Discussion Papers in Economics

HAPPINESS INERTIA:
ANALYTICAL ASPECTS OF THE EASTERLIN PARADOX

By
Ali Choudhary
(University of Surrey and State Bank of Pakistan)
Paul Levine
(University of Surrey)
Peter McAdam
(European Central Bank and University of Surrey)
&
Peter Welz
(Sveriges Riksbank)

DP 09/08

Department of Economics
University of Surrey
Guildford
Surrey GU2 7XH, UK
Telephone +44 (0)1483 689380
Facsimile +44 (0)1483 689548
Web www.econ.surrey.ac.uk
ISSN: 1749-5075

Happiness Inertia: Analytical Aspects of the Easterlin Paradox*

Ali Choudhary[§], Paul Levine[§§], Peter McAdam[†], Peter Welz[**]
[§]University of Surrey and the State Bank of Pakistan,
[§§]University of Surrey,
[†]European Central Bank and University of Surrey
[**]Sveriges Riksbank

October 27, 2008

Abstract

Using a New-Keynesian flexi-price model with external habit formation in consumption and labor supply, we identify the channels underlying the *Easterlin Paradox* (or "Happiness Inertia", its generalization). These include whether external habit formation is in "difference" or "ratio" form; the growth and convexity characteristics of non-pecuniary effects; and the nature of risk aversion. We show that the impact of labor habit formation on welfare can (unlike consumption) be positive or negative. The *form of* habit formation (rather than habit *per se*) is a key determinant of whether welfare functions reproduce happiness inertia; only when habit is modelled in ratio form, does this possibility open up. The model thus bridges the gap between theoretical models and social policy, pecuniary and non-pecuniary motives.

JEL Classification: H21, H32, C11, C52.

Keywords: Easterlin Paradox, Happiness Inertia, Habit, Ratio, Difference, Economic Bad.

*We thank seminar participants at the conference "Policies for Happiness" (Siena, June, 2007), as well as at MIT, the ECB, Sveriges Riksbank, the SBP, the Universities of St Andrews, Surrey and LUMS, and in particular Richard Easterlin, Miguel A. León-Ledesma, Ole Rummel, Joe Pearlman, Chris Tsoukis (discussant), Alpo Willman and one anonymous ECB working paper referee for helpful comments and discussions. McAdam further thanks the economics department at MIT for its hospitality where he was a visiting scholar during earlier stages of this work. The opinions expressed do not necessarily reflect those of our constituent institutions.

[†]Corresponding author: `peter.mcadam@ecb.int`.

1 Introduction

It is now thirty five years since Easterlin (1974) raised a paradox that has intrigued and haunted the economics profession: beyond a certain income there may be little, if any, relationship between increases in per-capita income and average social welfare ("happiness"). **Figure 1** illustrates: whilst income per head in the US has been growing continuously since WWII the proportion of survey respondents who reported being "very happy" appears broadly unchanged. Since then there have been considerable (and arguably inconclusive) attempts to empirically validate this paradox, see Frey (2008) for a discussion. However, if the empirical literature is voluminous, the corresponding effort to model the paradox appears scarcer.[1] This paper is a step towards bridging that gap. Moreover, we shall work with a generalization of the paradox, which we label "Happiness Inertia" which nests the Easterlin Paradox as a special case.

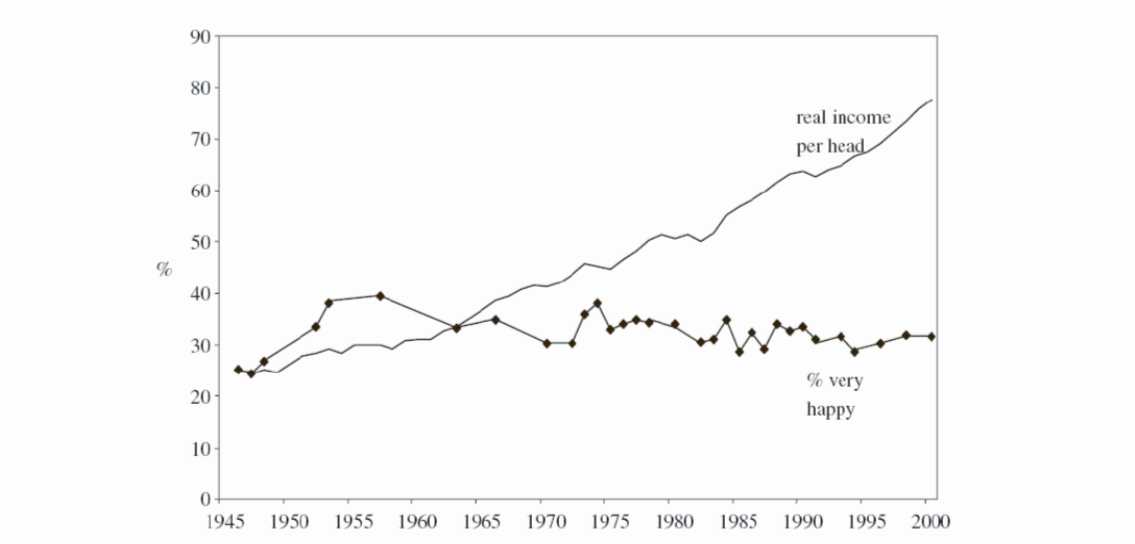

Figure 1: **Income and Happiness in the United States. Source Layard(2006)**

The literature identifies the relativity approach humans take in appraising their well-being as a key explanation for Happiness Inertia. This implies that an agent is adversely affected by the relative consumption levels of others in society (also known as *Catching*

[1]One key reason for this lack of theoretical work had been the strong disagreement on using the utility function as a proxy for subjective well-being. However, recent empirical work (see Clark et al. (2008)) has lead to a wider acceptance for this association and has consequently opened up opportunities for theoretical advancements in the area.

Up with or *Keeping Up with the Joneses*).[2] Thus, even though the agent may becoming richer, that his peers are too makes him appreciate less of what he has (e.g., see Arrow and Dasgupta (2007), Blanchflower and Oswald (2004), Di Tella et al. (2003)).[3]

We study behavior in the presence of such relativity in the context of a benchmark flexi-price New Keynesian model.[4] We study different types of habit formation (difference and ratio forms[5]) in consumption and labor-supply choices; for the cases of balanced and non-balanced growth paths; and for the emergence of essentially non-pecuniary effects. In so doing, we identify the channels that underlie the Easterlin Paradox and Happiness Inertia: namely, the strength and nature of habit formation, risk aversion, non-pecuniary effects and welfare convexities.

Several interesting results emerge. For instance, habit formation - a mainstay of areas like the equity-price puzzle, savings-growth dynamics, business-cycle analysis - has an ambiguous role in explaining Happiness Inertia. On a non-balanced growth path, habit is important in explaining Happiness Inertia. However, if Happiness Inertia is to be more than a transitory phenomenon, we should be focused on the long run. We show that only if habit preferences are specified in ratio form does it play a role along the balanced growth path. Moreover, not all forms of habit formation impact welfare in the same direction. Further, one interesting case surfaces whereby the most consumption and habit-rich societies are the "least happy" (have the lowest welfare).

The paper is organized as follows. In the next section, we describe the optimizing model with external habit formation in consumption and labor supply (modelled in both difference and ratio forms). In Section 3 we used comparative statics from the model to match the Easterlin Paradox (and its generalization, Happiness Inertia). Section 4 concludes.

[2]The idea that agents make relative comparisons in consumption and use it as a way to gain and project social status has a long lineage in economics, perhaps the most famous early example being Veblen (1899).

[3]Another perspective of relativity relates to *habituation*. Here, the joy from higher income and consumption is short-lived in that the agent fails to foresee its getting-used-to aspect and will require, over time, a further income boost to sustain the happiness. Here, however, we concentrate on the more familiar catching-up with the Joneses case.

[4]Relative comparisons in consumption are a common modelling device. However, we also examine that in labor supply, consistent, for instance, with the literature on "workaholism" (e.g., Oates (1971)).

[5]See Tsoukis (2007) for a detailed taxonomy of habit forms.

2 The Model

2.1 Two Formulations of Habit Formation and the External Bad

We consider two formulations of social comparisons. The first is the *difference form* where the welfare of representative household r at time 0 is given by:

$$\Omega_0^D = \sum_{t=0}^{\infty} \beta^t \left[\frac{(C_t(r) - H_{C,t})^{1-\sigma}}{1-\sigma} - \kappa_L \frac{(L_t(r) - H_{L,t})^{1+\phi}}{1+\phi} - \kappa_X \frac{X_t^{1+\varphi}}{1+\varphi} \right]. \tag{1}$$

where β is the household's discount factor, $C_t(r)$ is an index of consumption, $L_t(r)$ are hours worked, $H_{C,t}$ represents social comparisons in consumption, thus the desire not to differ too much from other households: $H_{C,t} = h_C C_{t-i},\ i \geq 0$[6], where $C_t = \left[\int_0^1 C_t(r)^{\frac{\zeta-1}{\zeta}} dr\right]^{\frac{\zeta}{\zeta-1}}$ is aggregate consumption (which the agent takes as exogenous), with $h_C \in [0,1)$. Similarly $H_{L,t} = h_L L_{t-j} \quad j \geq 0$, represents social comparisons in labour supply where $L_t = \left[\int_0^1 L_t(r)^{\frac{\eta-1}{\eta}} dr\right]^{\frac{\eta}{\eta-1}}$ is a Dixit-Stigliz aggregate of differentiated labour supplied by households with $h_L \in (-1,1)$.

Note, in contrast to consumption habit, labor-supply habit may be positive or negative: when the agent sees his peers working more he may feel less unhappy about himself working as much (a positive externality) or instead may feel pressure to join them (a negative one). Parameters $\sigma > 0$ and $\phi \geq 0$ reflect risk aversion and the real-wage labor supply elasticity and κ_i are preference shocks (alternatively, welfare weightings). If $\sigma = 1$ we attain balanced or steady-state growth.

Is the contribution of consumption and labor supply and their habit forms sufficient to generate Happiness Inertia? If so, then the Easterlin Paradox is merely some special case of the agent's standard optimization problem. If not, then the expression of the agent's welfare *must* be modified; the question is how? To account for this possibility, we introduce an extra argument, X, which we agnostically label an "external bad". Generically, it can be viewed in the similar vein to a Solow residual: in our context, what part of the agent's welfare cannot be ascribed to transactions in consumption and employment.

The notion of the bad can be thought of as arising from Easterlin (2003)'s distinction between pecuniary and non-pecuniary activities in the context of well-being. The former

[6]Note, the fact that $i \geq 0$, means the formulation is consistent with both *Keeping Up With* ($i = 0$) and *Catching Up With* the Joneses ($i \geq 0$).

can cause unhappiness because agents wrongly assume their pecuniary preferences are fixed. Thus, more income and consumption possibilities are seen by definition as welfare improving (and therefore worth striving for). However, given the presence of hedonic adaption (or, alternatively, habit formation) increasing income will instead simply raise agents' aspirations equivalent to their material gains, leaving happiness static. By contrast, non-pecuniary activities (e.g., family/marriage quality, leisure, friendship, desire for social fairness and equality) are characterized by either no (or significantly less) hedonic aspects. As Easterlin (2003) comments "... most individuals spend a disproportionate amount of their lives working to make money, and sacrifice family life and health, domains in which aspirations remain fairly constant". Thus the bad (accordingly, modelled with *no* habit formation) captures these non-pecuniary aspects in the agent's assessment of his well-being (and its trade off with pecuniary activities manifested by the negative sign in the welfare function).

But what determines X? Perhaps, indeed like the Solow residual, we should consider its growth as exogenous or else tied up with so many intertwining unobservables as to be ostensibly exogenous. Alternatively, the growth of the bad and consumption may be somehow related. For example, at the level of the agent, with higher incomes comes more pressure for longer work commitments[7], potentially crowding out family and leisure activities tending to many recognized modern ills - higher divorces rates, work-related stress etc. Indeed, higher economic growth could also - *à la* the "Kuznets curve" - widen inequality over some developmental ranges tending to deepen social distress. Or else with population growth comes struggles over the rights to scarce resources tending once more to immiserizing welfare. In psychology literatures, the economic bad can be equated with what James (2008) and De Graaf et al. (2001) have labelled *affluenza*: the psychological distress incurred by keeping up with the Joneses.[8] However, there is no necessity to link changes in the external bad to economic growth. It may simply reflect changes over time in the quality of public institutions, inter-personal conflict, public health issues etc.

Here we take no particular stand on the rights or wrongs of including such a term in the welfare function, only to observe what its qualitative characteristics might be. The only restriction on parameter φ is $\varphi \neq -1$. If $\varphi > 0$ the bad incurs convex welfare

[7] We could thus view X as reflecting "aspiration-levels", namely that as an individual's income increases (e.g., from promotion) the pressure for superior performance may reduce welfare, Irwin (1944).

[8] Thus, whilst h_C denotes the effect social comparisons has on economic evolutions (such as growth in consumption behavior), X reflects the associated psychological distress incurred.

costs; if $\varphi \in (-1, 0)$ or $\varphi < 0$ costs are concave.[9]. Finally, note X, is not intended to be an abstract concept. There has been substantial work is devising, collecting and *measuring* quality/satisfaction of life and happiness indicators (and, by implication, of unhappiness) and non-pecuniary measures of well-being by a number of international bodies and researchers, see Diener (2000), Veenhoven (2008), Kahneman and Schwarz (1999)). Weighing these against conventional pecuniary welfare measures is a feasible and indeed ongoing agenda.

The second form of habit formulation we consider is the *ratio form*:

$$\Omega_0^R = \sum_{t=0}^{\infty} \beta^t \left[\frac{(C_t(r)/H_{C,t})^{1-\sigma}}{1-\sigma} - \kappa_L \frac{(L_t(r)/H_{L,t})^{1+\phi}}{1+\phi} - \kappa_X \frac{X_t^{1+\varphi}}{1+\varphi} \right]. \tag{2}$$

where instead $H_{C,t} = C_{t-i}^{h_C}$ and $H_{L,t} = L_{t-j}^{h_L}$, $i, j \geq 0$.

Essentially therefore external habit in difference form implies the agent is concerned about absolute comparisons, whilst that in ratio form is framed more in growth terms. The difference can be also be motivated in terms of steady-state relative risk aversion: for $\frac{[C(1-h_C)]^{1-\sigma}}{1-\sigma}$ and $\frac{C^{(1-h_C)(1-\sigma)}}{1-\sigma}$ we have respectively, σ and $\gamma = \sigma - h_C(\sigma - 1)$, which coincide for $h_C = 0$; but $\forall h_C > 0$, $\gamma \leq \sigma$ iff $\sigma \geq 1$.

2.2 Optimization Behavior

The representative household maximizes (1) or (2) taking external habits $H_{C,t}$ and $H_{L,t}$ as given, subject to a standard budget constraint and a demand schedule,

$$L_t(r) = \left(\frac{W_t(r)}{W_t} \right)^{-\eta} L_t, \tag{3}$$

derived from the firm's maximization problem, where $W_t(r)$ is the wage rate and $W_t = [\int_0^1 W_t(r)^{1-\eta} dr]^{\frac{1}{1-\eta}}$ is a Dixit-Stiglitz aggregate wage index.

Turning to the supply side, competitive final goods firms use a continuum of intermediate goods according to a CES technology to produce aggregate output

$$Y_t = \left(\int_0^1 Y_t(f)^{(\zeta-1)/\zeta} df \right)^{\zeta/(\zeta-1)} \tag{4}$$

[9] A similar condition could be placed on the Frisch parameter ϕ, but the literature usually imposes $\phi > 0$.

where ζ is the elasticity of substitution. This implies a set of demand equations for each intermediate good f with price $P_t(f)$ of the form

$$Y_t(f) = \left(\frac{P_t(f)}{P_t}\right)^{-\zeta} Y_t \tag{5}$$

where $P_t = \left[\int_0^1 P_t(f)^{1-\zeta} df\right]^{\frac{1}{1-\zeta}}$ is an aggregate intermediate price index, but since final goods firms are competitive and the only inputs are intermediate goods, it is also the GDP price level.

In the intermediate goods sector each good f is produced by a single firm f using differentiated labor with technology,

$$Y_t(f) = A_t L_t(f) \tag{6}$$

where $L_t(f) = \left(\int_0^1 L_t(r,f)^{(\eta-1)/\eta} dr\right)^{\eta/(\eta-1)}$ is an index of differentiated labor types used by the firm, where $L_t(r,f)$ is the labor input of type r by firm f. A_t is an exogenous shock capturing shifts to trend total factor productivity. In each period intermediate firm f chooses a price $P_t(f)$ to maximize profits, resulting in the optimal price,

$$P_t(f) = \frac{W_t}{\left(1 - \frac{1}{\zeta}\right) A_t}. \tag{7}$$

In equilibrium households and firms are identical: $C_t(r) = C_t$ and $L_t(f) = L_t$. The deterministic zero-inflation, zero-growth steady state implies,

$$\begin{aligned} 1 &= \beta(1+R) && (8)\\ \frac{W}{P} &= -\frac{1}{1-\frac{1}{\eta}} \frac{\Lambda_L}{\Lambda_c} && (9)\\ Y &= AL = C && (10)\\ \frac{W}{P} &= A\left(1 - \frac{1}{\zeta}\right), && (11) \end{aligned}$$

where R_t is the nominal interest rate and (9) equates the marginal rate of substitution with the real wage. Mark-up $\frac{1}{1-\frac{1}{\eta}}$ reflects the market power of the household in the labor market.

For habit in *difference form* the steady-state marginal utilities are:

$$\Lambda_c^D = (1-h_C)[(1-h_C)C]^{-\sigma} \tag{12}$$

$$\Lambda_L^D = -\kappa_L(1-h_L)[(1-h_L)L]^{\phi}, \tag{13}$$

and for the *ratio form*,

$$\Lambda_c^R = (1-h_C)C^{-\sigma+h_C(\sigma-1)} \tag{14}$$

$$\Lambda_L^R = -\kappa_L(1-h_L)L^{\phi-(1+\phi)h_L}. \tag{15}$$

3 Confronting "Happiness Inertia"

We define Happiness Inertia as a generalization of the Easterlin Paradox: as living standards improve (e.g., from a positive technology shock), welfare may either remain constant, decline, or increase less than proportionally. We define these as, respectively, *strict* ($\frac{\delta\Omega_0}{\delta C}=0$), *absolute* ($\frac{\delta\Omega_0}{\delta C}<0$) and *weak* ($\frac{\delta\Omega_0}{\delta C}<1$) Happiness Inertia. The Easterlin Paradox arises as a limiting case, namely strict Happiness Inertia. In what follows we mostly focus on that; the other two inequality cases follow naturally.

So can the existence of external habit in itself explain the Happiness Inertia/Easterlin Paradox? To answer this, consider some comparative statics as consumption increases alongside some increase in the "bad", X.

3.1 Results For Habit-in-Difference Form

In the steady state re-write (1) as

$$\Omega_0^D = \Omega_0(\underset{+}{C}, \underset{-}{h_C}, \underset{-}{L}, \underset{sign(h_L)}{h_L}, \underset{-}{X}) = \frac{1}{1-\beta}\left[\frac{[(1-h_C)C]^{1-\sigma}}{1-\sigma} - \kappa_L\frac{[(1-h_L)L]^{1+\phi}}{1+\phi} - \kappa_X\frac{X^{1+\varphi}}{1+\varphi}\right] \tag{16}$$

Taking into account the consumption - leisure choice we can eliminate labor supply using (9) - (11), (12) and (13) to obtain

$$(1-\beta)\Omega_0^D(C,h_C,h_L,X) = \frac{[(1-h_C)C]^{1-\sigma}}{1-\sigma}\left[1+\frac{(\sigma-1)(1-\Phi)(1-h_L)}{(1+\phi)(1-h_C)}\right] - \kappa_X\frac{X^{1+\varphi}}{1+\varphi} \tag{17}$$

where $\Phi \equiv 1 - \left(1 - \frac{1}{\eta}\right)\left(1 - \frac{1}{\zeta}\right) \geq 0$ is a measure of market distortions where the combination $\eta = \zeta = \infty$ ($\Phi = 0$) nests the case of no distortions in product or labor markets. Interestingly, (16) shows that whilst habit in consumption decreases the *level* of welfare (ditto, the "bad" and labor supply) habit formation in labor supply can go either way depending on its sign. Thus not all sources of habit impact welfare equivalently. Or to paraphrase our discussion in the Introduction: burning the midnight oil alongside one's colleagues can be viewed both positively or negatively.

But, returning to the paradox, what can we say about welfare growth as consumption and the "bad" rise? Differentiating (17) with respect to time, implies for weak (i.e., $>$), strict ($=$) and absolute ($<$) inertia cases,

$$[(1 - h_C)C]^{1-\sigma}\left[1 + \alpha^D\right]\frac{1}{C}\frac{dC}{dt}\left\{\begin{array}{c} > \\ = \\ < \end{array}\right\}\kappa_X X^{\varphi}\frac{dX}{dt} \tag{18}$$

where $\alpha^D \equiv \frac{(\sigma-1)(1-\Phi)(1-h_L)}{(1+\phi)(1-h_C)}$. In the non balanced growth case, we see that basically all the parameters of the agent's decision environment (both forms of habit, risk aversion, labor supply elasticity etc.) matter for the presence of Happiness Inertia.

Equation (18) thus represents the general case; if $\sigma = 1$, our welfare function exhibits the particular instance of balanced growth. In that case, the first term on the right-hand side of (17) becomes $\log[(1 - h_C)C]$ and the condition for strict Happiness Inertia (i.e., $\frac{\delta \Omega_0^D}{\delta C} = 0$) implies,

$$\frac{1}{C}\frac{dC}{dt} = \kappa_X X^{\varphi}\frac{dX}{dt} = g_C\left(\underset{+}{\kappa_X}, \underset{+}{X}, \underset{+}{\varphi}\right) \tag{19}$$

Equation (19) highlights that even in a balanced growth path Happiness Inertia emerges. Under balanced-growth there is a welfare link between consumption and the "bad" since the (otherwise positive) effect of material improvements on welfare can be curbed by the latter's convexity. To illustrate (normalizing κ_X to unity for expositional convenience) if $\varphi \longrightarrow -1$, *strict* Happiness Inertia implies that consumption growth must match that in the "bad".[10]

Overall, two conclusions emerge from (18) and (19). First, with external habit in consumption of the difference variety the *short-term* growth of consumption, in the vicinity

[10] Of course, if the agent can somehow shield herself from these bads ($\kappa_X = 0$), such considerations evaporate. This may help explain the modern rise of "gated communities" and homogenous residential clusters (Dinzey-Flores (2006)).

of a given level $C = \bar{C}$ say, needed to sustain strict Happiness Inertia increases with h_C. Second, more importantly, note that external habit in difference form *plays no role* in explaining long-term (or steady-state) strict Happiness Inertia: only the existence of growth in the "bad" and its nature can do so.[11]

3.2 Results For Habit-in-Ratio Form

For the ratio form, the analogous forms of (17) to (19) are respectively,

$$(1-\beta)\Omega_0^R(\underset{+}{C}, \underset{-\text{ iff } \sigma>1}{h_C}, \underset{-}{X}, ..) = \frac{C^{(1-\sigma)(1-h_C)}}{1-\sigma}\left[1+\alpha^R\right] \; - \; \kappa_X \frac{X^{1+\varphi}}{1+\varphi} \tag{20}$$

$$(1-h_C)C^{(1-\sigma)(1-h_C)}\left[1+\alpha^R\right]\frac{1}{C}\frac{dC}{dt}\left\{\begin{array}{c}>\\=\\<\end{array}\right\}\kappa_X X^{\varphi}\frac{dX}{dt} \tag{21}$$

$$\frac{1}{C}\frac{dC}{dt} = \frac{\kappa_X}{1-h_C}X^{\varphi}\frac{dX}{dt} = g_C\left(\underset{+}{\kappa_X}, \underset{+}{X}, \underset{+}{\varphi}, \underset{+}{h_C}\right) \tag{22}$$

where $\alpha^R \equiv \frac{(\sigma-1)(1-\Phi)}{(1+\phi)}$.

Again the presence of the external bad decreases the *level* of welfare, although the impact of habit in consumption is dependent on the value of σ, whilst habit in labor supply now imparts no effect. But, notably, ((see (22)) habit in consumption now *increases* the growth of consumption required to match the long-term growth of the "bad" for strict Happiness Inertia to hold and therefore now has, alongside the "bad", a role in explaining the paradox. In fact, the higher is h_C the more society must engage in consumption growth to offset the bad (see (22)) although (looking at (20)) they risk lower welfare and lower happiness (as (20) shows). Thus consumption-rich societies may be welfare poor if they make strong interpersonal comparisons with ratio preferences.

Looking again at the non-balanced growth case, if $\sigma > 1$, we can compare the short-run bursts of consumption growth necessary to keep pace with the growth of the "bad" under strict Happiness Inertia, in the vicinity of a particular consumption level. For the latter, to compare the two utilities, we choose a level $\bar{C}$ at which (17) and (20) are equal for a

[11] Beath and FitzRoy (2007) construct a simple model with unemployment, habit and heterogeneous agents, but without the other distortions of our model, that is consistent with happiness-inertia.

given level of "bad" given by

$$\bar{C} = \left[(1-h_C)^{1-\sigma}\left[\frac{1+\alpha^D}{1+\alpha^R}\right]\right]^{\frac{1}{h_C(\sigma-1)}} \tag{23}$$

For the difference and ratio forms, denote by g_C^D and g_C^R respectively the short-run bursts of growth in the vicinity of $\bar{C}$ (given by (23)) consistent with strict Happiness Inertia, for a given X and $\frac{dX}{dt}$. Then from (18) and (21) we have that

$$g_C^R = \frac{1}{1-h_C} g_C^D \tag{24}$$

so $g_C^R > g_C^D$ for $h_C \in (0,1)$ and, as for the balanced growth case, the short-run growth of consumption needed to compensate for a given path of "bad" in a strict Happiness Inertia outcome is higher for the ratio form of habit. Thus from both a short-run *and* long-run perspective, external habit in ratio form helps to explain Happiness Inertia better than the difference form.

4 Conclusions

Empirical studies trying to validate the Easterlin Paradox are plentiful. This paper, however, has taken a quite different tack. We instead asked how could we modify the agent's decision framework to integrate and account for this paradox. We have done so in a simple, tractable manner. We show the parameterizations that lead to forms of the paradox in both balanced and non-balanced growth paths.

Our modelling of Happiness Inertia and the Easterlin Paradox suggests:

(a) If income growth does not increase happiness (or even if not in a commensurate manner), then standard analysis is open to the criticism of being a partial account of welfare. This, in turn, would underscore the need for policy makers to look beyond purely economic indicators to measure well-being, e.g., Kahneman and Stone (2004), Layard (2006). In recent years there has been much activity in generating well-founded internationally-comparable measures of social satisfaction and dissatisfaction (e.g., Diener (2000), Veenhoven (2008), Kahneman and Schwarz (1999)). Our framework provides a simple structure to analyze how such measures of satisfaction (for instance, their growth and convexity characteristics, possible links with

economic growth) can be meaningfully compared with that of traditional transaction in consumption and employment in the agent's welfare analysis.

(b) Habit formation has been widely recognized as a key channel in the happiness literature, and indeed is a mainstay of other literatures such as the equity-price puzzle. Yet, we have shown that its role is relatively complex in explaining Happiness Inertia. Its importance depends on what forms and types of habit are involved. Habit in consumption, for instance, tends to impact welfare levels negatively whilst labor habit can go either way. Under non-balanced growth, habit formation will matter just as many other facets of the agent's optimization environment matter. However, if Happiness Inertia is to be more than a transitory phenomenon, we must focus on the long run with a balanced growth path (the $\sigma = 1$ case). It turns out that only if habit preferences are specified in ratio form does it play a role in the balanced growth path. Thus, the *form of* Habit formation (rather than habit *per se*) is a key determinant of whether welfare functions reproduce Happiness Inertia. In our context, only when habit is modelled in ratio form, does this possibility open up.

(c) If economic growth brings unintended side-effects (e.g., congestion, crime) or such "bad"s arise naturally from human interaction, then simply to maintain welfare over time (as Easterlin surmised) requires increasing degrees of consumption compensation. If society is habit-rich in consumption (with ratio preferences) then that compensatory consumption will be higher than in its absence (or with difference preferences). Thus, societies may end up being consumption and habit rich, but welfare poor.

(d) Overall, the degree to which a society is afflicted by some degree of Happiness Inertia depends on κ_X (the "bad" preference weight); the *form* of habit formation (difference or ratio); the degree of convexity in the "bad", φ; and the growth in the "bad" (or affluenza) term. The nature of risk aversion, σ, determines the dynamics outside the balanced-growth path.

Our conclusions contribute to bridging the gap between theoretical models and social policy, between standard economic analysis and psychology literatures. Accordingly, a number of interesting directions for future research are suggested by this study. It would be useful to empirically discriminate between different types of habit formations and their strength to better understand habit's contribution to the paradox.

Further, given, e.g., Layard (2006)'s well-known advocacy of "corrective taxation"to curtail the possibly negative consequences of hedonic adaption, knowledge of the various channels underlying Happiness Inertia (i.e., as in point (d)) might usefully inform welfare-maximizing fiscal policy.

References

Arrow, K. J. and Dasgupta, P. (2007). Conspicuous consumption, inconspicuous leisure. Presented at the James Meade Centenary meeting, July 12-13, 2007, Bank of England.

Beath, J. and FitzRoy, F. (2007). Status, happiness and relative income. University of St. Andrews, DP no. 0604.

Blanchflower, D. G. and Oswald, A. J. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics*, 88:1359–1386.

Clark, A., Frijters, P., and Shields, M. (2008). Relative income, happiness and utility: An explanation for the easterlin paradox and other puzzles. *Journal of Economic Literature*, 46(1):95–144.

De Graaf, J., Wann, D., and Naylor, T. (2001). *Affluenza : The All-Consuming Epidemic*. Berrett-Koehler Publishers.

Di Tella, R., MacCulloch, R., and Oswald, A. J. (2003). The macroeconomics of happiness. *Review of Economics and Statistics*, 85(4):793–809.

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist*, 55(1):34–43.

Dinzey-Flores, Z. (2006). Public gated communities: the social impact of gates in private versus public housing. Presented at the American Sociological Association, August.

Easterlin, R. A. (1974). Does Economic Growth Improve the Human Lot? Some Evidence. In David, P. A. and Reder, M. W., editors, *Nations and Households in Economic Growth: Essays in Honor of Moses Abramowitz*. New York Academic Press.

Easterlin, R. A. (2003). Explaining Happiness. *Proceedings of the National Academy of Sciences of the United States*, 100(19):11176–11183.

Frey, B. S. (2008). *Happiness: A Revolution in Economics*. MIT Press.

Irwin, F. W. (1944). The realism of expectations. *Psychological Review*, 51:120–126.

James, O. (2008). *Affluenza*. Vermillion Press.

Kahneman, D., D. E. and Schwarz, N. (1999). *Well-being: The foundations of hedonic psychology*. New York: Russell Sage Foundation.

Kahneman, D. Krueger A.B. Schkade D. Schwarz, N. and Stone, A. (2004). A survey method for characterizing daily life experience: The day reconstruction method. *Science*, 306:1776–1780.

Layard, R. (2006). Happiness and public policy: a challenge to the profession. *Economic Journal*, 116(510):C24–C33.

Oates, W. E. (1971). *Confessions of a Workaholic: The Facts about Work Addiction*. World, New York.

Tsoukis, C. (2007). Keeping up with the joneses, growth and distribution. *Scottish Journal of Political Economy*, 54(4):575–600.

Veblen, T. B. (1899). *The Theory of the Leisure Class: An Economic Study of Institutions*. New York: Macmillan.

Veenhoven, R. (2008). World database of happiness. World Database of Happiness, Erasmus University Rotterdam. Available at: http://worlddatabaseofhappiness.eur.nl.