



**Income, Happiness, and the Disutility of Labour**

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# Income, Happiness, and the Disutility of Labour

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## Abstract

We reexamine the claim that the effect of income on subjective well-being suffers from a systematic downward bias if one ignores that higher income is typically associated with more work effort. We analyze this claim using German panel data, controlling for individual unobserved heterogeneity, and specifying the impact of working hours in a non-monotonic form. Our results suggest that the impact of working hours on happiness is rather small and exhibits an inverse U-shape. We do not find evidence that leaving working hours out of the analysis leads to an underestimation of the income effect.

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## 1. Introduction

Does income make people happy, and if so, how much extra happiness does a person experience if his income rises? While this is (and certainly remains) one of the hot topics in the Economics of Happiness, there is an emerging consensus that the impact of income on a person's subjective well-being is positive, statistically significant, but quantitatively rather small. Supportive evidence for this finding is provided by, for example, Frey and Stutzer (2002), Luttmer (2005) and van Praag and Ferrer-i-Carbonell (2004). A recent survey is provided by Clark et al. (2008).

To isolate the true effect of income on happiness, however, it is necessary to control for any negative influences associated with the process of earning more money. One factor that potentially counteracts the positive effect of income is that earning more money typically requires additional work efforts – the so-called “disutility of labour”. When thinking about money, people often seem to focus only on its benefits but neglect its costs. As Kahneman et al. (2006) put it:

“When someone reflects on how additional income would change subjective well-being, they are probably tempted to think about spending more time in leisurely pursuits such as watching a largescreen plasma TV or playing golf, but in reality they should think of spending a lot more time working and commuting.” (p. 1910)

Estimations of the effect of income on happiness typically ignore this cost side of income and run regressions without controlling for hours of work. The income effect obtained from such regressions reflects the sum of the proper positive income effect and the effect of increased working hours. If working hours have a negative effect on well-being, this combined effect underestimates the true effect of income. To isolate the true effect of income, one has to control for the impact of working hours explicitly. Pouwels et al. (2008) provide such an analysis, using data from the German Socio-Economic Panel (GSOEP). Their results support the hypothesis that the basic model tends to underestimate the effect of income on happiness. For men (women), this study finds that the underestimation amounts to 25 (12) percent.

Our paper picks up the idea of Pouwels et al. (2008), but extends their methodology. While Pouwels et al. (2008) restrict their analysis to a cross-section for the year 1999, we include eight subsequent waves of the GSOEP (1999-2006). This expands the available sample from roughly 1,300 to almost 17,000 observations. Once we include multiple waves of the GSOEP, its panel structure allows us to control for individual unobserved heterogeneity by using fixed

effects.<sup>1</sup> Moreover, Pouwels et al. (2008) assume a log-linear regression specification. This implies that the disutility of an additional working hour is large if the number of hours already worked is small, but that the negative impact of an additional hour of work diminishes as the number of working hours increases. In our analysis, we use a more flexible, quadratic specification. This has diminishing marginal disutility of labour as one of its special cases, but also allows for the (perhaps more plausible) case that hours of work exert increasing marginal disutility. Indeed, we find that working hours have an inversely U-shaped impact on well-being, but that the magnitude of its impact is rather small. We do not find evidence that controlling for the disutility of labour increases the impact of income on happiness.

## 2. Data and Methodology

We use the GSOEP for the years from 1999 to 2006.<sup>2</sup> We include all couples between ages 18 and 65 that are active in the labour force. This yields an unbalanced panel with roughly 17,000 observations.

In a first step, we estimate the following equation:

$$LS_{it} = \beta_1 \ln Y_{it} + \beta_2 \ln Y_{it}^P + \beta_3 (\ln Y_{it} \cdot \ln Y_{it}^P) + \beta_4 \ln L_{it} + \beta_5 \ln age_{it} + \beta_6 H_{it} + \beta_7 H_{it}^P + \varepsilon_{it},$$

where  $LS_{it}$  is a person's life satisfaction (on a scale from 0 to 10),  $Y_{it}$  is the net annual labour income of individual  $i$  in year  $t$ . The specification also includes the income of the partner  $Y_{it}^P$  and an interaction term of both incomes.  $L_{it}$  is the number of weekly paid working hours, including overtime,  $age_{it}$  is a person's age,  $H_{it}$  and  $H_{it}^P$  are self-rated measures of health ranging from 1 (bad) to 5 (very good), and  $\varepsilon_{it}$  is a random error term. Following Pouwels et al. (2008), we first estimate a basic model (with  $\beta_4 = 0$ ) and then an extended model (where we estimate the value of  $\beta_4$ ).

In a second specification, we check whether these results are robust to including individual fixed effects and allowing for a more general specification of the influence of working hours on life satisfaction. Our estimation equation thus becomes

$$LS_{it} = \beta_1 \ln Y_{it} + \beta_2 \ln Y_{it}^P + \beta_3 (\ln Y_{it} \cdot \ln Y_{it}^P) + \beta_4 L_{it} + \beta_5 L_{it}^2 + \beta_6 \ln age_{it} + \beta_7 H_{it} + \beta_8 H_{it}^P + \nu_i + \mu_t + \varepsilon_{it},$$

<sup>1</sup> Ferrer-i-Carbonell and Frijters (2004) show the importance of controlling for fixed effects in explaining happiness. Lykken and Tellegen (1996) provide evidence that up to 80 percent of the well-being variation is influenced by individual genes and personal traits.

<sup>2</sup> The data were made available by the DIW Berlin and were extracted using PanelWhiz (see Haisken-DeNew and Hahn (2006)).

where  $v_i$  is an individual-specific effect and  $\mu_t$  is a time dummy. To take into account the ordinal character of the dependent variable, we run a Probit-adjusted OLS (see van Praag and Ferrer-i-Carbonell (2004)).<sup>3</sup> The most important change in specification, however, concerns the substitution of log weekly paid working hours by weekly paid working hours,  $L_{it}$ , and weekly paid working hours squared,  $L_{it}^2$ .

### 3. Results

The results of the ordered probit regression are shown in Table 1. Income has a positive influence, whereas working hours exert a negative well-being effect. When we compare the basic with the extended model, we see that the basic model tends to underestimate the income effect on happiness. The income coefficient for men rises by about 39 percent, and the difference is significant at the 1 percent level. For women, the bias is weaker. The income effect rises only by 1 percent.

	Women		Men	
	Basic model	Extended model	Basic model	Extended model
Log income				
Woman	0.659*** (0.242)	0.665*** (0.242)	0.107 (0.242)	0.167 (0.243)
Man	0.849*** (0.224)	0.709*** (0.225)	0.373* (0.225)	0.518** (0.225)
Interaction term	-0.064*** (0.024)	-0.052** (0.024)	-0.008 (0.024)	-0.013 (0.024)
Log weekly working hours				
		-0.188*** (0.024)		-0.369*** (0.037)
Log age				
	0.192*** (0.036)	0.171*** (0.036)	0.239*** (0.038)	0.182*** (0.038)
Health				
Woman	0.509*** (0.011)	0.507*** (0.011)	0.178*** (0.010)	0.175*** (0.01)
Man	0.181*** (0.01)	0.181*** (0.019)	0.542*** (0.011)	0.541*** (0.011)
Individual fixed-effects	No	No	No	No
Time fixed-effects	No	No	No	No
Log Likelihood	-28,201	-28,170	-27,758	-27,708
Observations	16,937	16,937	16,937	16,937

Note: Standard errors in parentheses. \*, \*\*, \*\*\* denotes significance at the 10, 5, and 1 percent level, resp.

Table 1: Regression result (Pooled Ordered Probit)

<sup>3</sup> We also conducted conditional fixed-effect logit and standard fixed-effects OLS estimations for robustness checks which gave qualitatively identical results.

When we control for individual fixed effects and specify the impact of working hours in a quadratic form, a different picture emerges (Table 2). Income still has a positive influence on happiness, but working hours do not have a strictly negative effect anymore. If anything, working time influences well-being in an inverse U-shaped manner. An increase in working hours raises well-being for the first hours and exerts marginal disutility only if a person has already worked a large number of hours. The general magnitude of the impact of working hours on happiness is, however, rather small and the coefficients are not significantly different from zero. This suggests that the increase in working hours, at least up to some point, should not be considered the “cost side” of earning a higher income. Instead, more working hours could also be associated with other positive factors such as higher employment status, more social contacts at work etc. (see e.g. Booth and van Ours (2008)).

	Women		Men	
	Basic model	Extended model	Basic model	Extended model
Log income				
Woman	0.311 (0.395)	0.307 (0.396)	0.493 (0.375)	0.491 (0.376)
Man	0.383 (0.37)	0.386 (0.371)	0.669* (0.353)	0.666* (0.353)
Interaction term	-0.027 (0.040)	-0.028 (0.040)	-0.047 (0.038)	-0.046 (0.038)
Weekly working hours		0.002 (0.003)		0.002 (0.005)
Weekly working hours squared		-0.000 (0.000)		-0.000 (0.000)
Log age	-0.685 (0.530)	-0.671 (0.531)	-1.118** (0.561)	-1.119** (0.561)
Health				
Woman	0.247*** (0.010)	0.247*** (0.010)	0.068*** (0.010)	0.068*** (0.010)
Man	0.060*** (0.011)	0.060*** (0.011)	0.250*** (0.010)	0.250*** (0.010)
Individual fixed-effects	Yes	Yes	Yes	Yes
Time fixed-effects	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.13	0.13	0.11	0.11
Observations	16,937	16,937	16,937	16,937

Note: Standard errors in parentheses. \*, \*\*, \*\*\* denotes significance at the 10, 5, and 1 percent level, resp.

Table 2: Regression result (Probit-adjusted OLS)

If working hours do not generate disutility, however, leaving them out of the regression should not cause a negative bias for the income coefficient. The findings in Table 2 provide supportive evidence that the income coefficient is indeed unaffected by including working hours. When comparing the basic model with the extended model for men and women, the differences between the income coefficients are not significant (and even have the opposite sign). Hence, after controlling for fixed effects and the non-monotonic influence of working hours, we do not find supportive evidence for the claim by Pouwels et al. (2008) that leaving working hours out of the analysis tends to underestimate the effect of income on happiness.

#### **4. Conclusion**

We reexamined the claim that neglecting the impact of working hours on happiness causes a downward bias in the income-happiness-relationship. Pouwels et al. (2008), using cross-sectional data for Germany, found that controlling for working hours would substantially increase the impact of income on subjective well-being. Replicating their methodology, we find similar results. When we consider a methodology that has currently become standard in the happiness literature, including a panel dataset and the control for individual unobserved heterogeneity by including fixed effects, however, the results change considerably. Using this estimation technique and specifying the impact of working hours in a more flexible, quadratic form that allows for non-monotonic influences, we obtain results that suggest that the impact of working hours on happiness is rather small and exhibits an inverse U-shape. Since the magnitude of the effect of working hours is small, there is no evidence that leaving working hours out of the analysis leads to an underestimation of the income effect.

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