Income growth and happiness: Reassessment of the Easterlin Paradox

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Abstract

This paper presents evidence of a positive but very small long run relationship between income growth and happiness, evidence that can disprove the Easterlin Paradox. However, the paper argues that there is actually reason to sustain the paradox because it finds the magnitude of the estimated relationship too small to suggest that income growth has substantial consequence in improving happiness over the long-term. Certainly, the evidence suggests that happiness is more than about raising incomes. This paper argues that a rejection of the paradox is acceptable if and only if the empirical findings indicate economic significance.

Keywords: Easterlin Paradox; income growth; happiness; dynamics

JEL Classification: A20; C53; I30; O40

1. INTRODUCTION

This paper is yet another intervention to the continuing debate on the Easterlin Paradox. Simply put, the paradox refers to a contradiction between the short run or cross-section evidence of a positive income-happiness relationship and the long run or time series evidence of a nil income-happiness relationship. This situation is problematic because it goes against the conventional idea that a positive income-happiness relationship exists regardless of the time perspective adopted in the analysis.

Briefly, a summary of the debate can include the following observations. First, Easterlin (1974, 1995, and 2001) argues that hedonic adaptation to income and social comparison in income operate to cancel out any short run impact of income growth and/or make happiness revert to its long run level despite the income growth. Notice the argument does not say that income growth cannot affect happiness—in fact, it does but under the restrictive condition of *ceteris paribus*.

Second, Stevenson and Wolfers (2008), as well as the associated studies of, among others, Deaton (2008), Inglehart et al. (2008), Diener et al. (2013), and Veenhoven and Vergunst (2013), present evidence that refute the empirical findings of Easterlin and those with colleagues (e.g., Easterlin and Angelescu 2009; Easterlin and Sawangfa 2010; Easterlin et al. 2010). Stevenson and Wolfers, maintain that a statistically insignificant association between income growth and happiness is not at all proof of the absence of a long run relationship between the two variables, as hinted above. The Easterlin group, in turn, counters by saying that what the Stevenson-Wolfers group presents as robust evidence against the paradox is merely the short run relationship and, if so, the paradox remains valid (c.f., Easterlin 2013).[1]

[1] Easterlin and Angelescu (2009) also argue that a positive coefficient on income growth that Wolfers and

Third, both groups in fact report positive but very small estimates on the so-called long run income-happiness relationship (c.f., Oswald 1997; Veenhoven and Hagerty 2006; Clark and Senik 2011; Veenhoven and Vergunst 2013). Their empirical findings in fact suggest that income growth is not the end-all and be-all to happiness. Such is the case because income growth and happiness are essentially two disparate concepts: one measures the economy's welfare—albeit, in a not comprehensive way—and another measures people's welfare—albeit, not without problems. Moreover, there is an issue with regard to the transformation of income growth into happiness: happiness is neither a definite nor an automatic consequence of income growth. What is clear in the extant literature is that many other things constitute happiness. There is also another issue concerning how social values and preferences have become inextricably linked to money, income, or wealth that turns out to be not decisive in raising happiness and have become detached to, say, relationships, community, and citizenship that are critical to happiness. Of course, ensuring that analyses are sound and robust is important; but, it seems, the debate has become more about the statistical significance of the evidence and not about what it reveals in practical terms.

The foregoing introduction acknowledges that the debate on the Easterlin Paradox is one of those situations in which scholars are examining an issue using dissimilar perspectives and empirical strategies. This paper, in turn, contributes to the debate by asserting that an economic significance reading of the evidence might be more helpful toward a better understanding of the paradox itself. Correspondingly, the paper argues that a rejection of the paradox should hinge on an affirmative answer to the question: *Does the long run relationship between income growth and happiness indicate economic significance?*

To that end, the Easterlin Paradox is the null hypothesis of this study. The analysis takes income

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Stevenson found is the result of data from transition economies that cover the post-transition period but not pre-transition period.

growth and happiness as the key variables. Specifically, the study takes the dynamics of income growth, happiness adaptation to income, and social comparison in income as the underpinning processes in the income-happiness relationship. Like the Easterlin and Stevenson-Wolfers groups, this paper uses country-level data; but, unlike the two groups, it chooses a dynamic time series procedure for the analysis and, in turn, determines if the evidence carries economic significance.

The rest of the paper has the following structure. Part 2 presents a framework for an analysis of the Easterlin Paradox. A discussion of the data and empirical strategy follows in Part 3. The empirical findings and implications come in Part 4. The last part concludes the paper.

2. FRAMEWORK

2.1. Conceptual Framework

Consider a happiness function of the form

$$H_t = F[Y_t^*] \tag{1a}$$

where H_t is (reported) happiness, Y_t^* is a composite of income stimuli, and $\frac{dH_t}{dY_t^*} \geq 0$.

Define $Y_t^* = f[Y_t, Y_t^e, Y_t^r]$ with Y_t as the current income, Y_t^e as the expectation income, and Y_t^r as the relative income. The latter two terms represent social comparison in income, which assumes a relative income setup (Duesenberry 1952; see also Pollak 1976 and Frank 1985). Here, Y_t^e is the anticipation of income effect (Hirschman 1973): that is, social comparison income with respect to

a superior group's income Y_t^{sg}. Algebraically, $Y_t^e = \frac{Y_t^{sg}}{Y_t}$ and $\frac{dH_t}{dY_t^e} \geq 0$. Next, Y_t^r is the relative deprivation of income effect (Merton and Kitt 1950; see also Festinger 1954): that is, social comparison in income with respect to a peer group's income Y_t^{pg}. Algebraically, $Y_t^r = \frac{Y_t}{Y_t^{pg}}$ and $\frac{dH_t}{dY_t^r} \leq 0$.[2]

Consider, next, the happiness function extended to include happiness adaptation in income. Then, Equation 1a modifies into

$$H_t = F[Y_t^* - AY_t] \tag{1b}$$

where AY_t is the level of happiness adaptation to income. Define the initial condition of Equation 1b as $H_0 = F[Y_0^*]$, thus setting $AY_0 = 0$.

Borrowing from Fredrick and Loewenstein (1999; see also Helson 1964 and Pollak 1970), the current level of happiness adaptation to income takes the form

$$AY_t = \alpha Y_{t-1}^* + (1-\alpha)AY_{t-1} - [\sum_{i=1}^{t-1} \alpha(1-\alpha)^i Y_{(t-1)-i}^* + \sum_{i=1}^{t-1} (1-\alpha)^{i+1} AY_{(t-1)-i}] \tag{2}$$

where α is the rate of adaptation with a value between 0 and 1. (I demonstrate in the Appendix that the scenarios of zero and "instantaneous" happiness adaptation to income.) Equation 2 emphasizes the impact of recent experience in the adaptation process. Rearranging the terms obtains

[2] If $H_t = f[Y_t, Y_t^e, Y_t^r]$, then $\frac{dH_t}{dY_t} = F_{Y_t} + F_{Y_t^e}\frac{dY_t^e}{dY_t} + F_{Y_t^r}\frac{dY_t^r}{dY_t} \neq 0$. Thus $\frac{dH_t}{dY_t} = 0$ if $F_{Y_t} = F_{Y_t^e}\frac{dY_t^e}{dY_t} + F_{Y_t^r}\frac{dY_t^r}{dY_t}$.

$$\Delta AY_t = \alpha(Y^*_{t-1} - AY_{t-1}) - [\sum_{i=1}^{t-1}(1-\alpha)^i \alpha(Y^*_{(t-1)-i} - AY_{(t-1)-i}) + \sum_{i=1}^{t-1}(1-\alpha)AY_{(t-1)-i}] \quad (3)$$

From Equation 1b, let the change in happiness ΔH_t be

$$\Delta H_t = F[\Delta Y^*_t - \Delta AY_t] \quad (1c)$$

Substituting Equations 3 into Equation 1c, then moving H_{t-1} from the left-hand to the right-hand side of Equation 1b, and lastly grouping the common terms leads to the following expression

$$H_t = F[\Delta Y^*_t] + H_{t-1} - \alpha H_{t-1} + \alpha \sum_{i=1}^{t-1}(1-\alpha)H_{(t-1)-i} + \sum_{i=1}^{t-1}(1-\alpha)AY_{(t-1)-i} \quad (4)$$

Assume $AY_0 \equiv AY_{(t-1)-i} = 0$ (c.f., initial condition of Equation 1b) and Equation 4 becomes

$$H_t = F[\Delta Y^*_t] + (1-\alpha)H_{t-1} + \alpha \sum_{i=1}^{t-1}(1-\alpha)^i H_{(t-1)-i} \quad (5a)$$

or, simplifying further,

$$H_t = F[\Delta Y^*_t] + \sum_{i=0}^{t}\lambda_i H_{(t-1)-i} \quad (5b)$$

with $\lambda_i = \alpha^i(1-\alpha)^{i+1}$ and i = 0, 1…t. Recall that Let $Y^*_t = f[Y_t, Y^e_t, Y^r_t]$. Obviously, if Y^*_t is in the natural logarithm form, then the baseline setup in Equation 5a (5b) transforms into the following expression:[3]

[3] Stevenson and Wolfers (2008, p. 70) recognize that the "milder forms of adaptation are potentially consistent with [their] findings."

$$H_t = F[y_t, y_t^e, y_t^r] + \sum_{i=0}^{t} \lambda_i H_{(t-1)-i} \quad (5c)$$

where y_t is the rate of income growth, y_t^e is the rate of expectation income growth (i.e., $\frac{y_t^{sg}}{y_t}$), y_t^r is the rate of relative income growth (i.e., $\frac{y_t^{pg}}{y_t}$), and $\lambda > 0$ because $1 > \alpha > 0$.

2.2. Empirical Framework

Equation 5c presents an autoregressive process in happiness as the basic setup; that is, there is social expectation that current level happiness depends on its past levels.[4] All the same, an explicit specification of $F[y_t, y_t^e, y_t^r]$ is necessary in order to measure the net impact of the income stimuli on happiness across time. One reason for doing so is that the impact of the income stimuli might not be apparent in the short run but manifest only after some period has lapsed. Another reason is that the impact of the income stimuli manifests in the short run but there are also other effects in the subsequent periods. Thus, a distributed lag process in $F[y_t, y_t^e, y_t^r]$ is appropriate to account for the habit process that involves the current and past values of the income stimuli.

If so, Equation 5b becomes

$$H_t = \alpha_0 + \sum_{i=0}^{t} \beta_i y_{t-i} + \sum_{i=0}^{t} \theta_i y_{t+i}^e + \sum_{i=0}^{t} \varphi_i y_{t-i}^g + \sum_{i=0}^{t} \lambda_i H_{(t-1)-i} + error_t \quad (6a)$$

In short, a dynamic analysis of the income-happiness relationship takes on an autoregressive

[4] Equation 5b is equivalent to an adaptive expectation process.

distributed lag setup (c.f., Bottan and Perez Truglia 2011; Vendrik 2013). The term $\sum_{i=0}^{t}\lambda_i H_{(t-1)-i}$ accounts not only for the historical information of happiness but also for other effects coming from, say, omitted control variables. The other term, $\sum_{i=0}^{t}\beta_i y_{t-i} + \sum_{i=0}^{t}\theta_i y^{e}_{t+i} + \sum_{i=0}^{t}\varphi_i y^{g}_{t-i}$, accounts for both the impacts of the income stimuli on happiness across time, which is equivalent to net impact of the specific habituation processes.[5] Equation 6 actually recognizes that the adaptive processes in income growth and happiness operate together and affect each other. Thus, $\sum_{i=0}^{t}(\beta_i + \theta_i + \varphi_i)$ is net effect of the income stimuli and $\frac{\sum_{i=1}^{t}(\beta_i + \theta_i + \varphi_i)}{1 - \sum_{i=0}^{t}\lambda_i}$ is the long run impact of income growth on happiness.

3. METHODOLOGY

Data and Description of Measures

This paper uses the longest annual time series data available in testing the Easterlin Paradox. In this regard, Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, Netherlands, and United Kingdom comprise a convenient sample because they have data from 1973 to 2012. More

[5] Suppose $\beta_0 > 0$ and set $\theta_0 = \varphi_0 = 0$. The initial impact of y_t on H_t is β_0. All things the same, the initial impact β_0 translates as $\beta_0\lambda_0$ on H_{t-1}, $\beta_0\lambda_0\lambda_1$ on H_{t-2}, $\beta_0\lambda_0\lambda_1\lambda_2$ on H_{t-3}, etc. Suppose, too, y_{t-1} has an impact of $\beta_1 > 0$. All things the same, the subsequent impacts of β_1 are $\beta_1\lambda_0$ on H_{t-1}, $\beta_1\lambda_0\lambda_1$ on H_{t-2}, $\beta_1\lambda_0\lambda_1\lambda_2$ on H_{t-3}, etc. Graham (2009), for example, argues the case of an "unhappy growth" or $\beta_0 < 0$. If so, the impacts of $-\beta_0$ are $-\beta_0\lambda_0$ on H_{t-1}, $-\beta_0\lambda_0\lambda_1$ on H_{t-2}, $-\beta_0\lambda_0\lambda_1\lambda_2$ on H_{t-3}, etc. In either β_0 or $-\beta_0$ notice a "steady" adjustment process as H_t moves towards its new equilibrium.

important, the available data are comparable across the sample countries.[6]

Income growth data are mainly from the World Development Indicators. First, y_t is the annual growth rate of per capita gross domestic product (GDPPC) of each country in the sample. The figures are in constant 2005 US dollar prices. As with the Easterlin group, the figures are in percentage terms. I resort to the Penn Tables 7.1 just to complete the y_t series for Ireland.

Next, y_t^e uses either annual growth rate of GDPPC of the United States (US) or the average annual growth rate of GDPPC of the G-7 as the superior group's income. The former sets the US as the country to beat in the context of global economic competition following Dumenil et al. (2001) and Brenner (2006), whereas other setup takes the economic performance of the G7 as indicative of what member-countries might achieve because of collective economic momentum. Each setup doubles as a robustness test since the US is part of the G7. These figures are also in constant 2005 US dollar prices. Like y_t earlier, y_t^e is also in percentage terms.

In turn, y_t^r uses the annual growth rate of GDPPC of the neighboring countries as the peer group's income. Following Becchetti et al. (2013), for example, neighbors refer to the countries with a common border to the reference country (c.f., Luttmer 2005; Clark and Senik 2010). For this study, I restrict the coverage within the sample countries but modify the identification to include "proximate" neighbors. The United Kingdom, for example, has both Ireland and France as its proximate neighbors. For robustness test, I also include US as another "neighbor" of the sample

[6] The World Happiness Database has data for the sample countries in this paper as well as for Japan and the United States and for the same period covered in the study. There is, however, an issue concerning the comparability of the data because the survey procedure and measure for happiness are different in the case of Japan and of the United States.

countries. Again, growth rates are in real terms. Likewise, y_t^r is in percentage terms.

Happiness data are from the Eurobarometer. It refers to the average annual life satisfaction of each country in the sample. The aggregated data come from the responses to the question: "*On the whole, are you very satisfied, fairly satisfied, not very satisfied, not at all satisfied with the life you lead?"* with the four ratings taking the values 4, 3, 2, and 1, respectively. Accordingly, H_t for each country takes a value between 4 (maximum) and 1 (minimum).

3.2. Empirical Strategy

Stutzer (2004), Newman et al. (2008), Di Tella and MacCulloch (2010), Di Tella et al. (2010), Bottan and Perez Truglia (2011), Wunder (2012), Bartolini et al. (2013), Paul and Guilbert (2013), and Vendrik (2013) analyze a dynamic setup of the income-happiness relationship using individual annual time series data from one country or few countries. Their findings for the most part confirm a positive but very small estimate on the income variable. This paper takes their lead in utilizing a dynamic model but, in contrast, uses country-level annual time series for a sample of countries in the analysis.

Specifically, I estimate the following econometric model

$$H_{jt} = \alpha_0 + \sum_{i=0}^{t} \beta_i y_{j,t-i} + \sum_{i=0}^{t} \theta_i y^e_{j,t+i} + \sum_{i=0}^{t} \varphi_i y^g_{j,t-i} + \sum_{i=0}^{t} \lambda_i H_{j,(t-1)-i} + \varepsilon_{jt} \qquad (6b)$$

where j refers to Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, Netherlands, and United Kingdom; and ε_{jt} is the residual term.

Given that the identification of the reference groups (i.e., superior and peer groups) is problematic because of its endogeneity to income growth and given that the conventional procedure of fixed effects to control for the unobservable country-level heterogeneity is not efficient because of the autoregressive setup, the GMM-SYS is therefore the appropriate procedure in the estimation of Equation 6. Moreover, given that the number of lags on the regressors is not set *ex ante*, I resort to a sequential procedure in the estimation of Equation 6b—that is, the lagging of a regressor stops when the coefficient on its subsequent lag turns out statistically insignificant. At the same time, I rely on the Arellano-Bond autocorrelation test as another guide in the determination of the lags of regressors. I however note that the aforementioned studies that use dynamic specifications report short lags on happiness and even shorter lags on the income stimuli.

4. FINDINGS

4.1. Descriptive Findings

Figure 1 shows the decadal trends in income growth and happiness for the nine countries: y_t has been falling but H_t has been rising, albeit slightly, across the decades. Figure 2, in turn, details y_t of each country: Belgium ($\bar{y} = 1.73$ and $s_y = 1.95$), Denmark ($\bar{y} = 1.45$ and $s_y = 2.23$), France ($\bar{y} = 1.54$ and $s_y = 1.72$), Germany ($\bar{y} = 1.86$ and $s_y = 1.96$), Italy ($\bar{y} = 1.59$ and $s_y = 2.45$), Ireland ($\bar{y} = 3.24$ and $s_y = 4.53$), Luxembourg ($\bar{y} = 2.59$ and $s_y = 3.60$), Netherlands ($\bar{y} = 1.72$ and $s_y = 1.87$), and United Kingdom ($\bar{y} = 1.85$ and $s_y = 2.37$). The figure clearly shows income growth volatility but, still, indicates a cyclical pattern throughout the period typical of advanced capitalist economies. Ireland reports the highest average for the whole period and Denmark reports the lowest figure, with both France and Italy also indicating comparable low averages. For the sample countries, $\bar{y} = 1.98$, $s_y = 2.59$, and range of 1.78 (i.e., 3.23 minus 1.45) with the mode falling between 1.5 and 2.0.

Meanwhile, Figure 3 presents the trends in H_t for each country: Belgium ($\overline{H} = 3.13$ and $s_H = 0.11$), Denmark ($\overline{H} = 3.56$ and $s_H = 0.06$), France ($\overline{H} = 2.86$ and $s_H = 0.09$), Germany ($\overline{H} = 2.98$ and $s_H = 0.09$), Italy ($\overline{H} = 2.76$ and $s_H = 0.12$), Ireland ($\overline{H} = 3.19$ and $s_H = 0.09$), Luxembourg ($\overline{H} = 3.31$ and $s_H = 0.06$), Netherlands ($\overline{H} = 3.38$ and $s_H = 0.04$), and United Kingdom ($\overline{H} = 3.17$ and $s_H = 0.04$). In contrast to Figure 2, H_t is relatively stable throughout the period; yet, it seems to display mild, albeit it is almost unnoticeable, fluctuations across the years. The data show that Denmark has the highest and Italy has the lowest average for the whole period. The full sample has the following key statistics $\overline{H} = 3.15$, $s_H = 0.25$, and range of 0.80 (which is equivalent to two notches on a 1 to 10 scale (i.e., 0.08 times 2.5)) with the mode falling between 3.0 and 3.5.

[**Insert Figures 1, 2, 3 Here**]

Analyses reveal that y_t is statistically different across the sample countries not only for the whole period averages ($F(8, 359) = 1.92$, $p < 0.10$), but also for the decadal ($F(4, 359) = 7.99$, $p < 0.01$) and annual averages ($F(39, 359) = 9.71$, $p < 0.01$). Further analyses reveal that H_t for the whole period is statistically different across the sample countries ($F(8, 359) = 344.02$, $p < 0.01$). The decadal ($F(4, 359) = 1.15$, p = n.s.) and annual figures of H_t ($F(38, 359) = 0.24$, p = n.s.), in contrast, are statistically comparable across the sample countries. These results simply indicate that there are commonalities in the H_t trajectories even if there are differences in the y_t trajectories.

4.2. Empirical Findings

Table 1 summarizes the results from dynamic panel regression. Model 1 is the "baseline" results with three lags on H_t. In fact, H_{t-4} is statistically insignificant for all five specifications (not shown in the table). The lagged happiness parameters in Models 1 to 5 obtain an average of 0.9330,

which simply indicates that "complete" happiness adaptation to income occurs by the third year.[7]

[Insert Table 1 Here]

For Models 2 to 5, in particular, the results lead to the following observations. First, in these four specifications, there is clearly no short run impact of income growth on happiness (all $\beta_0 > 0$, but p= n.s.). More interestingly, the size of the β_0s in Table 1 is comparable to the estimates reported by Stevenson and Wolfers (2008), using data from the Eurobarometer, and those by Veenhoven and Vergunst (2013), using data from the World Happiness Database.

The results on the one-period lag and the two-period lag on income growth have opposing signs—the latter term shows a negative coefficient, thereby indicating that a long run adjustment in income growth occurs in the second year. At the same time, the three-period lag on income growth is statistically insignificant (not shown in table) for Models 2 to 5. Therefore, the results not only indicate that there is a long run impact of income growth on happiness but there is also a quick adjustment in the way income growth gets to affect happiness. Indeed, this empirical finding is consistent with Di Tella et al. (2001, 2003, and 2010). Across Models 2 to 5, the average of ($\beta_1 + \beta_2$) is 0.0030, which turns out to be comparable to that in Veenhoven and Vergunst (2013). Across Models 2 to 5, too, the average of ($\beta_0 + \beta_1 + \beta_2$) is 0.0044. In short, the net impact of income growth (alone) across time is positive but, without a doubt, very small in magnitude.

Second, the measures for social comparison in income give the anticipated findings. Interestingly, though, the results bare short and long run impacts of expectation income growth on happiness. In

[7] Model 1: 0.6961+0.1194+0.1139=0.9294; Model 2: 0.6663+0.1054+0.1466=0.9183; Model 3: 0.6787 +0.1057+0.1392=0.9235; Model 4: 0.6670+0.1252+0.1510=0.9432; Model 5: 0.6787+0.1271+0.1446= 0.9504

contrast, there is no short run but only a long run impact of relative income growth on happiness. For both measures, a two-period lag is statistically insignificant (not shown in table). The average of ($\theta_1 + \theta_2$) is 0.0014 and, for ($\varphi_1 + \varphi_2$), -0.0006 at best. Therefore, these results indicate that a positive outlook with regard to economic performance is conducive to happiness even in the short run; it is in fact large enough to offset the negative impact of income comparison on happiness.

The average net impact of the income stimuli (i.e., $F[y_t, y_t^e, y_t^r]$) using the estimates in Models 2 to 5 is 0.0051, which in turn obtains an average long run relationship between income growth and happiness of 0.0782.[8] This long run estimate implies that an overall 2 per cent net growth of the income stimuli sustained for at least 20 years is necessary in order to increase the average H_t of the sample countries from 3.15 to 3.20. At, say, 5 per cent net growth of the income stimuli, the time requirement to reach the 3.20 target is 8.2 years.[9] It is thus evident from the calculations that the long run impact of income growth is very small. Put another way, income growth must be very large in order to achieve a very small increase in happiness. Notwithstanding these findings, I note that the more difficult issue in the context of the sample countries is of course achieving a respectable level of income growth in the present economic conditions and political environment in Europe, a topic that is outside the scope of the present study.

4.3. Some implications

The empirical findings of the study confirm a statistically significant positive long run relationship between income growth and happiness, thereby suggesting a rejection of the Easterlin Paradox is

[8] Model 2: (0.0016+0.0080–0.0049+0.0005+0.0013+0.0003–0.0006) / (1–0.6663–0.1054–0.1466) = 0.0745
Model 3: (0.0011+0.0078–0.0042+0.0003+0.0008+0.0003–0.0007) / (1–0.6787–0.1057–0.1392) = 0.0706
Model 4: (0.0017+0.0073–0.0049+0.0004+0.0012–0.0003–0.0006) / (1–0.6670–0.1252–0.1510) = 0.0853
Model 5: (0.0013+0.0070–0.0042+0.0003+0.0007–0.0004–0.0006) / (1–0.6787–0.1271–0.1446) = 0.0824

[9] At 2 per cent, 3.20/(0.0782*2) = 20.46; at 5 per cent, 3.20/(0.0782*5) = 8.18

necessary. Even so, a substantive reading of the results leads to a reconsideration of the paradox because, in closer inspection, the evidence is not robust in economic terms. Ziliak and McCloskey (2008), for instance, assert that the size of the estimated relationship must be large enough to matter—that is, the results must indicate the "oomph". In the context of the paradox, then, the oomph means checking if the evidence has meaning and consequence to happiness that it would not be possible to dismiss it as a trivial result. If so, the evidence in this paper has established that income growth has very little oomph in terms of happiness.

Therefore, the answer to the query *"Does the long run relationship between economic growth and happiness indicate any economic significance at all?"* is a "No". The Easterlin Paradox is a valid proposition because, as the evidence reveals, the long run impact is trivial in magnitude.

Let me also point out that a dismissal of statistical significance in favor of economic significance is not the same as committing a Type II error because statistical significance remains the basis for embracing economic significance. Let me further point out that this conclusion does not mean that income growth per se does not or cannot bring any benefit to society in general or to happiness in particular; but, rather, it simply demonstrates that any effect from income growth accrued in the short run does not endure in the long run perspective. Therefore, other factors may be much more effective in raising happiness in the long term.

Ultimately, the conclusion based on economic significance proposed in this paper draw attention to the following issues regarding the Easterlin Paradox. First, the results expose the fundamental differences between income growth and happiness, namely: income growth is largely about the economy's welfare but happiness is mainly about people's welfare. While they are not necessarily contradictory elements, there is however no guarantee that the former translates as the latter and do so consistently across time. In this context, then, income growth may be a good measure about

the economy—albeit, it is not a comprehensive measure of economic performance—but it is not, and probably never was, a good measure for happiness.

Nonetheless, it is also important to add that a more sensible position with regard to the paradox is not a complete rejection of an income-based approach if only because income growth functions as a means for making possible the things and activities that promote the enjoyment of a good life and encourage the social relationships that support happiness. At the same time, income growth makes the provision of basic services necessary for human development possible through public taxation and other public measures. Therefore, a broader approach to happiness is a more sensible direction to take if the goal of society is to raise happiness. Such an approach is certainly crucial in order to have a sensible evaluation of people's welfare.

Second, the natural tendency to compare human welfare and disregard of adaptation tends to lead to an overemphasis on income growth as a determinant of happiness. Yet, the situation is also the consequence of an education system and mass media that glorifies achievement, competition, and profitability. In such a context, then, an income-based approach serves a mediating metric in the performance of comparison but with limited success because it is difficult to do given that human welfare is fundamentally an internal human experience.

Proper education and the regulation of the mass media in order to direct them toward building relationship, community, and citizenship essential for happiness can address the above problem. Yet, such a demand is difficult to pursue unless a transformation of the institutional foundations that define the capitalist system takes place as well. In short, a holistic approach is necessary.

Finally, even though earlier studies on the Easterlin Paradox raised the trivial magnitude of the income-happiness relationship, the extant literature in general has given too little attention to the

economic significance reading of the evidence that actually validates the paradox. Perhaps, then, a discrepancy in the interpretation of the evidence is yet another dimension to an explanation why there is an impasse on the paradox.

5. CONCLUSION

That the pursuit of economic progress has consequential impacts to people and societies is not a controversial matter. Of course, what economic progress means in particular contexts and times is a matter of public discussion. How government pursues economic progress is likewise a matter of public discussion. How people and societies might respond to change in order to profit from economic progress is still another issue for public discussion. Indeed, such and other related topics comprise the context on why the Easterlin Paradox is one of the most important on-going debates in economics. If a common measure of economic progress like income growth does not translate to an increase in happiness, then the pursuit of income growth might be futile in the end.

Thus, in this paper, I reexamined the Easterlin Paradox. In particular, a dynamic panel regression analysis that incorporated happiness adaptation to income and social comparison in income found evidence that confirms the findings of Stevenson-Wolfers group: there is a robust and positive long-run relationship between income growth and happiness. The conclusion from such evidence is to reject the Easterlin Paradox.

Yet, from the same analysis, the size of the purported long run relationship is too small to matter. This evidence—highlighting the economic significance of the results—leads to the conclusion that income growth in itself is not a very effective tool for raising happiness. This conclusion comes natural when using a perspective that goes beyond income in the interpretation of the results. All the same, an outright rejection of the Easterlin Paradox is not defensible given the evidence.

I hope that this paper highlighted what is probably the sensible interpretation of the empirical findings in this paper and in the extant literature in general, namely: a statistically significant long run relationship between economic growth and happiness cannot reject the Easterlin Paradox if such evidence indicates no economic significance. At the same time, I hope the empirical findings of this paper also highlighted the role of public policy in correcting people's misconceptions and in turn shifting their attention away from income-based metrics toward broad-based metrics that are probably more effective in raising and sustaining happiness.

If people are born into social realities that define their values and preferences, then it follows that there is an inextricable connection between the collective appraisal and outlook in life to the same underlying foundations. As such, sound education and the regulation of the mass media thus play important roles in shaping and directing human preferences toward relationship, community, and citizenship that are valuable to human welfare. Yet, the suggestion does not mean that income-based metrics are worthless altogether because they are still needed to obtain resources that secure the provision of an education system and the regulation of the mass media so, in the end, people get to enjoy the opportunities that permit them to go as far as possible in advancing their life circumstances. The evaluation of life then is not limited to income-based metrics but becomes concrete in terms of how people are able to pursue and achieve the "good life". Society in this way achieves the greatest happiness. It is in the context of this economic interpretation that the empirical findings in this paper affirm the Easterlin Paradox.

Future research might consider introducing time varying variables that mediate between income growth and happiness like social or relational capital as a measure of social progress. The idea is that economic and social progress should go hand in hand in creating an environment conducive for happiness. I can surmise, however, that such analysis will sustain the positive but small long-run relationship between income growth and happiness. Besides, the addition of time varying

mediating variables might obtain an even smaller long-run relationship compared to the results in this paper.

REFERENCE

Bartolini, S., Bilancini, E., and Sarracino, F. (2013). "Predicting the trend of well-being in Germany: How much do comparisons, adaptation, and sociability matter?," *Social Indicators Research*, 114(2): 169-191

Becchetti, L., Castriota, S., Corrado, L., and Ricca, E. (2013). "Beyond the Joneses: Inter-country income comparisons and happiness," *Journal of Socio-Economics*, 45(3): 187-195

Bottan, N. and Perez Turglia, R. (2011). "Deconstructing the hedonic treadmill: Is happiness autoregressive?," *Journal of Socio-Economics*, 40(3): 224-236

Brenner, R. (2006). *The economics of global turbulence: The advanced capitalist economics from long boom to long downturn, 1945-2005*, London: Verso Books

Clark, A. and Senik, C. (2010). "Who compares to whom? The anatomy of income comparisons in Europe," *Economic Journal*, 120(544): 573-594

Clark, A. and Senik, C. (2011). "Will GDP growth increase happiness in developing countries?," Discussion Paper No. 5595, Bonn: Institute for the Study of Labor

Di Tella, R. and MacCulloch, R. (2010). "Happiness adaptation to income beyond "basic needs," in E. Diener, J. Helliwell, and D. Kahneman (eds.), *International differences in well-being* (pp. 217-246), New York: Oxford University Press

Di Tella, R., De New, J., and MacCulloch, R. (2010). "Happiness adaptation to income and to

status in an individual panel," *Journal of Economic Behavior & Organization*, 76(3): 834-852

Di Tella, R., MacCulloch, R., and Oswald, A. (2001). "Preferences of inflation and unemployment: Evidence from surveys of happiness," *American Economic Review*, 91(1): 335-341

Di Tella, R., MacCulloch, R., and Oswald, A. (2003). "Macroeconomics of happiness," *Review of Economics and Statistics*, 85(4): 809-827

Diener, E., Tay, L., and Oishi, S. (2013). "Rising income and subjective well-being of nations," *Journal of Personality and Social Psychology*, 104(2): 267-276

Duesenberry, J. (1952). *Income, savings, and the theory of consumer behavior*, Cambridge: Harvard University Press

Dumenil, G., Glick, M., and Levy, D. (2001). "Brenner on competition," *Capital & Class*, 25(2): 61-77

Easterlin, R. (1974). "Does economic growth improve the human lot? Some empirical evidence," in P. David and M. Reder (eds.), *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz* (pp. 89-125), New York: Academic Press

Easterlin, R. (1995). "Will raising the incomes of all increase the happiness of all?," *Journal of Economic Behavior & Organization*, 27(1):35-47

Easterlin, R. (2001). "Income and happiness: Towards a unified theory," *Economic Journal*,

111(473): 465-484

Easterlin, R. (2013). "Happiness and economic growth: The evidence," Discussion Paper No. 7187, Bonn: Institute for the Study of Labor

Easterlin, R. and Angelescu, L. (2009). "Happiness and growth the world over: Time series evidence on the happiness-income paradox," Discussion Paper No. 4060, Bonn: Institute for the Study of Labor

Easterlin, R. and Sawangfa, O. (2010). "Happiness and economic growth: Does the cross section predict time trends? Evidence from developing countries," in E. Diener, J. Helliwell, and D. Kahneman (eds.), *International Differences in Well-being* (pp. 166-216), Oxford: Oxford University Press

Easterlin, R., McVey, L., Switek, M., Sawangfa, O., and Zweig, J. (2010). "The happiness paradox revisited," *Proceedings of the National Academy of Sciences*, 107(52): 22463-22468

Festinger, L. (1954). "A theory of social comparison in process," *Human Relations*, 7(2): 117-140

Frank, R. (1985). *Choosing the right pond*, New York: Oxford University Press

Frederick, S. and Loewenstein, G. (1999). "Hedonic adaptation," in D. Kahneman, E. Diener and N. Schwarz (eds.), *Well-being: The foundations of hedonic psychology* (pp. 302-329), New York: Russell Sage Foundation

Helson, H. (1964). *Adaptation-level theory*, New York: Harper & Row Publishers

Hirschman, A. (1973). "The changing tolerance for income inequality in the course of economic development," *Quarterly Journal of Economics*, 87(4): 544-566

Inglehart, R., Foa, R., Peterson, C., and Welzel, C. (2008). "Development, freedom, and rising happiness," *Perspectives on Psychological Science*, 3(4): 264-285

Luttmer, E. (2005). "Neighbors as negatives: Relative earnings and well-being," *Quarterly Journal of Economics*, 120(3): 963-1002

Merton, R. and Kitt, A. (1950). "Contributions to the theory of reference group behavior" in R. Merton and P. Lazarsfeld (Eds.), *Studies in the scope and method of 'the American soldier'* (pp. 40–106), Glencoe: Free Press

Newman, C., Delaney, L., and Nolan, B. (2008). "A Dynamic Model of the Relationship Between Income and Financial Satisfaction: Evidence from Ireland," *Economic and Social Review*, 39(2): 105-130

Oswald, A. (1997). "Happiness and economic performance," *Economic Journal*, 107(445): 1815-1831

Paul, S. and Guilbert, D. (2013). "Income–happiness paradox in Australia: Testing the theories of adaptation and social comparison," *Economic Modeling*, 30(1): 900-910

Pollak, R. (1970). "Habit formation and dynamic demand functions," *Journal of Political Economy*, 78(4): 745-763

Pollak, R. (1976). "Interdependent preferences," *American Economic Review*, 66(3): 309-320

Stevenson, B. and Wolfers, J. (2008). "Economic growth and happiness: Reassessing the Easterlin Paradox," *Brookings Papers on Economic Activity*, 39(1): 1–87

Stutzer, A. (2004). "The role of income aspirations in individual happiness," *Journal of Economic Behavior & Organization*, 54(1): 89-109

Veenhoven, R. and Haggerty, M. (2006). "Rising happiness in nations 1946-2004: A reply to Easterlin," *Social Indicators Research*, 79(3): 421-436

Veenhoven, R. and Vergunst, F. (2013). "The Easterlin illusion: Economic growth does go with greater happiness," Working Paper No. 1, Rotterdam: Erasmus Happiness Research Organization

Vendrik, M. (2013). "Adaptation, anticipation and social interaction in happiness: An integrated error-correction approach," *Journal of Public Economics*, 105(1): 131-149

Wunder, C. (2012). "Does subjective well-being dynamically adjust to circumstances?," *Economic Letters*, 117(3): 750-752

Ziliak, S. and McCloskey, D. (2004). "Significance redux," *Journal of Socio-Economics*, 33(5): 665-675

APPENDIX

Recall the generalized framework

$$H_t = F[\Delta Y_t^*] + (1-\alpha)H_{t-1} + \alpha\sum_{i=1}^{t-1}(1-\alpha)^i H_{(t-1)-i} \quad (5a)$$

where $F[\Delta Y^*] = F[\Delta Y_t, \Delta Y_t^e, \Delta Y_t^r]$ represents the income stimuli.

Zero Happiness Adaptation to Income

Zero happiness adaptation to income scenario requires $\alpha = 0$. No social comparison in income requires $\Delta Y_t^e = \Delta Y_t^r = 0$. If so, Equation 5a reduces into

$$h_t = F[\Delta Y] \quad (7a)$$

where $h_t = \Delta H_t$. Equation 7a is actually the recent workhorse of the Easterlin group (c.f., Easterlin and Angelescu 2009; Easterlin and Sawangfa 2010; Easterlin et al. 2010; and Easterlin 2013).

Setting $\Delta Y_t^e \neq 0$ and $\Delta Y_t^r \neq 0$ and keeping $\alpha = 0$ obtains the expression

$$h_t = F[\Delta Y_t, \Delta Y_t^e, \Delta Y_t^r] \quad (8a)$$

Instantaneous Happiness Adaptation to Income

Instantaneous happiness adaptation to income scenario requires $\alpha = 1$. Once again, no social

comparison in income means $\Delta Y_t^e = \Delta Y_t^r = 0$. If so, Equation 5a reduces into

$$H_t = F[\Delta Y] \qquad (7b)$$

In fact, Equation 7b is the original workhorse of the Easterlin group (c.f., Easterlin 1974, 1995, and 2001).

Setting $\Delta Y_t^e \neq 0$ and $\Delta Y_t^r \neq 0$ and keeping $\alpha = 1$ obtains the expression

$$H_t = F[\Delta Y_t, \Delta Y_t^e, \Delta Y_t^r] \qquad (8b)$$

Equations 7a (7b) and 8a (8b) make up the "basic model" from which a dynamic specification is possible for econometric estimation.

Table 1: ***Income-Happiness Relationship***

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.1981	0.2545	0.2407	0.1743	0.1536
	0.0643	0.0249	0.0275	0.0962	0.1193
H_{t-1}, Happiness lagged-1	0.6961	0.6663	0.6787	0.6670	0.6787
	0.0000	0.0000	0.0000	0.0000	0.0000
H_{t-2}, Happiness lagged-2	0.1194	0.1054	0.1057	0.1252	0.1271
	0.0862	0.0967	0.1036	0.0516	0.0495
H_{t-3}, Happiness lagged-3	0.1139	0.1466	0.1392	0.1510	0.1446
	0.0796	0.0170	0.0250	0.0099	0.0129
y_t, Income growth (current)		0.0016	0.0011	0.0017	0.0013
		0.2000	0.3133	0.1600	0.2543
y_{t-1}, Income growth lagged-1		0.0080	0.0078	0.0073	0.0070
		0.0000	0.0000	0.0000	0.0000
y_{t-2}, Income growth lagged-2		-0.0049	-0.0042	-0.0049	-0.0042
		0.0003	0.0008	0.0001	0.0004
y_t^e, Expectation income growth (current)		0.0005	0.0003	0.0004	0.0003
		0.0350	0.0278	0.0882	0.0560
y_{t-1}^e, Expectation income growth lagged-1		0.0013	0.0008	0.0012	0.0007
		0.0192	0.0404	0.0244	0.0540
y_t^r, Relative income growth (current)		0.0003	0.0003	-0.0003	-0.0004
		0.2654	0.2628	0.2547	0.2021
y_{t-1}^r Relative income growth lagged-1		-0.0006	-0.0007	-0.0006	-0.0006
		0.0388	0.0353	0.0195	0.0091
AR(1)	-2.7924	-2.8157	-2.8081	-2.8146	-2.8086
	0.0052	0.0049	0.0050	0.0049	0.0050
AR(2)	1.1601	0.9203	1.1340	1.0578	1.2831
	0.2460	0.3574	0.2568	0.2902	0.1994
Time fixed effect	Yes	Yes	Yes	Yes	Yes

Notes:

1. The estimates are from dynamic panel regression via GMM-SYS. The dependent variable is H_t (current). Numbers below parameter estimates are the p values.
2. Model 2: Expectation income growth is $y_t^e = y_t^{US} / y_t$ and relative income growth is $y_t^r = y_t / y_t^{pg}$.

   Model 3: Expectation income growth is $y_t^e = y_t^{G7} / y_t$ and relative income growth is $y_t^r = y_t / y_t^{pg}$. The peer groups (pg) in both models are as follows: Belgium [France, Germany, Luxembourg, Netherlands, United Kingdom]; Denmark [Germany]; France [Belgium, Germany, Luxembourg, Italy]; Germany [Belgium, Denmark, France, Luxembourg, Netherlands]; Ireland [United Kingdom]; Italy [France]; Luxembourg [Belgium, France, Germany]; Netherlands [Belgium, Germany]; United Kingdom [Ireland, France].

   Model 4: Expectation income growth is $y_t^e = y_t^{US} / y_t$ and relative income growth is $y_t^r = y_t / y_t^{pg}$.

   Model 5: Expectation income growth is $y_t^e = y_t^{G7} / y_t$ and relative income growth is $y_t^r = y_t / y_t^{pg}$. The peer groups in models 2 and 3 now include the US.

Figure 1: ***Trends in Decadal Average in Income Growth and Happiness***

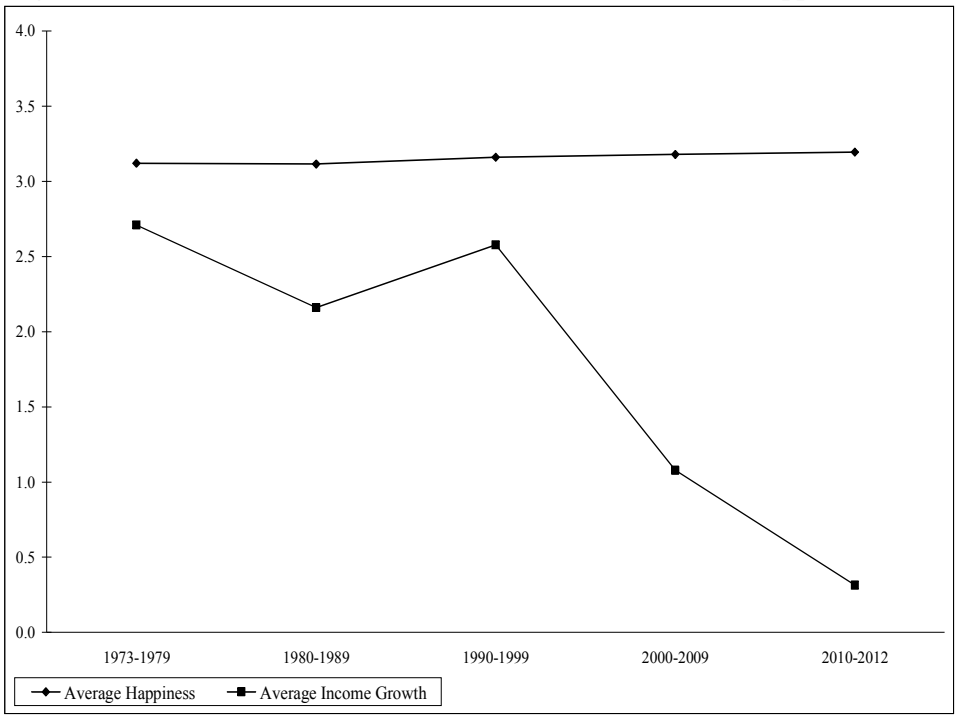
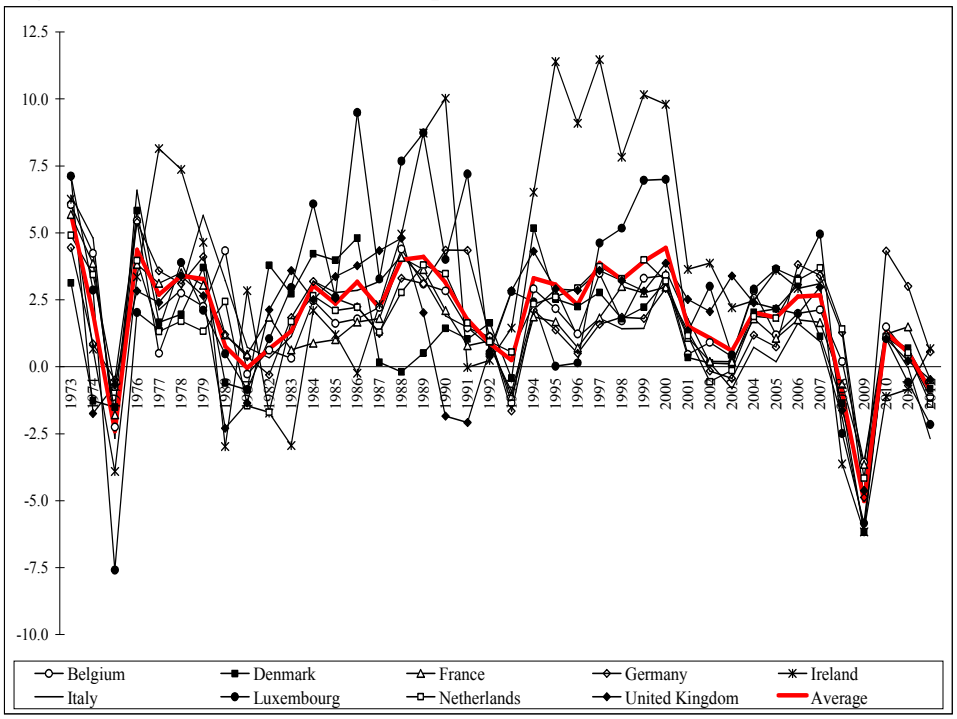
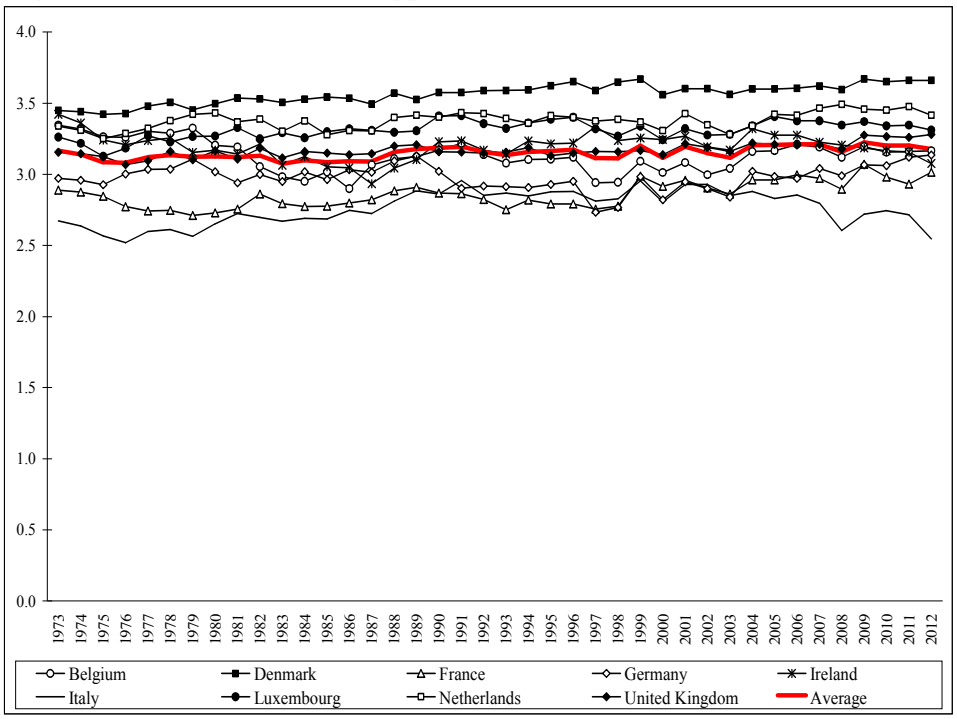


Figure 2: ***Trends in Annual Per Capita Income Growth, 1973-2012***



Mean (1973-2012): 1.98

Figure 3: ***Trends in Average Happiness, 1973-2012***



Mean (1973-2012): 3.15