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Does Happiness Adapt to Increase in Income? Evidence from Pakistan Socio-economic Survey (1998-2001)

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The fact that happiness does not increase as income increases over time [the Easterlin Paradox (1974)] has puzzled a number of scholars for a number of decades. The latest research on this topic [Easterlin, *et al.* (2010)] concludes that happiness increases with an increment in income in the short term but it adapts to this income increment in the long term.

The objective of this research is to test whether happiness adapts to income increase in the short term using two-period panel Pakistan Socio-Economic Survey [PSES (1998-2001)]. The paper makes use of a unique question on happiness asked in PSES to resolve two issues simultaneously: unavailability of happiness question in period 1 and potential inconsistency of responses to general happiness question.

The paper applies Random Effect Ordered Probit model to investigate the hedonic adaptation effect using various formulations used in the happiness economics literature.

The results show positive and statistically significant impact of income change on happiness with weak evidence of adaptation to income since it is statistically insignificant. The result is consistent with the studies that show no adaptation during a short period. Among several reasons for hedonic adaptation, falling positive emotions and rising aspirations are discussed along with causes of happiness and policy implications.

The significance of the present research lies in the fact that it is the first study in Pakistan that tests the hedonic adaptation to income and hence contributes to the evidence on happiness dynamics.

JEL Classification: I31, D60, C25
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I. INTRODUCTION

The evidence of rising income with no corresponding increase in happiness [the Easterlin Paradox (1974)] has led to extensive research on happiness. One of the explanations to the Easterlin Paradox is that people adapt their happiness to income over time and this explanation is termed as hedonic adaptation or hedonic treadmill in the literature [Brickman and Campbell (1971)]. It describes how people tend to adapt to good or bad events and then return to the same baseline level of happiness [Bottan and Truglia (2011)].

This paper empirically analyses adaptation of happiness to income, an issue that has not been conclusively settled. However, evidence from long panel surveys like BHPS (British Household Panel Survey) and GSOEP (German Socio-Economic Panel), is in favour of (incomplete) adaptation of happiness to income [Clark, *et al.* (2006); Di Tella,

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et al. (2010)] but no efforts have been made to analyse happiness adaptation to income in case of Pakistan, and in developing countries in general (there are no case studies for developing countries due to limited data availability on happiness. However, there are cross-country studies, for example, Easterlin, *et al.* (2010) and Frey and Stutzer (2002)]. The present paper analyses this issue by creating a short panel data on happiness using a proxy variable for the first period in the two-period Pakistan Socio-Economic Survey (PSES) panel due to the unavailability of data on happiness in the first period. Hence, the present work would provide one of the first studies of this issue for a developing country.

There are many studies that provide evidence of hedonic adaptation to specific life domains such as adaptation to income [Di Tella, *et al.* (2010)] and to life events such as marriage, divorce, and unemployment [Clark, *et al.* (2006)]. The details of earlier studies related to specific life domains are given in Frederick and Loewenstein (1999). There are, however, some studies that show existence of general hedonic adaptation, in contrast to specific adaptation cited above.

Bottan and Truglia (2011) argue that there may be general adaptation to happiness regardless of the domain: 'having experienced moments of happiness (unhappiness) today may make people more prone to feelings of unhappiness (happiness) in the future, regardless of the source of the original increase (decrease) in well-being'. They provide indicators of effect of specific and general adaptation from econometrics' perspective: the former is captured by the lagged coefficient on, for example, income while the latter is shown by the lagged coefficient on happiness. They derive interesting conclusion from this study: the adaptation effect of increased income is twofold—one is the specific effect of increase in income that leads to high income aspirations in the future and hence a fall in happiness in the future, and the other is the general effect of increase in income that leads to increased happiness in the present but make people prone to unhappiness in the future.

Diener, *et al.* (2006) propose five revisions in the original treadmill model. These revisions are, to wit: non-neutral set points,[1] individual set points, multiple set points, and individual differences in adaptation. These revisions allow us to explain incomplete or non-adaptation in the data. The following section presents a variety of formulations discussed in the literature that allow for hedonic adaptation to income.[2]

The paper proceeds as follows: Section II discusses various formulations of hedonic adaptation models. Section III estimates the model and delineates estimation results. The final section summarises the results and concludes the paper with policy implications and recommendations.

II. THE MODEL

Many formulations are proposed in the literature to study hedonic adaptation. Based on empirical findings, Layard (2006) proposes the following happiness function with a negative effect of the lagged income to allow for adaptation:

[1]The set point is a term in psychology for a genetically determined hedonic or happiness point to which a person converges after a positive or negative shock.

[2]A distinction is made between hedonic and eudemonic approaches to happiness in psychology. The former relates to pleasure as a stand alone concept where as the latter not only considers happiness but also the sources and processes that lead to happiness.

$$U_{it} = U\,(y_{it} - \beta y_{it-1},\, h) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where U_{it} is the happiness of the ith individual at time t, y_{it} is the real household income of the ith individual at time t, y_{it-1} is one period lag of real household income of the ith individual at time $t-1$, and h is number of hours of work.

Another formulation considered in Layard (2006) is to allow for loss-aversion:[3]

$$U_{it} = U[(1-\beta)y_{it} + \beta\Delta y_{it},\, h] \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Based on Layard's explanation, loss-aversion can be defined as:

$$\Delta U_{it}|\Delta y_{it} < 0 >> \Delta U_{it} \mid \Delta y_{it} > 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

That is, the effect of a unit change in income on happiness is greater when income falls than when income rises. The asymmetry of happiness response to changes in income is an important finding attributed to Kahneman and his colleagues [Kahneman and Tversky (1979)], and has many important policy implications.

Somewhat similar to model in (1), Clark, *et al.* (2006) considers the following formulation with current real income and change in real income:[4]

$$U_{it} = \beta_1 \ln(y_{it}) + \beta_2 \ln (y_{it} \mid y_{it-1}) + \gamma Z_{it} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

where Z indicates demographic variables (gender, age, education, and urban or rural region). These demographic variables are included in order to control the effect of income (y) on happiness (U) since all these variables are assumed to affect happiness directly.

Ferrer-i-Carbonell and Van Praag (2008) consider many modifications of the following general specification:[5]

$$U_{it} - U_{it-1} = \beta(y_{it} - y_{it-1}) + \delta Z_{it} + \gamma(Z_{it} - Z_{it-1}) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

To allow for loss-aversion, for instance, they consider the following specification:

$$U_{it} - U_{it-1} = \beta_1 \Delta y_{it}^{+} + \beta_2 \delta Z_{it} + \gamma(Z_{it} - Z_{it-1}) \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

Where

$$\Delta y_{it} \text{ for } \Delta U_{it} \mid \Delta y_{it} > 0 \text{ and } \Delta y_{it}^{-} \text{ for } \Delta U_{it} \mid \Delta y_{it} > 0 \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

Bottan and Truglia (2011) test whether happiness is autoregressive and use models similar to the following formulation:

$$U_{it} = \alpha U_{it-1} + \beta_1 \ln y_{it} + \beta_2 \ln y_{it-1} + \gamma_1 Z_{it} + \gamma_2 Z_{it-1} \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

Where a negative (positive) coefficient on lagged happiness variable would show that happiness is adaptive (inertial). This model captures both general and specific effects of

[3]The asymmetry of income comparison by higher income group and lower income group is termed as loss aversion by Kahneman and Tversky (1979) in their prospect theory.

[4]This is not the exact specification used in Clark, *et al.* (2006). I have modified it to suit for a two-period panel.

[5]The original specification given in Ferrer-i-Carbonell and Van Praag (2008) is for more than two time periods.

happiness adaptation by lagged values on happiness and income respectively. The next section describes data, sampling, method used to estimate hedonic adaption to income using various formulations discussed above, and discusses results.

III. THE METHODOLOGY AND RESULTS

Data

To study happiness adaptation to income, we need individual-level panel data. In Pakistan, there are three such panel datasets available: IFPRI (International Food Policy Research Institute) from 1986 to 1991 (biannual visits in 5 years), PSES (Pakistan Socio-Economic Survey), 1998-99 and 2001, and PPHS (Pakistan Panel Household Survey), 2001, 2004, and 2010.[6] Except PSES, none of the other two datasets have happiness questions in their questionnaire.[7] Therefore, we resort to PSES to explore this issue. We use PSES dataset at individual level.[8] PSES surveys all urban and rural areas of the four provinces of Pakistan (Punjab, Sindh, Balochistan, and NWFP)[9] defined as such by the 1981 population census excluding FATA (Federally Administered Tribal Areas), military restricted areas, districts of Kohistan, Chitral, Malakand, and protected areas of KPK. The population of the excluded areas constitutes about 4 percent of the total population.

Sampling

A two stage stratified sample design is adopted for the 1998-99 PSES. Enumeration blocks in urban areas and Mouzas/Dehs/villages in rural areas are taken as primary sampling units (PSUs). Households within the sampled PSUs are taken as secondary sampling units (SSUs). Within a PSU, a sample of 8 households from urban areas and 12 households from rural areas is selected. Households covered during round I of the PSES are revisited during round II in 2000-01. After some adjustment due to attrition, the total sample for round II of the PSES turns out to be 4021 households (2577 rural and 1444 urban).

The dataset comprises of 6749 individuals who directly responded to the subjective questionnaire (21 questions), after list-wise (subject-wise) deletion of the missing values. Since the number of missing values is very low (around 2 percent) and their pattern is random (i.e., missing at random), deleting them in this way will not cause any statistical problems such as bias.

Estimation

The PSES at individual level is used to estimate the models similar to various formulations given above for two period panel data from the PSES phase 1 (1998) and phase 2 (2001). The objective is to test for specific and general adaptation effects as given in Bottan

[6]PPHS rounds 2001 and 2004 contain only rural samples and hence these datasets are called PRHS (Pakistan Rural Household Survey). For detail of PPHS, see Nayab and Arif (2012).

[7]PPHS (2010) contains a section on subjective welfare but it only asks about relative economic position.

[8]The PSES (2001) is based on round II of the PSES. The sample design for round II is based on the sample design of round I conducted in 1998. Details of the sample design are given in Arif, *et al.* (2001) and Siddiqui and Hamid (2003).

[9] NWFP is now known as Khyber Pakhtunkhwa (KPK).

and Truglia (2008). The life happiness question[10] is not available in phase 1. However, there is a question in phase 2 asking about happiness relative to the past.[11] That question is used to make a surrogate for life happiness question in phase 1. This question also provides a great advantage in interpreting happiness over time. Generally, the question on happiness asks how satisfied or happy are you with your life overall, in general, or all things considered. People answer this question using different reference points like comparing with last year's happiness, with neighbours', or with their contra-factual situation—how happy they could be if they had done things differently [Bottan and Truglia (2011)]. To estimate general hedonic adaptation, we need lagged values on happiness variable. However, if this variable is constructed by the responses to a general happiness question given above then it may have different interpretations according to different reference points. The best solution to obtain lagged values consistent over time is to construct it from the responses to the question comparing present happiness with past happiness. A number of studies based on panel data may have inconsistency issue in their happiness variable since most of the long panel datasets like British Household Panel Survey, German Socio-Economic Panel Study, and Swiss Household Panel ask the general happiness question.

The estimation is run using the sample common in both phases at individual level. Since the happiness question has only three categories (1. Very happy 2. Happy 3. Not so happy), it is considered ordinal and an ordered probit panel model is used for estimation. This is the most suitable estimation technique when we have ordered dependent variable with panel data. The unobservable individual traits are considered random and assumed to be uncorrelated with included variables in the model. These assumptions are plausible since there is very high heterogeneity in individuals' responses, and hence a random effects model is preferred to the fixed effects model. The theoretical formulation (Crouchley's formulation) of ordered choice models with random effects for panel data are given below [Greene and Hensher (2008)]:

$$U_{it}^{*} - \beta' y_{it} + u_i + \varepsilon_{it}$$
$$U_{it} = j \quad \text{if} \quad \mu_{j-1} \leq U_{it}^{*} < \mu_j$$

U_{it}^{*} is a an unobserved (latent) variable,
U_{it} is a manifested variable equal to the jth category,
y_{it} is a vector of explanatory variables,
$\varepsilon_{it} \sim N(0, 1)$, stochastic error term,
$u_{it} \sim N(0, \sigma^2)$, random effect term independent of ε_{it} for all t, and
$\mu's$ are cut-off points for each category.

The parameters β's and the cut-off points are estimated using maximum likelihood.

Results

[10] "On the whole, how happy are you with the kind of things you have been doing in recent years?".
[11] "Compared with the past, do you feel your life is: 1. Very happy 2. Happy 3. Not so happy".

Table 1 summarises the results of the random effects ordered probit models.[12] The coefficient on lag nominal income (LAGLNNY) is negative (–0.0163) but statistically insignificant in model 1. Economic criterion suggests that there is an evidence of adaptation to income (after initial impact of income, 27.5 percent is lost over the year (that is, 0.0163/0.0592)) but statistical criterion does not endorse that conclusion. Hence current happiness depends only on current income and is not affected by the previous level of income.

Table 1

Random Effects Ordered Probit Models

(Key: LAG = Lagged Value, LN = Natural Log, N = Nominal, Y = Income, D = First Difference, R = Real, HAPP = Happiness, (…) = Dependent Variable)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	(HAPP)	(HAPP)	(HAPP)	(HAPP)	(HAPP)	(DHAPP)	(HAPP)	(HAPP)
Constant	**–0.2462**	0.2157	0.0053	0.2157	**0.0053**			
Gender	–0.0533	–0.0553	–0.0539	–0.0553	–0.054			
Age	**0.0013**	**0.0013**	**0.0013**	**0.0013**	**0.0013**			
Education	0.0040*	0.0047	0.0042*	0.0047	0.0042*			
Urban	**0.0501**	0.0670	0.0548*	0.0699	0.0548*			
LNNY	0.0592							
LAGLNNY	**–0.0163**							
DLNNY		0.0378						
LNRY			0.0542		**0.0327**		0.0513	
LAGLNRY			**–0.0215**				**–0.0248**	
DLNRY				0.0378	**0.0215**	0.0646		0.0401
LAGHAPP							0.0969	0.1984
Correct Prediction (%)	39.96	39	39.5	39.3	39.5	10	36.3	35.6
Adaptation Effect	No	No	No	NO	NO	NO	INERTIA	INERTIA

Note: Coefficients highlighted in bold are insignificant, those marked by a *significant at 10 percent, and all other significant at 5 percent.

The coefficient for first-order difference of nominal household income (DLNNY) is positive and significant in model 2. This indicates a positive effect of income changes on happiness. It may indicate adaptation to income if we restrict coefficients of current and lagged incomes to be the same.

Model 3 and model 4 show similar results to the above models but with real income (LAGLNRY and LNRY). After initial impact of income, 40 percent is lost over the year (that is, 0.0215/0.0542) in model 3 but the coefficient on lagged value is statistically insignificant. Whereas model 4 has same effect on happiness like nominal income in model 2.

The coefficients for current income (LNRY) and first-order difference income (DLNRY) are positive but insignificant in model 5. Moreover, the log likelihood is flat at the estimates which indicates wide confidence intervals.

[12]All estimations are done by NLOGIT 4.0 (LIMDEP 9.0) econometric software developed by William Greene.

The dependent variable is change in happiness (DHAPP) in model 6 and the coefficient of first-order difference real income (DLNRY) is positive and significant but log likelihood is flat at current estimates. This shows that change in income has a positive effect on change in happiness.

The coefficient for current income (LNRY) is positive and significant, the coefficient of lagged income (LAGLNRY) is negative but insignificant, and the coefficient on lagged happiness (LAGHAPP) is positive and significant but the log likelihood is flat at current estimates in model 7. The positive coefficient on lagged happiness would indicate inertia in happiness. Since the time periods are two years apart and it might be the case that the gap is too long so that happiness dissipates over this interval to its previous level and hence shows adaptation. If that is the case it would indicate an adaptation effect. The other extreme case is also possible—the gap is too short—and the happiness would take time to adjust to its previous level after the passage of a long time, and hence would depict inertia.

The coefficient on differenced real income (DLNRY) is positive and significant, and the coefficient on lagged happiness (LAGHAPP) is positive and significant in model 8. It has the same interpretation as model 7.

A comparison of the eight models, estimated above, is made on the basis of percentage of correct predictions. All models show correct predictions in the range of 35 percent to 40 percent except model 6 with only 10 percent correct predictions. These models may provide a weak evidence for hedonic adaptation to income, although inconsistent with the findings on long panels like German Socio-Economic Panel (GSOEP) and British Household Panel Survey (BHPS), is yet consistent with most of the findings in the literature [see, Clark, *et al.* (2006) for a review of this evidence].

IV. SUMMARY, CONCLUSIONS, AND POLICY IMPLICATIONS

The study tests the existence of hedonic adaption to income using PSES two panel datasets for 1998-99 and 2001. Adaptation implies that the marginal utility of income is diminishing over time particularly over a long period of time as shown in many empirical studies using long panel datasets. But this is not true in the short time period as evident from the present study and earlier studies [for example, Bottan and Truglia (2011)]. Easterlin, *et al.* (2010) attempts to resolve this paradox. The study finds that happiness and income are directly related in the short term but they are not related in the long term (for a period of more than 10 years). Since present study uses a very short panel, it confirms Easterlin, *et al.* (2010) findings. However, the findings in the present study should be taken with caution since the panel is relatively short and the happiness in phase 1 is measured with a surrogate. The evidence of inertia in some models remains inconclusive unless supported by evidence from a longer panel.

There are many explanations possible for adaptation (non-adaptation) to income increase. According to the hedonic adaptation prevention model [Lyubomirsky (2011)], a(n) decrease (increase) in positive changes and events followed by positive emotions like gratitude, inspiration, and appreciation, and high (low) aspirations lead to adaptation (non-adaptation). Not pursuing (pursuing) intrinsic and self-determined goals also reduces (enhances) happiness. Layard (2005) identifies seven causes of happiness: family relationships, financial situation, work, community and friends, health, personal

freedom, and personal values. Though these factors causes happiness to increase but to maintain this increasing trend, we need to slowdown the process of adaptation by using positive emotions and positive changes.

Extravagant current consumption can reduce future happiness. Tax instrument can be used to discourage too much current consumption so that people save more and maintain their same level of happiness in the future.

Increase in real wages will also affect happiness. Along with minimum regular pay, performance-related pay should be introduced and be rewarded rapidly, generously, and frequently to motivate and enhance positive emotion. We can invoke Kahneman's findings on loss aversion to derive implications for prompt reward and delayed reward. The same amount of reward can have different effects on happiness because of difference in time. Similarly and obviously, small and large rewards have very different effects on motivation. Frequent rewards combined with surprise can be very effective to enhance positive emotions. Oswald, *et al.* (2014) shows that happiness increases productivity and performance at workplace, and hence firm's promotion policies have positive effect on employees' performance. The study finds that happier individuals have approximately 12 percent greater productivity.

Welfare policies should be designed in such a way to maintain work-life balance so that people have enough time for family, friends, and community so that their emotional well-being can be enhanced.

At macro level, steps should be taken to minimise unemployment and to stabilise inflation since unemployment reduces nominal income, on average, whereas inflation diminishes real income. There is strong evidence that both have negative impact on happiness as confirmed by many studies [see, for example, Gandelman and Murillo (2009); Di Tella and MacCulloch (2001, 2006, 2008); Frey and Stutzer (2002); Di Tella, MacCulloch, and Oswald (2001, 2003); Wolfers (2001); Oswald (1997); Clark and Oswald (1994)].

The present study is limited to happiness-income relationship with some demographic variables as controls since the focus of study is on adaptation. However, other variables can be included that serve as proxies for time spent with family and friends, and in community.

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