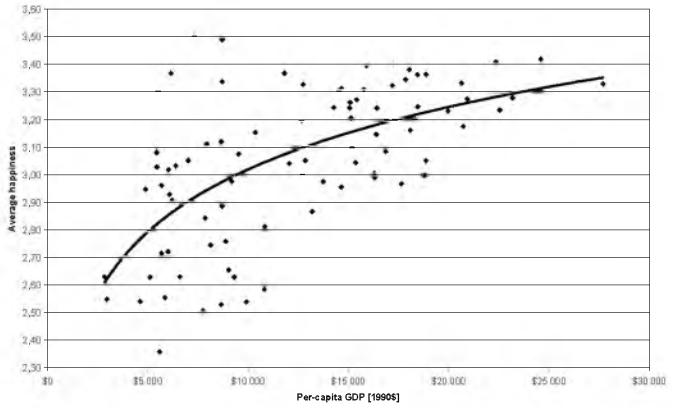
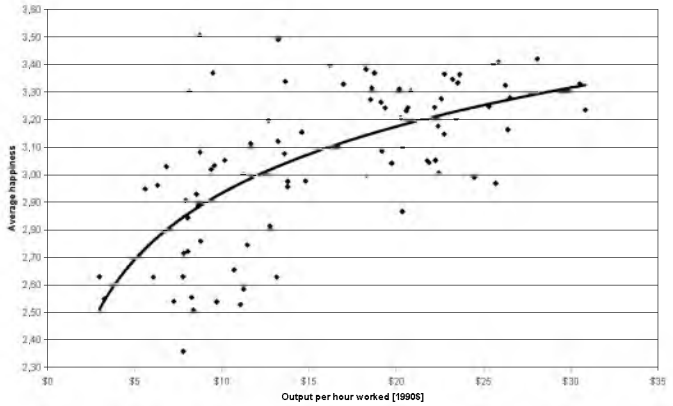
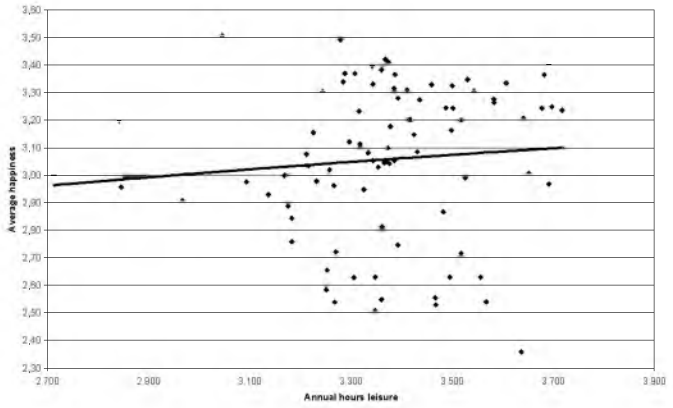
Figure 1. Income, Productivity, and Happiness.



Panel (a)



Panel (b)



Panel (c)

Table 1: Empirical results for baseline model.

	Women				Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	3.566**	1.262**	2.759**	.6619*	3.511**	1.345**	2.826**	1.182**
	(.0442)	(.2130)	(.0743)	(.2867)	(.0434)	(.2181)	(.0746)	(.2853)
GDP	-	.2493**	-	.2267*	-	.2342**	-	.2276**
		(.0227)		(.0239)		(.0232)		(.0244)
Productivity	-	-	.3125*	-	-	-	.2649**	-
			(.0244)				(.0246)	
Leisure	-	-	-	.6674*	-	-	-	.1854
				(.2107)				(.2085)
-2Loglikelihood	99,559.9	99,442.2	99,400.5	99,432.4	92,941.9	92,842.4	92,829.7	92,841.6

Notes: Women sample contains 51,883; the sample with all men, 49,188 observations. Standard errors in parentheses. *, and ** denotes significance at the 0.05, and 0.01 level respectively.

Table 2: Model with random effects and interaction terms.

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Intercept	3.510**	3.510**	2.756**	2.761**	2.793**	.8286**	.8356**	.9451**
	(.0395)	(.0388)	(.0580)	(.0578)	(.0603)	(.2107)	(.2104)	(.2266)
GDP	-	-	-	-	-	.2227**	.2207**	.2110**
						(.0178)	(.0177)	(.0191)
Productivity	-	-	.2919**	.2900**	.2781**	-	-	-
			(.0182)	(.0182)	(.0194)			
Leisure	-	-	-	-	-	.5140**	.5231**	.5076**
						(.1547)	(.1545)	(.1657)
Sex (male = 0)	.0513**	.0501**	.0495**	.0485**	-.0192	.0495**	.0484**	-.1844
	(.0045)	(.0086)	(.0045)	(.0086)	(.0400)	(.0045)	(.0086)	(.1838)
Sex * GDP	-	-	-	-	-	-	-	.0203
								(.0153)
Sex * Productivity	-	-			.0257	-	-	-
					(.0148)			
Sex * Leisure	-	-	-	-	-	-	-	.0363
								(.1316)
Random effects sex	No	Yes	No	Yes	Yes	No	Yes	Yes
-2Loglikelihood	192,592.5	192,470.1	192,339.3	192,219.6	192,216.6	192,380.1	192,259.6	192,257.4

Notes: See Table 1.