Did the Easterlin Paradox apply in South-Korea 1980-2015? A case study

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Abstract

In 1974 Richard Easterlin presented data showing that there is no relationship between economic growth and average happiness in the USA, yet a higher personal income did go with greater individual happiness in that nation. This phenomenon came to be known as the 'Easterlin Paradox'. Easterlin explains this pattern using the relative income theory, which holds that the positive effect of income increase is offset by: (a) adaptation to income change and (b) comparison to the income of compatriots. There is discussion as to whether this pattern is universal and, in this context, Easterlin (Easterlin et al. 2010) claims that the enormous economic growth in South-Korea over the last decade has not lead to an increase in average happiness. In this paper we report an empirical check of this claim, using another dataset from South-Korea. We also check whether the relative income theory applies in this case. Contrary to Easterlin's claim, we found that South-Koreans became happier and that the relative happiness theory did not apply in this case. It appears there is more in the relationship between economic growth and average happiness than Easterlin thought in 1974.

1 Introduction'

The Easterlin Paradox

In 1974 Easterlin presented data on the USA, showing that average happiness had not increased between 1946 and 1970, in spite of tremendous economic growth over these years, and that personal income was related to personal happiness in the USA, rich Americans being happier than their poorer compatriots. Happiness and income are thus positively related on the micro

[1] Based on master thesis ''Easterlin Paradox or Easterlin Illusion? Some empirical tests''(Slag 2017)

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level, but not on the macro level. Since economic growth translates to higher incomes, this finding seemed contradictory and came to be known as the ‘’Easterlin Paradox’’. Easterlin explained this phenomenon assuming two cognitive mechanisms; ‘adaptation’ and ‘social comparison’, both of which will nullify the effect of income gains. Adaptation neutralizes the effect of extra income when aspirations rise at the same rate and social comparison keeps happiness at the same level; “a riding economic tide lifts all boats” and any difference with references groups (the Jones’s) remains the same. Together these notions are known as ‘relative income theory’.

Later research

Easterlin’s counter-intuitive finding has been the cause of considerable research on the effect of economic growth on happiness in nations, later studies being able to draw on a growing body of data, both for more countries and for longer time-series. The results of these later studies are mixed.

At the *macro-level*, several investigators have found a small positive effect of economic growth on average happiness in nations, e.g. Hagerty (2000), Hagerty & Veenhoven (2003); Stevenson & Wolfers (2008), Diener et al. (2013) and Veenhoven & Vergunst (2014). Easterlin disputes these findings (Easterlin, 2005, 2010, 2016) and still maintains that economic growth has not made us any happier.

Rather than just checking whether or not the Easterlin paradox is true, several investigators have looked for the conditions in which it applies or not. At the *macro level* of nations, Oishi & Kesebir (2015) found that economic growth has increased average happiness only when economic growth is equally divided across the nation’s population. Likewise, Diener et al (2013) found that the effect of economic growth is more robust when measured using average income, than with GDP per capita.

Many later studies at the *micro level* within nations have confirmed that people who earn a relatively high income tend to be happier than their less well earning fellow citizens. Follow-up studies have shown that income increases result in a positive change in an individual’s happiness (Senik, 2004; Frijters et al., 2004; Ferrer-i-Carbonell, 2005; D’Ambrosio & Frick, 2012; Vendrik, 2013). See Slag & Veenhoven (2018) for a recent review of the available follow-up studies on this topic.

Micro-level studies on the effect of adaptation and social comparison on an individual’s happiness have found both positive and negative coefficients. According to the relative income theory of Easterlin (1974) these effects should be consistently negative to cancel out the

positive effect of income on happiness, but the data suggest that comparison can also boost happiness. This indicates that Easterlin's theory does not hold under all circumstances (Slag & Veenhoven 2018).

Need for contextual focus

So far, the data suggest the economic growth does not always work out on happiness in the same way; the Easterlin Paradox may apply in many cases, but it is not an 'iron law'. Context dependency is more plausible. Economic growth is likely to involve various effects on happiness and the balance of these effects is likely to vary across situations. If we must choose whether to foster economic growth for the sake of human wellbeing, we must know in which conditions economic growth has affected happiness most and least.

In this perspective, Easterlin's study shows that economic growth has not added to happiness in the USA since the end of World War II (Easterlin 1974; 1995). Later studies in Europe have shown that economic growth has added a little to average happiness in most European nations (Hagerty & Veenhoven, 2003; Stevenson & Wolfers, 2008). As yet we are not well informed about the effect of economic growth on happiness in the East-Asian 'Tiger economies', only the case of Japan has been studied by Stevenson and Wolfers (2008) who found a positive effect of income increases on average happiness in Japan.

In this paper, we considered the case of South-Korea for which good data is available (cf. section 2.1). Having looked at the *macro-level* effect of economic growth on average happiness, we then tested whether or not the relative income theory of Easterlin applied at the *micro-level*.

The case of South-Korea

South-Korea is especially interesting, because this country is one of the fastest growing economies of this time with an average yearly growth of 7.3% since 1967. Since it is likely that the effect of economic growth on average happiness is small, this effect will be better visible when there is large variation in GDP. Furthermore, median and average income in South-Korea show more or less similar growth between 2006 and 2014, which indicates that economic growth in this country was equally divided in this era.

This paper is organised as follows: the data are described in Section 2, the analysis is discussed in Section 3, the results are presented in Section 4 and conclusions in Section 5.

2 Data

We used longitudinal data, both at the *macro level* of the nation South-Korea and at the *micro level* of individual citizens. At the macro level we used trends in average happiness and average income and at the micro level we used changes in individual happiness and individual income.

2.1 Happiness

The time-series data on *average* happiness in South-Korea 1980-2010 that we used were taken from separate studies among representative samples of the general population. The follow-up data on *individual* happiness were taken from the Korean Income & Labour Panel Study (KLIPS), which gave us data from six yearly interviews from 2009 to 2014 inclusive.

Time-series on average happiness in Korea

The data on average happiness in South-Korea over the years were taken from the World Database of Happiness, which gathers findings on happiness in nations observed in different survey programs such as the World Values Survey, the Gallup World Poll. The following time series of average happiness were used.

The World Values Survey (WVS), where respondents are asked questions on their subjective appreciation of life. The first question used was: *‘’Taken all things together, would you say you are: very happy, quite happy, not very happy or not at all happy’’*. For further analysis, these answers are coded from 4 to 1. The second question used was: *‘’All things considered, how satisfied are you with your life as-a-whole now*?’’ with answers possible between 10 (satisfied) to 1 (dissatisfied). Data taken from the WVS covered the years 1981, 1990, 1996, 2001, 2005 and 2012.

The Gallup World Poll (GWP), which includes the question ‘’Suppose the top of the ladder represents the best possible life for you and the bottom of the ladder the worst possible life. *Where on this ladder do you feel you personally stand at the present time*?’’ with answers ranging from 10 to 0. The data taken from the Gallup World Poll covered the period of 2006 to 2015 and thus spanned one decade.

Two additional questions on happiness have been used in surveys in Korea: *‘’All things considered, how satisfied or dissatisfied are you with your life as-a-whole these days*?’’ with answers ranging from 10 (very satisfied) to 0 (not satisfied). This question figured in surveys in 1980 and 2007. The second question is: *‘’Tell me how much you are satisfied or dissatisfied*

with your life as a whole?'' with answers ranging from 1 (very dissatisfied) to 7 (very satisfied). This question was used in 1981 and 2001. These questions figured in different surveys and their results are gathered in the World Database of Happiness (WDH), distributional findings on happiness in the general public in South-Korea, questions type 122C and 122G.

Table 1

Overview of survey questions on happiness, used in South-Korea 1981-2015

Question	Years[5]
''Taken all things together, would you say you are: very happy, quite happy, not very happy or not at all happy?'' (WVS)	1990; 1996, 2001; 2005; 2012
'All things considered, how satisfied are you with your life as-a-whole now? (WVS)	1982, 1990; 2001; 2005; 2012
'Suppose the top of the ladder represents the best possible life for you and the bottom of the ladder the worst possible life. *Where on this ladder do you feel you personally stand at the present time*? (GWP)	2006; 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015
'All things considered, how satisfied or dissatisfied are you with your life as-a-whole these days? (WDH)	1980; 2001; 2007
'Tell me how much you are satisfied or dissatisfied with your life as a whole? (WDH)	1981; 2001

Follow-up data on individual happiness and income in Korea

For the micro level data, the data was taken from the Korean Labour and Income Panel Study (KLIPS), the data from 2009 (wave 12) up to 2014 (wave 17) were used, since the earlier waves only surveyed urban households and are therefore not representative of the general population of South-Korean. This gave a total of 79474 observations over a time span of 6 years. In KLIPS the question relating life satisfaction is: *''Overall, how satisfied or dissatisfied are you with your life?''* with answers ranging from very satisfied to very dissatisfied on a scale of 5. Most studies used an ascending order for increased satisfaction, so the answer possibilities were reversed with very satisfied (5) and very dissatisfied (1). The total number of

[5] Links lead to detail on these studies in the World Database of Happiness (Veenhoven, 2016)

observations was 79474. A descriptive account of the variables used is presented in table A of the appendix

2.2 Income

The macro level data on about GDP per capita in Korea over the years was taken from the OECD Database, and the micro-level data about changes in personal income were taken from the above mentioned Korean Labour and Income Panel Study KLIPS.

3 Methodology

The question whether economic growth has caused average happiness to raise in South-Korea was answered using a *macro-level* trend analysis. The question as to whether comparisons with the income of compatriots have neutralized the effects of income growth on happiness is answered in a *micro-level* change analysis.

3.1 Macro level analysis

We started with a simple bi-variate presentation of the trends in economic growth and happiness in South-Korea. Then, we did a more sophisticated multi-variate analysis. In line with Stevenson & Wolfers (2008), we estimated the relationship between the average happiness and the natural logarithm of GDP per capita. This gave the following functional form:

$$Happiness_t = \alpha + \beta \ln GDP_t + \varepsilon_t \qquad (1)$$

where *Happiness* is the average happiness score in year *t*; lnGDP_t is the natural logarithm of the real GDP per capita in year *t* and εt is the random error term; this error term captures the influence of other variables than real GDP per capita on happiness.

Since the number of observations for all measures of happiness was rather low, outliers may have a strong influence on the results. Therefore, an additional analysis was performed to cover this issue. As mentioned in section 2.1, there is data on five measures of happiness in South-Korea that cover a relatively long-time period. Four of these measures have at least 20 years between the first and last observation, while the Gallup World Poll has a decade between the first and last observation.

In line with Stevenson & Wolfers (2008) we tested the Easterlin Paradox using a long-

difference approach. According to Easterlin, in the long term there should be no systematic difference in the average happiness in a country due to a difference in real GDP per capita. Regressing real GDP per capita on the first and last result of the different happiness measures enabled us to test this for South-Korea. All the measures we used had different beginning and end years covering changes in the business cycle. Since all the measures were obtained using different questions to measure happiness with different scales of answer possibilities, we first standardized the answers to make them comparable.

Standardization of responses to answer scales of different lengths is accepted, but only if the mean and standard deviation of the original data is also available. This is common practise when changing the length of Likert scales (Colman et al., 1997). As noted, different wordings were used for all the surveys, however it was determined that for this study all measures of happiness and life satisfaction fell within the definition of happiness used by Veenhoven, (1984). Standardization is not an optimal procedure, but this approach was preferred for comparability of measures and to take advantage of the different data available.

Using the standardized scores, we took the first and last observations, and regress them against the log real GDP per capita in South-Korea. This additional test this gave the following functional form:

$$Happiness_{i,t} = \alpha + \beta \ln GDP_t + \varepsilon_t \qquad (2)$$

where $Happiness_{i,t}$ is the standardized happiness scores of measure *i* in year *t*; $\ln GDP_t$ is the natural logarithm of real GDP per capita in year *t* and εt is the random error term.

3.2 Micro-level analysis

At the micro level household income was regressed on happiness using the following formula:

$$Happiness_{i,t} = \alpha + \beta \ln Y_{i,t} + \gamma X_{i,t} + d_t + \varepsilon_t \qquad (3)$$

where $Happiness_{i,t}$ is an individual's happiness score in year *t*, $Y_{i,t}$ is an individual's household income in year *t*, $X_{i,t}$ is a set of control variables, d_t is a year specific dummy and εt is the error term.

Ferrer-i-Carbonell & Frijters (2004) show that fixed effects models are to be preferred, since they control for time invariant unobserved factors, such as personality traits. Since these factors have a large influence on an individual's happiness, it is important to control for this. This yields the following equation:

$$Happiness_{i,t} = \alpha + \beta \ln Y_{i,t} + \gamma X_{i,t} + d_t + v_i + w_{i,t} \quad (4)$$

where $Happiness_{i,t}$ is an individual's happiness score in year t, $Y_{i,t}$ is an individual's household income in year t, $X_{i,t}$ is a set of control variables, d_t is a year specific dummy, v_i is the person time-invariant fixed effect error term and $w_{i,t}$ is the time-variant error term.

Two variables were added to equation 4 to test for the effect of adaptation and social comparison. One, the lagged value of an individual's household income was included to test for adaptation, since individuals adapt to changes in income and thus the effect of changes in income on happiness decrease over the years. Lagged household income controls for previous income and thus for changes in household income. Two, the mean average income of an individual's reference group was added.

Many studies use income average income within a nation as their reference, but Goerke and Pannenberg (2015) have shown average income is not used as a reference in social comparison. Instead, direct colleges and friends form the most used social comparison group. Unfortunately, the available South Korean data do not inform us about the income of friends and colleagues. Therefore, we considered people with the same characteristics as the reference group, since friends and direct colleagues of an individual are often of about the same age as that person and have a similar education level. Creating reference groups is thus an arbitrary process. In this study the reference group was specified as individuals who had in the same year the same education level, the same marital, employment and health status, and fell within the age range of minus five to plus five years of an individual's age. The more characteristics that are added to the above list, the fewer individuals there will be who share the same characteristics and the more the reference income will depend on only a handful of observations. This gave equation 5:

$$Happiness_{i,t} = \alpha + \beta \ln Y_{i,t} + \gamma X_{i,t} + \beta_1 \ln \bar{Y}_{i,j,t} + \beta_2 \ln Y_{i,t-k} + d_t + v_i + w_{i,t} \quad (5)$$

where $Happiness_{i,t}$ is an individual's happiness score in year t, $Y_{i,t}$ is an individual's household income in year t, $X_{i,t}$ is a set of control variables, $Y_{i,t-k}$ is the income of individual i during year t-

k, where *k* is the number of lags, $Y_{i,j,t}$ is mean income of reference group *j* of individual *i* during year *t*, d_t is a year specific dummy, v_i is the person time-invariant fixed effect error term and $w_{i,t}$ is the time-variant error term.

4 Results

At the macro-level we observed a clear correlation between economic growth and average happiness in South-Korea between 1980 and 2010. At the micro-level we observed that South-Koreans who' incomes grew became happier and this gain in happiness was not neutralized by adaptation or social comparison.

4.1 Economic growth went together with a rise in average happiness in South-Korea

The macro-level analysis showed that economic growth mostly went hand in hand with a rise in average happiness in South-Korea. This pattern of rising happiness appeared most clearly in the WVS data which cover the period 1980 to 2010. The GWP data showed a slightly different pattern with more fluctuations, but also showed a clear increase in happiness when looking at the total effect between 2006 and 2015. See the time graphs in figures A to D on the appendix.

Regression analysis was used to test formally the relationship between economic growth and the rise of average happiness in South-Korea. The coefficient of the logarithm of real GDP per capita was positive for all the different measures, but it was only significant for the 4-scale measure of happiness of the World Values Survey. The unstandardized coefficient of the log of real GDP per capita on happiness was 0.166. This implies that South-Korean GDP would need to increase by 40700% to gain 1 point on a 4-scale measure of happiness.

Table 2:
Macro relationship between happiness and economic growth in South-Korea.

	Life satisfaction (WVS)	Happiness (WVS)	Life evaluation (Gallup)
ln(GDP)	0.536 (0.315)	0.166 (0.047)**	2.645 (1.627)
Constant	Yes	Yes	Yes
R^2	0.491	0.805	0.248
Period	1982-2012	1990-2012	2006-2015
Standard errors given in parentheses. Asterisks denote statistical significance lower than or equal to the *10 percent, **5 percent and ***1 percent level. Economic growth measured by real GDP per capita.			

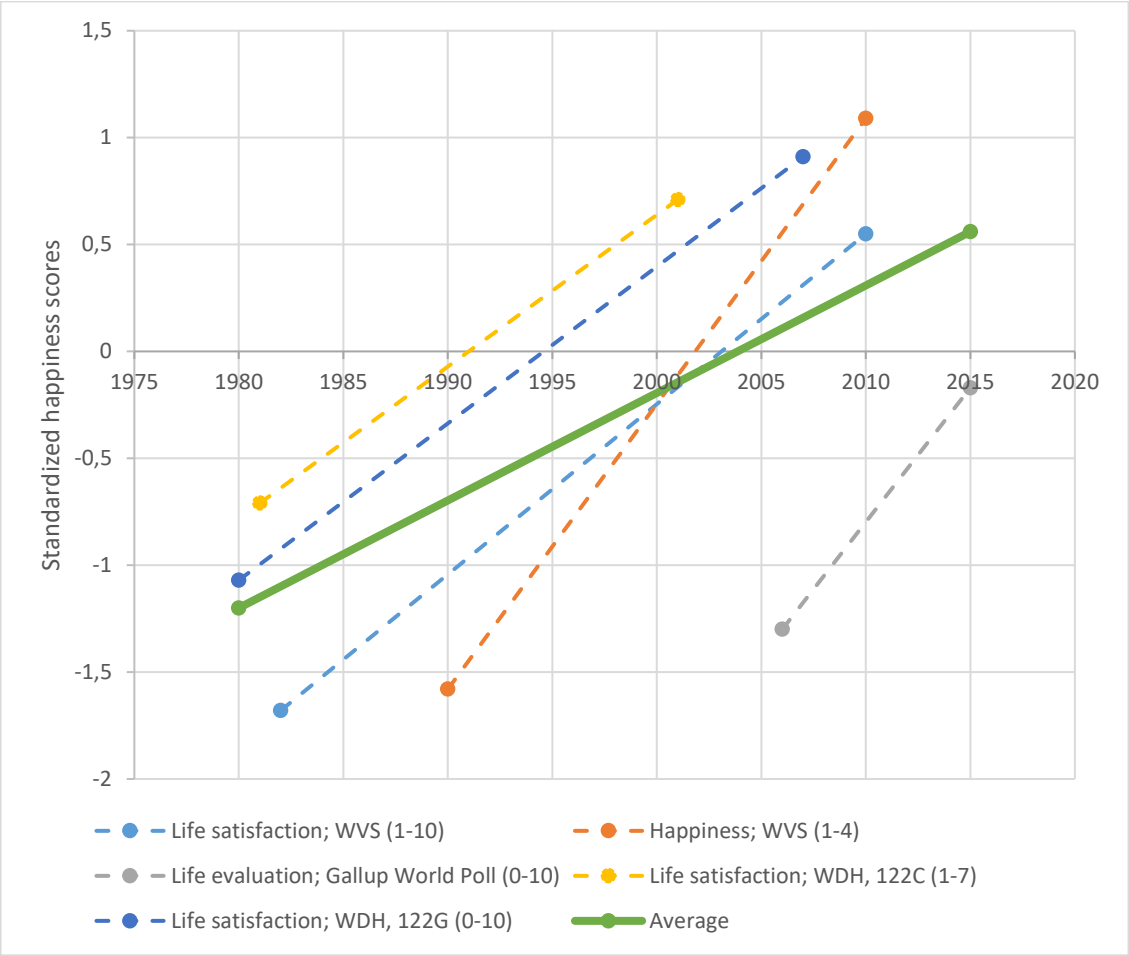
The long difference approach, discussed in section 3, was used for further analysis. The standardized values of the first and last observation gave a more pronounced view of the

results; for real GDP per capita and the natural logarithm of real South-Korean GDP per capita this effect was significant and positive, indicating a positive relationship between income and happiness on a macro level in South Korea. The standardized coefficient was 0.00006 for real GDP per capita on happiness, and 0.898 for the natural logarithm of real GDP per capita. The standardized happiness scores for South-Korea are given in Figure 1. All happiness scores indicating the first observations are found in the left bottom corner, the last observations are in the far-right corner. This pattern indicated there was an increase in happiness across different measures and time periods and thus there was a positive relationship between economic growth and average happiness in South Korea.

Table 3
Macro relationship between happiness and economic growth in South Korea, long differences.

	Standardized happiness	R^2
Real GDP/capita (log)	0.898 (0.347)**	0.442
Real GDP/capita	0.00006 (0.00002)***	0.461
Note: Standard errors given in parentheses. Asterisks denote statistical significance lower than or equal to the *10 percent, **5 percent and ***1 percent level. Economic growth measured by real GDP per capita.		

Figure 1:
Standardized happiness scores regressed against the real GDP/per capita in South Korea



4.2 South-Koreans who's income increased became happier: adaptation and social comparison did not neutralize that gain

On the micro-level, the results are more pronounced: both life satisfaction and household income increased in South-Korea over the period 2009 to 2014, although life satisfaction remained constant in 2013, despite an increase in household income. See figure F at the appendix.

Simple bi-variate correlations between life satisfaction, current household income, earlier household income and reference group income are shown in table 3. The correlation coefficient between life satisfaction and household income was 0.33, it was slightly smaller for past household income and the income of the reference. These differences in size of the correlation suggested that there was an independent effect of current income on happiness.

Table 3
Correlation matrix life satisfaction and household income in South Korea

	Life satisfaction	Current household income	Earlier household income	Reference group income
Life satisfaction	1.000			
Current household income	0.329	1.000		
Earlier household income	0.267	0.674	1.000	
Reference group income	0.287	0.552	0.484	1.000

The results of a more sophisticated analysis of the relation between income and happiness in South-Korea, using equation 3 and 4, are shown in table 4. Random errors were used in Model 1, while fixed effects were used in Model 2. Models 3, 4 and 5 were extensions of model 2 and included the effects of earlier household income (Model 3), reference group income (Model 4) or both (Model 5). Household income was significant positive across all different specifications. As argued in section 4.2, the results of models using fixed effects are considered to be most reliable. The unstandardized coefficient of the natural logarithm of household income was 0.036 and significant at the 1%-level, but within each model household income was positive and significant; thus, there was a positive relationship between household income and individual happiness.

Using Model 3 it was found that earlier household income, as proxy for the adaptation effect, was positive, but not significant from 0. Using Model 5 we saw that past household income, was positive, but not significant from 0. When we added more lags of an individual's household income to test for adaptation effects that lay further in the past, we saw that both the second and third lag of household income were negative and only significant at the 10%-level. See table B on the appendix. Thus, past household income did not influence an individual's happiness; thus no evidence for the adaptation effect was found for South-Korea.

The effect of the natural logarithm of the reference group's income is considered in Model 4. See Table 4. This effect was positive and significant at the 1%-level; the unstandardized coefficient was 0.025. This coefficient increases slightly and stays positive when past household income is introduced in Model 5, although it is only significant at the 5%-level. This effect is only significant positive for this specification of the reference group. Other definitions of the reference group do not result in significant results of the reference group income on happiness in South Korea. See table C on the appendix.

Similar pattern in subgroups

Further analyses of the effects of household income, earlier household income and reference group income depending on age group, marital status or education level are given in the tables 5, 6 and 7. From table 5 it can be seen that the effect of household income was larger among middle-aged individuals, but smaller for younger and older people. Further, it appeared that there was a positive significant effect of earlier household income among the oldest age group. The R^2, however, was dramatically low: therefore, we should not draw strong conclusions on this finding. For the middle aged (46-55) there was a significant negative sign at the 10%-level. This gives some credibility for the adaptation effect. Furthermore, reference group income was not significant across all specifications.

It can be seen from table 6, that the effect of household income is the largest among separated living individuals, and the lowest for widowed individuals. This first finding should be interpreted with care since there was only a small sample of separated individuals in the whole sample. A few outliers might influence the effect heavily. Further, there was only evidence for the effect of social comparison income among married individuals. All other sub groups give insignificant results. There is some evidence for singles that supports the adaptation effect.

It can be seen from table 7 that the effect of household income for the group with the lowest education level was smaller than that for all other groups. The effect of earlier household income was only positive significant at the 10%-level for the lowest education level. The effect of reference group income was only significant positive for the lowest education level and for university graduates.

Table 4
Baseline model micro analysis

	Model 1	Model 2	Model 3	Model 4	Model 5
Current household income (log)	0.075 (0.002)***	0.037 (0.003)***	0.057 (0.005)***	0.035 (0.003)***	0.057 (0.005)***
Earlier household income (log)			0.002 (0.003)		0.002 (0.004)
Reference group income (log)				0.025 (0.010)***	0.033 (0.015)**
Age	-0.014 (0.001)***	-0.035 (0.004)***	-0.0136 (0.004)***	-0.011 (0.004)***	-0.015 (0.004)***
Age^2	0.0002 (0.000)***	0.0003 (0.000)***	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***
Employed	0.025 (0.005)***	0.032 (0.006)***	0.031 (0.006)***	0.016 (0.007)**	0.031 (0.007)***
Self-employed	0.027 (0.077)***	0.040 (0.001)***	0.032 (0.010)***	0.029 (0.010)***	0.032 (0.011)***
Unemployed	-0.206 (0.015)***	-0.149 (0.016)***	-0.129 (0.017)***	-0.173 (0.016)***	-0.30 (0.018)***
Non-working	Reference group	Reference group	Reference group	Reference group	Reference group
Single	-0.116 (0.015)***	-0.120 (0.034)***	-0.162 (0.041)***	-0.129 (0.034)***	-0.168 (0.042)***
Married	0.085 (0.0113)***	0.030 (0.027)	0.018 (0.033)	0.024 (0.027)	0.006 (0.033)
Separated	-0.164 (0.032)***	-0.106 (0.051)**	-0.087 (0.062)	-0.122 (0.054)**	-0.110 (0.065)*
Divorced	-0.184 (0.018)***	-0.129 (0.042)***	-0.158 (0.051)***	-0.125 (0.042)***	-0.156 (0.052)***
Widowed	Reference group	Reference group	Reference group	Reference group	Reference group
Excellent health	0.665 (0.016)***	0.560 (0.019)***	0.556 (0.022)***	0.538 (0.020)***	0.531 (0.023)***
Good health	0.593 (0.013)***	0.484 (0.016)***	0.481 (0.018)***	0.460 (0.017)***	0.453 (0.020)***
Medium health	0.331 (0.0133)***	0.263 (0.016)***	0.264 (0.018)***	0.243 (0.017)***	0.240 (0.019)***
Poor health	0.262 (0.0130)***	0.213 (0.014)***	0.217 (0.017)***	0.200 (0.015)***	0.201 (0.017)
Bad health	Reference group	Reference group	Reference group	Reference group	Reference group
Elementary school	Reference group	Reference group	Reference group	Reference group	Reference group
Secondary school	0.048 (0.010)***	0.011 (0.199)	-0.239 (0.234)	-0.031 (0.200)	-0.241 (0.233)
College	0.145 (0.013)***	0.081 (0.201)	-0.139 (0.236)	0.041 (0.201)	-0.142 (0.235)
University	0.199 (0.011)***	0.101 (0.200)	-0.140 (0.235)	0.054 (0.201)	-0.153 (0.235)
Graduate	0.310 (0.018)***	0.145 (0.206)	-0.016 (0.242)	0.093 (0.206)	-0.029 (0.242)
Constant	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
R^2	0.198	0.201	0.132	0.185	0.126
Dependent variable: life satisfaction. Standard errors given in parentheses. Asterisks denote statistical significance lower than or equal to the *10 percent, **5 percent and ***1 percent level.					

Table 5
Model micro analysis, specified on age groups

	<25 year	26-35 year	36-45 year	46-55 year	56-65 year	>65 year
Current household income (log)	0.065 (0.015)***	0.051 (0.013)***	0.070 (0.013)***	0.085 (0.012)***	0.053 (0.012)***	0.033 (0.010)***
Earlier household income (log)	-0.009 (0.075)	-0.008 (0.009)	0.006 (0.008)	-0.016 (0.008)*	0.002 (0.008)	0.009 (0.004)**
Reference group income (log)	0.041 (0.080)	-0.025 (0.066)	0.055 (0.051)	0.052 (0.038)	0.027 (0.037)	0.041 (0.025)
Control variables included	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	8010	10312	13082	11703	9801	12070
R^2	0.081	0.076	0.187	0.086	0.04	0.012
Dependent variable: life satisfaction. Controls included: age, age squared, employment status, marital status, health status and education level. Standard errors given in parentheses. Asterisks denote statistical significance lower than or equal to the *10 percent, **5 percent and ***1 percent level.						

Table 6
Model micro analysis, specified on marital status

	Married	Single	Divorced	Separated	Widowed
Current household income (log)	0.066 (0.006)***	0.047 (0.010)***	0.055 (0.022)**	0.160 (0.091)*	0.032 (0.013)**
Earlier household income (log)	0.001 (0.003)	-0.012 (0.006)*	0.007 (0.011)	0.043 (0.044)	0.014 (0.006)**
Reference group income (log)	0.057 (0.026)**	0.019 (0.036)	0.062 (0.042)	-0.142 (0.094)	-0.014 (0.036)
Control variables included	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Number of observations	42343	14197	2242	289	5907
R^2	0.129	0.124	0.044	0.606	0.098
Dependent variable: life satisfaction. Controls included: age, age squared, employment status, health status and education level. Standard errors given in parentheses. Asterisks denote statistical significance lower than or equal to the *10 percent, **5 percent and ***1 percent level.					

Table 7
Model micro analysis, specified on education level

	Elementary school	Secondary school	College	University	Graduate
Household income (log)	0.027 (0.010)***	0.065 (0.007)***	0.067 (0.015)***	0.068 (0.011)***	0.064 (0.027)**
Past household income (log)	0.008 (0.005)*	-.0.004 (0.004)	0.015 (0.010)	0.001 (0.007)	0.005 (0.023)
Reference group income (log)	0.064 (0.028)**	0.004 (0.026)	0.071 (0.058)	0.084 (0.033)***	-0.096 (0.064)
Control variables included	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes
Number of observations	11793	29629	8111	13481	1964
R^2	0.140	0.154	0.117	0.121	0.109
Dependent variable: life satisfaction. Controls included: age, age squared, employment status, marital status and health status. Standard errors given in parentheses. Asterisks denote statistical significance lower than or equal to the *10 percent, **5 percent and ***1 percent level.					

5 Discussion

We found that the Easterlin Paradox did not apply in South-Korea. Why has Easterlin concluded otherwise? What more can we learn about the effect of economic growth on happiness?

5.1 Main finding

This study showed that the Easterlin Paradox did not apply in South-Korea between 1982 and 2015. On the *macro-level*, we found a positive relationship between economic growth and average happiness. Although not all measures of happiness provided significant results, the long difference approach clearly showed a highly positive significant result of economic growth on average happiness. This result was most reliable because it included different measures of happiness across different time periods. On the *micro-level*, we found an even stronger link between happiness and income, whilst the effect of adaptation and social comparison appeared to be positive, instead of negative. This result held across different specifications and subgroups of the population in South-Korea. So, using our data taken from various sources reported in the World Database of Happiness, the relative income theory did not apply in the case of South-Korea.

5.2 Difference with Easterlin's analysis of this case

Our results contradict the claim made by Easterlin et al. (2010), that the high economic growth seen in South-Korea has not made South-Koreans any happier. Easterlin et al. based their claim only on the relationship between the life-satisfaction scores in the World Values Survey 1980-2005 and economic growth, while we used a longer data period, more measures of happiness and more advanced techniques to establish the effect of economic growth on average happiness. We found a positive relationship between economic growth and average happiness in South Korea, which was statistical significant.

5.3 Significance of statistical significance

As we have seen from table 2, the macro-level correlation between economic growth and rise of happiness was positive, but did not reach statistical significance. On the basis of this same finding Easterlin et al. conclude that there is no relationship between economic growth and average happiness in South-Korea. We have argued that using slightly different indicators and analyses gives a significant correlation.

How meaningful is statistical significance anyway in this discussion? Can we not just use effect sizes? 'Significance' is the probability that a correlation observed in an a-select sample will also exist in the population from which that sample was drawn. In this case, the 'population' is average happiness in South Korea in each of the 30 years between 1980 and 2010. The five observations of life-satisfaction in the years 1990, 1996, 2001, 2005 and 2010 can hardly be considered as an a-select sample from that population and the sample of only 5 cases is clearly too small to demonstrate significance of a small correlation. In short, this technique of significance testing is not well applicable in this case.

The unacknowledged limitations of significance testing have also clouded our view on cross-national tests of the Easterlin paradox. In this case, the problem is not only that there is no a-select sample of nations, but more fundamentally, that the assumption of a 'population' of nations is misleading. As we will discuss in more detail below, effects of economic growth on happiness are likely to vary across contexts and looking for a general tendency is therefore fruitless. The question is not whether or not economic growth boosts happiness, but what are the conditions in which it boosts happiness in which conditions it does not.

5.4 Further research

A first task for future research is to overcome our present data-limitations, in particular to use

longer time-series, both at the macro-level and the micro-level. A second task is to explore causality in the relation between economic growth and happiness and a third task is to explore the conditions in which the balance of effects tends to be positive, neutral or negative.

Longer time series

For our macro-level analysis, only a handful of observations was available per measure of happiness. Since small relationships only appear to be significant when using a lot of observations, these effects can easily appear to be insignificant. Concluding that there is no relationship between economic growth and average happiness is therefore premature. More observations are therefore necessary to draw more reliable conclusions. Future studies should incorporate different measures of happiness to increase reliability of the results.

On the micro-level, the KLIPS dataset has a relatively short span at present of only six years, making adaptation effects harder to study. This study should be repeated when a number of years has past to test whether the results we found still hold.

Additional over-time data on the macro and micro levels are required because, as Easterlin (2016) argues, the Easterlin Paradox is about the long-term trend-relationship between economic growth and average happiness, and the focus is not on the short-term relationship.

Causal direction

Another limitation of the micro level research is that the assumption was made that causality runs from income to happiness, and not from happiness to income. Exogenous shocks to income have been shown to influence happiness, thereby indicating that income gain can have a positive effect on happiness (Frijters et al., 2004; Ambery & Flemming, 2014). It is likely however, that reverse causality is involved; happier individuals tending to have higher incomes later in life (De Neve & Oswald, 2012). In this South-Korean case-study, no correction was made for this influence, but it is not likely to be a problem. De Neve and Oswald (2012) have shown that this relationship only appears after 10 years. Since the timespan for the micro based research in the case study was 6 years, this effect was expected to be small or not present. Taking an instrumental variable approach would correct for this problem, but currently there are no studies that have found instruments uncorrelated with happiness and that are strong enough to be used to predict income. An additional advantage of an instrumental variable analysis would be that it captures the variance caused by time-varying omitted variables, which a fixed effects approach does not. Therefore, including an instrumental variable approach in

future studies would be helpful for establishing more precisely the relationship between income and happiness.

Contextual variation

Economic growth in a country can affect the happiness of individuals in various ways and the balance of effects is likely to differ across contexts. There is little point in searching for an average net effect, what we want to know is in what conditions economic growth adds to happiness and in what conditions does it not. We also want to know why effects of economic growth on happiness differ across times and places. Future research should therefore focus on separate country studies or look for contextual variation in world samples.

6 CONCLUSION

Economic growth has added to happiness in South-Korea since the 1980s. This illustrates that the Easterlin Paradox is not a general law, but rather a contextual phenomenon.

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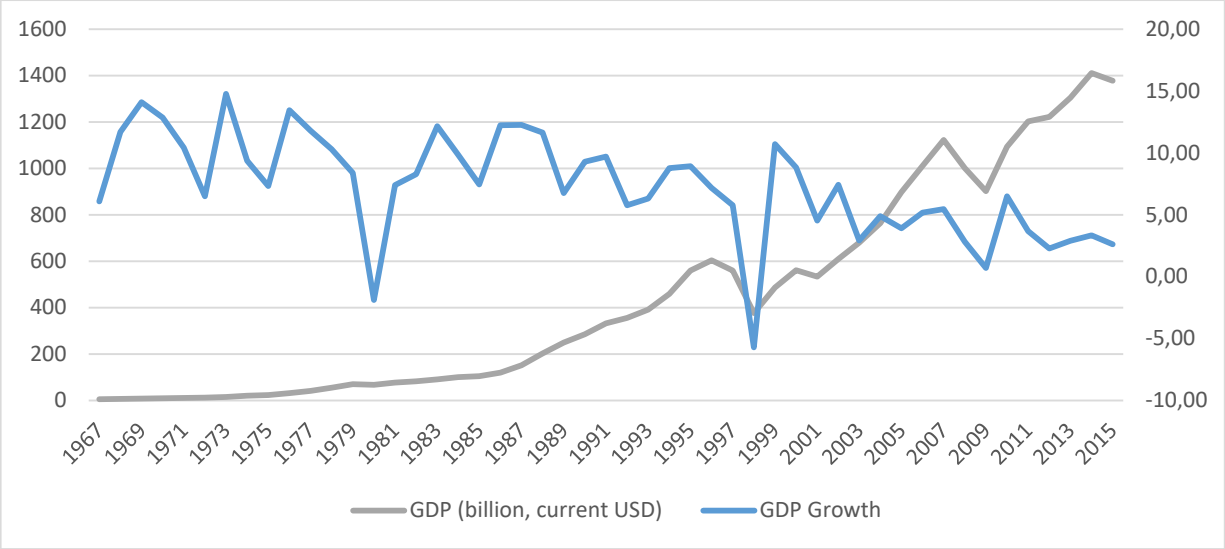
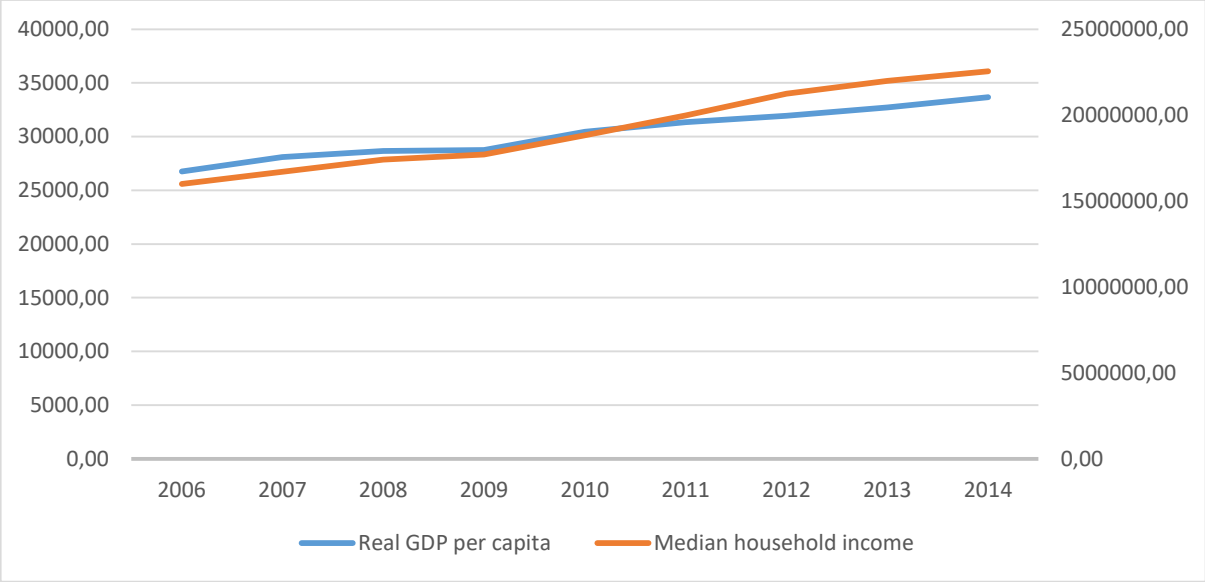
Appendix

Figure A: GDP and GDP growth in South Korea.



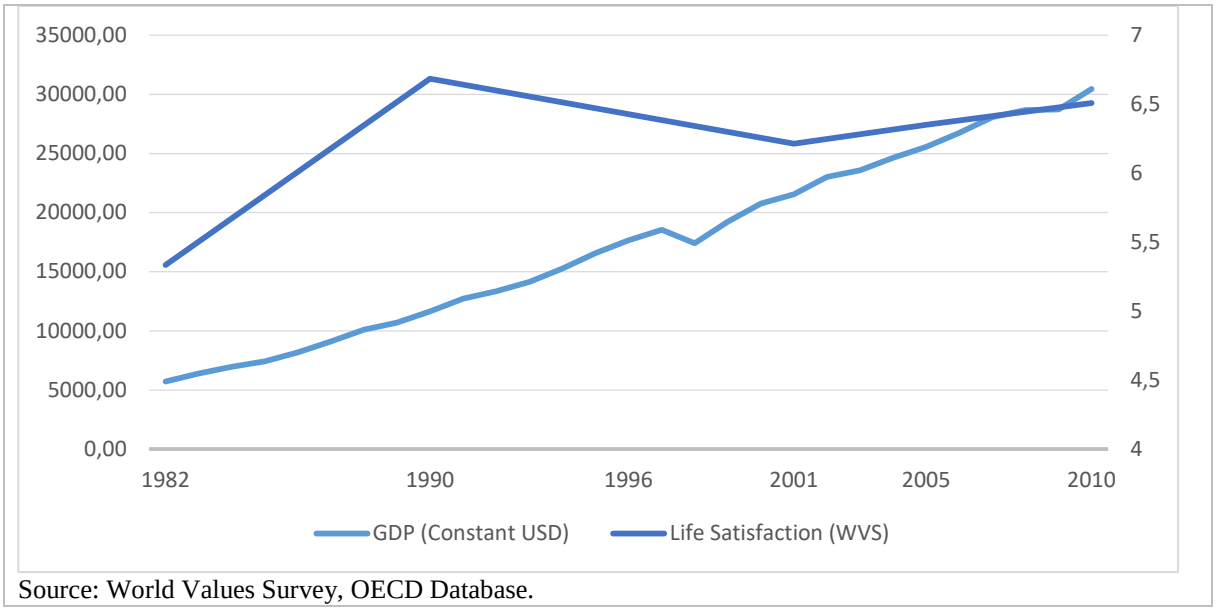
Source: OECD Database.

Figure B: Real GDP per capita and median household income.



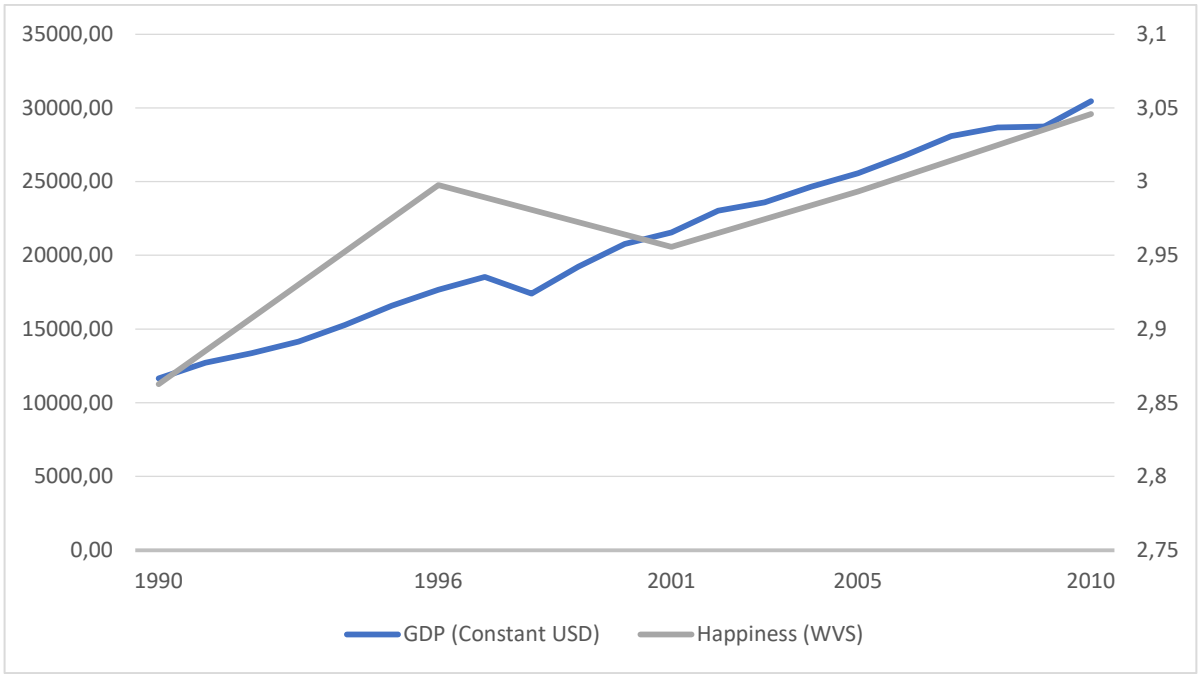
Source: OECD Database.

Figure C: Life satisfaction (WVS) and GDP/capita (USD) in South Korea.



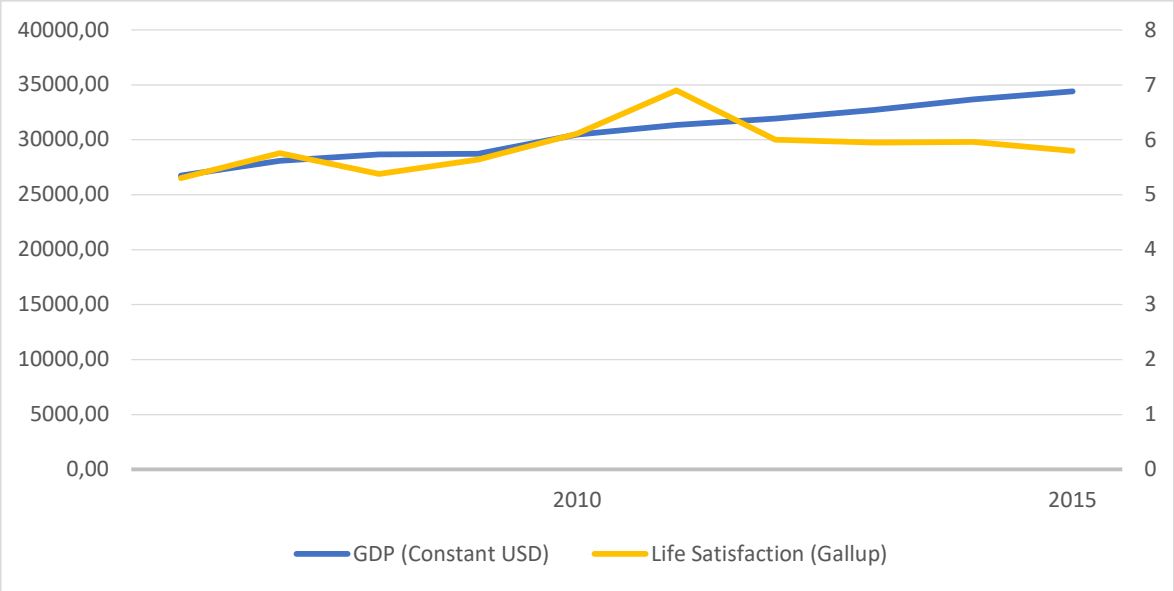
Source: World Values Survey, OECD Database.

Figure D: Happiness (WVS) and GDP/capita (USD) in South Korea.



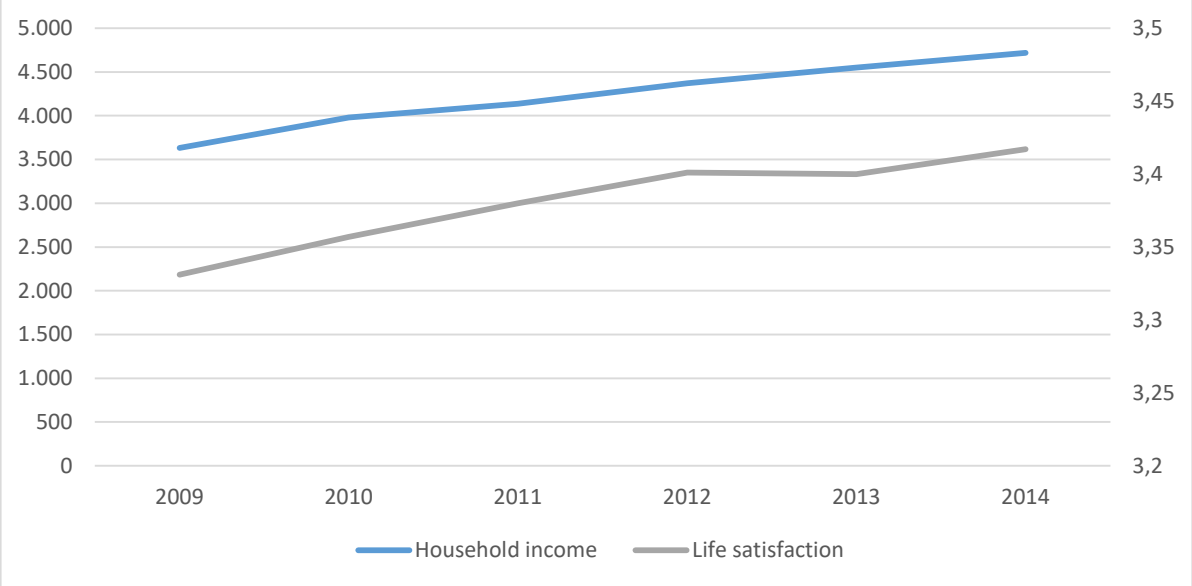
Source: World Values Survey, OECD Database.

Figure E: Life evaluation (GWP) and GDP/capita (USD) in South Korea.



Source: Gallup World Poll, OECD Database.

Figure F: Household income (SKW) and life satisfaction.



Source: Korean Labor and Panel Income Studies.

Table A: Descriptive statistics microdata

Variable	Mean	Std. Dev.	Min	Max	Observations
Life satisfaction	3.38	0.50	1	5	79474
Income	4.22	3.70	0	121500	79474
Reference group income	4.24	1.60	2	33269,5	78987
Log(income)	797.73	1.13	0.6931472	1.170.767	79459
Age	47.23	17.97	15	100	79474
Employed	0.28	0.45	0	1	79474
Self-employment	0.09	0.29	0	1	79474
Unemployed	0.02	0.13	0	1	79474
Non-working	0.42	0.49	0	1	79474
Male	0.48	0.50	0	1	79474
Single	0.22	0.42	0	1	79474
Married	0.65	0.48	0	1	79474
Separated	0.01	0.08	0	1	79474
Divorced	0.03	0.18	0	1	79474
Widowed	0.09	0.29	0	1	79474
Excellent health	0.05	0.21	0	1	79474
Good health	0.51	0.50	0	1	79474
Medium health	0.29	0.46	0	1	79474
Poor health	0.12	0.33	0	1	79474
Bad health	0.03	0.16	0	1	79474
Elementary school	0.18	0.39	0	1	79474
Secondary school	0.46	0.50	0	1	79474
College	0.12	0.33	0	1	79474
University	0.21	0.40	0	1	79474
Graduate school	0.03	0.17	0	1	79474
Note: All variables relating income were measured in 10.000 SKW.					

Table B: Model micro analysis, additional lags of household income

	One lag of household income (original specification)	Two lags of household income	Three lags of household income	Four lags of household income
Current household income (log)	0.057 (0.005)***	0.055 (0.006)***	0.036 (0.008)***	0.010 (0.012)
Earlier household income (log), one lag included	0.002 (0.004)	0.005 (0.005)	0.004 (0.007)	-0.127 (0.012)
Earlier household income (log), two lags included		-0.006 (0.003)*	0.000 (0.006)	-0.006 (0.011)
Earlier household income (log), three lags included			-0.006 (0.003)*	-0.016 (0.009)
Earlier household income (log), four lags included				0.002 (0.030)
Reference group income (log)	0.033 (0.015)**	0.031 (0.017)*	0.013 (0.021)	-0.003 (0.030)
Control variables included	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Number of observations	64978	51559	38473	25373
R^2	0.126	0.160	0.120	0.006
Dependent variable: life satisfaction. Controls included: age, age squared, employment status, marital status, health status and education level. Standard errors given in parentheses. Asterisks denote statistical significance lower than or equal to the *10 percent, **5 percent and ***1 percent level.				

Table C: Model micro analysis, different reference groups

	Reference group 1 (original): Age (-5, +5 year), health status, employment status, marital status and education level	Reference group 2: Age (-5, +5 year), employment status, marital status and education level	Reference group 3: Age (-5, +5 year), health status and employment status	Reference group 4: Age (-5, +5 year), marital status and employment status
Current household income (log)	0.057 (0.005)***	0.057 (0.005)***	0.057 (0.005)***	0.057 (0.005)***
Earlier household income (log)	0.002 (0.004)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)
Reference group income (log)	0.033 (0.015)**	0.007 (0.023)	-0.030 (0.032)	-0.002 (0.033)
Control variables included	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Number of observations	64978	64978	64978	64978
R^2	0.126	0.133	0.130	0.107
Dependent variable: life satisfaction. Controls included: age, age squared, employment status, marital status, health status and education level. Standard errors given in parentheses. Asterisks denote statistical significance lower than or equal to the *10 percent, **5 percent and ***1 percent level.				