


Spring 5-17-2018

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Don't worry be Happy: Analysis of Happiness as an Economic measurement

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Thesis Submission for the Masters of Science Degree
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May 19th 2018

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Everyone wants to be happy. Happiness however never seems to be a national goal. A possible answer is that happiness is subjective and on its own may not be reflective of the economic status of a country. Therefore, should people's happiness should be treated equally with other traditional economic measurements? This cross-country level study looks at the relationship between happiness and traditional economic measurements; mainly GDP per capita. Questions concerning whether GDP per capita indeed captures the overall well-being of a citizen and happiness' eligibility as an economic measurement are addressed. Findings confirm that happiness and GDP per capita are positively correlated. As a result, subjective happiness may not be all that different from traditional economic measures like GDP per capita.

1. Introduction

Most of us may not be able to tell exactly how happy or unhappy we, or others are. The subjective nature of happiness makes it difficult to even consider measuring it. It is arduous to correctly quantify, and thus use in any form of national accounting. Moreover, traditional economics assumes simply increasing utility and expanding budget constraints is how an individual improves his or her well-being. GDP per capita (and other per capita measurements) are therefore the immediate standard well-being measure. Past literature and developments in more inclusive 'non-traditional' measures (like HDI) have proved this to be false.

However the big question is, are peoples' happiness important? The typical resounding answer is yes, but more succinctly, is it important enough for governments to keep annual data on (like GDP per capita)? For that to happen happiness will need to be a serious signal of the economic and social state of the country. A reason for people neglecting happiness as a serious enough measure is that it is assumed that people's happiness is not reflective of anything else but their feelings. This paper proposes that happiness may constitute of other 'serious' things like income levels, institutional quality, environmental quality, as well as feelings, and strength of interpersonal relations. The intuition is that people are like sponges. They move through their lives being affected by all good and bad aspects of the country. Whether it be bad weather, recession, high and low employment, political coup, natural disasters, etc. This means that people's 'happiness function' may hold a lot of this information that could be valuable to understanding the state of the country. However we can imagine that more personal things like the death of a loved one, a breakup, etc might skew a person's happiness score significantly. Nevertheless, a person's happiness function still holds essential economic and social occurrences. If this study was a causal one, it will be imperative to control for personal differences (or utilize individual fix effects).

Further, economics puts more emphasis on the importance of money in increasing utility and well-being. Since economics (and economists) tend to be at the forefront of policy making this ideology concurrently shaped (and continues to) how we view money and well-being; and thus, policies put in place. If money (and only money) makes you happy, then GDP/GDP per capita and others like measures will suffice. However since theoretically there are other things in a person's happiness function income may be essential but not the only thing that makes a person happy. Specifically in the context of this research we would expect a positive relationship between

happiness and GDP per capita. This would mean that income does contribute to people's happiness. More importantly it tells us that despite the subjective nature of happiness it can inform us of a country's economics. This is of course all based on the major assumption that indeed everybody wants to be happy.

This is why Easterlin (1973) (and others) have studied topics like how happiness and income move together. The Easterlin Paradox came out of this study and will be discussed in more detail in the Literature review. In short, Easterlin said "most people could increase their happiness by devoting less time to making money, and more to nonpecuniary goals such as family life and health." In order to accurately understand this motif it is necessary to comprehend what constitutes current happiness measures, how we came to rely so much on measures like GDP per capita, and finally, if measurements like GDP per capita are reflective of how happy people are, and well-being as a whole. The history and purpose of GDP will therefore be discussed next.

GDP per capita has been historically available for so long that most citizens, countries, and international bodies view it as the benchmark for economic growth and well-being. It allows for comparison of standard of living among nations and helps us see how countries and its citizens are progressing over time. However, the GDP measurement was birthed out of a specific need at a specific time. Thomas Petty is known to have created the earlier form of national accounts in England. He was attempting to "ascertain the taxable capacity of the nation" (Cobb, Halstead, Rowe 1995). Another (more detailed) national accounting measurement came from France around the same time. Adam Smith's version showed a broader view of national wealth that also took into account manufacturing. Smith however left out what we would call, the service and entertainment industries. The value of such industries was completely overshadowed by others at that time. This is of course not true (especially for the United States) today.

The first version of the Gross Domestic Product we know so well was created in 1931 during the term of United States' 31st President, Herbert Hoover. The government was asked to provide answers about the economy but could not because there was no consistent data concerning the economic affairs of the country. In the course of his last year as President the Senate tasked the Commerce Department to provide estimates of the country's national income. The Commerce Department asked Simon Kuznets, a young economist at the time (most famous for the Kuznets curve), with putting together a more dependable uniform set of national accounts.

This set of national accounts is what gave our current GDP measurement a spine. Interestingly, Simon Kuznets was satisfied but skeptical of the set of national accounts he made. So much so that in addressing Congress and the nation for the first time in 1934, he tried to inform them of the obvious drawbacks of the national accounting system. He said that “the welfare of a nation can scarcely be inferred from a measurement of national income as defined above.” Kuznets repeated a similar message in 1962: “Distinctions must be kept in mind between quantity and quality of growth, between its costs and return, and between the short and the long run. Goals for ‘more’ growth should specify of what and for what” (Cobb, Halstead, Rowe 1995). The skepticism of the author of the economic measurement we’re so familiar with should speak volumes to us.

Gross Domestic Product was created to measure the total value production of activities that are counted on the national accounts system. It makes no judgments on the costs or benefits of the goods and services that are produced. Despite the fact that it has helped economically propel us to where we are now, unfortunately GDP does not take into consideration several things like negative externalities like pollution. Pollution is a signal of high production which of course is accounted for positively in GDP. A well-known example is China. China is famous for producing a high percentage of the world’s products and consequently for its high level of toxic pollution. This level of pollution has been detrimental the lives of many Chinese. However, this story is not reflected in China’s continually impressive GDP figures. Pollution is accounted for twice when calculating GDP. First, during the process of production in the manufacturing process, and second, when pollutants use millions of dollars to clean it all up. Both instances deceitfully contribute positively to GDP. The ripple effect of negative externalities like pollution (i.e huge oil spills) is not only felt economically but also in the health of the people affected. The fact that Deepwater Horizon oil spill in 2010 by British Petroleum off of the Gulf of Mexico did not affect GDP per capita is appalling. Government may therefore risk increasing per capita measurements and end up not actually increasing the well-being of its people.

2. Literature Review

2.1 *General Well Being*

Research on happiness is part of a larger literature on well-being. Calculating well-being was one of the closest developments to calculating people's happiness. The first main breakthrough well-being/happiness calculations was in 1990 when United Nation Development Program (UNDP) Pakistani Economist Mahbub ul Haq (along with his team) created the Human Development Index (HDI). HDI is a geometric mean of education, health, and income. Haq like many others recognized the shortcomings of the traditional well-being measurements like GDP per capita. His main purpose for creating the index was to "to shift the focus of development economics from national income accounting to people-centered policies." Haq understood that creating an index did not just change how people viewed development economics and well-being. He knew that by providing a better proxy for well-being meant better research. Better research leads to better policies, and better policies meant well-being of citizens could actually increase. Indeed the HDI revolutionized how people viewed well-being and helped assist better research. Nobel laureate Amartya Sen who worked with Haq on the HDI, utilized the HDI in his own work on human capabilities. Having an economist as prominent as Sen use the HDI sent waves throughout the international community. It brought attention to the importance of having an accurate measure of well-being. The rest is of course history.

A few papers have reevaluated the ability of traditional economic measurements in measuring well-being. Two out of the plethora of such papers will be discussed. Kosack and Tobin (2015) asked the question, which countries' citizens are better off with trade? Past literature on the topic used economic growth, income, government spending, and government social spending as proxies for citizen well-being. None of these are complete proxies for well-being because they do not directly influence it. For example, government spending does not take into account households' individual efforts to improve their welfare, and it includes many aspects of government spending that are only indirectly related to citizen welfare. Items such as defense, law enforcement, infrastructure, etc are all included in government spending but don't directly contribute to well-being.

Alternative Measures of Well-Being, a working paper published in Organization for Economic Co-operation and Development (OECD), which looks at if GDP per capita is well-

suited for measuring well-being, or if we need to find appropriate surrogates. Authors of the paper mention that “the well-being of individuals and households does not only depend on GDP per capita, but also on other factors such as leisure time, environmental quality, increases in competences and longevity, and distributive issues” (Boarini, Johansson, D’Ercole 2006). The paper surveys different measures of well-being and their relationship with GDP per capita levels, rates of change, and international rankings. Paper results show that indeed there are several other more inclusive traditional measures that are better alternatives to GDP per capita.

There have also been non-academic advances in better well-being measurements. As previously mentioned China is known for its high level of production and thus pollution. The State Environmental Protection Administration (SEPA) and the National Bureau of Statistics (NBS) of China released China’s (probably the world’s) first green national accounting report on September 8th 2006. The actual project was created in March 2004 by SEPA and NBS in order to do accounting analysis on “physical quantification of environmental pollution, imputed treatment cost and environmental degradation cost for 42 industries and 3 regions of the East, the Central and the West China.” (*Green GDP Accounting Study Report 2004 Issued*). The project is simply an attempt to adjust standard GDP for pollution; namely, environmentally-adjusted GDP.

The ‘Green GDP’, as its formally called, is an accounting system that deducts natural resources costs and environmental degradation costs in order to truly assess China’s economic development. Results of their analysis revealed an economic loss by environmental pollutions of about 512 billion yuan (about \$83 billion). This figure was 3.05% of 2004 national GDP. Treatment cost was estimated to be 287 billion yuan (47 billion dollars); which was 1.8% of 2004 national GDP. These results show the true nature of China’s growth and reveal a serious deterrent to economic development and well-being. The World Bank and several countries around the world applauded China for its work and its interest in improving citizen well-being.

The most popular push towards well-being is Bhutan’s effort to completely redefine economic success by completely replacing their economic measures with happiness. This venture started in 2012 with a long report by the Center of Bhutan Studies titled, *A Short Guide to Gross National Happiness (GNH) Index*. It proposed an alternative way to view Bhutan’s development. The concept of GNH came from Jigme Singye Wangchuck, Bhutan’s fourth Dragon King. He came up with the phrase in order to assist in the building of an economy that would aid Bhutan

to still adhere to its heavily Buddhist influenced culture, as supposed to the Western material-based idea of development, embodied in traditional measures like Gross National Product (GNP). The GNH philosophy is designed to promote nine domains: *psychological wellbeing, mental and spiritual health, time-balance, social and community vitality, cultural vitality, education, living standards, good governance and ecological vitality*. The report notes that the index is “meant to orient the people and the nation towards happiness, primarily by improving the conditions of not-yet-happy people.”

The GNH index value for 2010 showed that 10.4% of Bhutanese people were unhappy, 47.8% were ‘narrowly happy’, 32.6% were ‘extensively happy’, and 8.3% were ‘deeply happy’. The report mentions that the GNH “is very much a living experiment, seeking to convey more fully the color and texture of people’s lives than does the standard welfare measure of GDP per capita” (Ura, Alkire, Zangmo, Wangdi 2012). In spite of all this Bhutan failed to put into effect its GNH policy due to a wavering political structure. This emphasizes the importance of the role of institutions to act as a fertile soil for such social enterprises to work. Clearly more research and work need to be done for a successful implementation of measures like GNH.

Joseph Stiglitz, Noble Prize winner, has dedicated a lot of work to income inequality and well-being. Stiglitz and Fitoussi (2013) discuss the demand to move beyond measures of market activity (GDP) and towards measures of well-being. They assert that “reductions in wellbeing (following deteriorations in people’s physical and psychological health, community life or employment status, or in the provision of environmental goods) that are accepted in the name of maximization of material wealth results in totally misguided policies”. We track the performance of a nation in order to put in place the necessary policies to achieve our goals. Stiglitz and Fitoussi use the example of the aftermath of the earthquake in Japan as a metaphor of our measurement problems. Although in the short run Japan’s GDP may have gone down, in the long run it would have increased as a result of reconstruction efforts. A theory is that the increased danger and anxiety that was caused by the disaster might have had significant health effects on a huge portion of the population, the alleviation of which through drugs and treatments could increase GDP. In sense the “mechanical nature of our economic models tells us nothing about the immaterial consequences of the irreversible losses suffered by the Japanese people.” This can be generalized to any citizen in the world, and therefore add to the plethora of evidence in support of the creation of better measurements. Stiglitz’ motivation behind his work on income inequality is not different from his opinions on a better measurement system. In an article Stiglitz says that

“hopefully, the work of our commission will have increased the impetus to align the metrics of well-being with what really contributes to quality of life - and, in so doing, help us direct our efforts at those things that really matter.” This sums up the continued journey toward a more inclusive economic measurement.

2.2 Happiness

As mentioned previously Easterlin (1973) is what created the Easterlin Paradox. The paradox simply says that there is a link between income and average level of happiness. Easterlin said that there is a certain point for wealthier countries where they do not experience increases in happiness. Similarly, Kahneman and Deaton (2010) find that in the United States people earning above \$75,000 more or less experience the same level of happiness compared to those earning just below that. This study is commenting more on relative income than absolute income. Easterlin (1973) found that in the United States richer individuals were happier than poorer ones, but over time the society as a whole did not become happier as it became richer. Easterlin (1974) mentions that “in all societies, more money for the individual typically meant more individual happiness. However, raising the income of all does not increase the happiness of all.” This individual and society distinction is at the root of how we view the Paradox and happiness research. Do people view increases in wealth relative to their immediate past or to others? Layard (1980) says “a basic finding of happiness surveys is that, though richer societies are not happier than poorer ones, within any society happiness and riches go together.” A great way of analyzing this dynamic is through having survey, happenstance data, and a mixture of both.

Stevenson and Wolfers (2008) do just that. Contrary to Easterlin, with a bigger data set and differing methodologies, they find a positive relationship between changes in happiness and income (GDP per capita) over time within countries; and weaker across. They however indicate that their findings show a clear role for absolute income and a smaller role for relative income comparisons. They use data from World Values Survey (happiness and satisfaction), Gallup World poll happiness, Pew Global Attitudes survey, and Eurobarometer. The World Values Survey (WVS) is their main focus. WVS happiness and satisfaction data is survey data; over a span of years, but in waves. They therefore use varying fixed effects and national level data to analyze both within and across country variation. Their varying specifications yield a positive

and signification relationship between happiness and GDP per capita. The methodology of this research is inspired by the work of Stevenson and Wolfers. This research adds to their work by expanding their data 8 more years, testing the relationship between happiness and social and economic measures, including more comprehensive regional and income group analysis, and inclusion of inequality analysis.

Easterlin et al (2010) revisit the Easterlin paradox. They emphasize the importance of separating the long and short-term effect. In a period of 10 years or more Easterlin's past findings show that happiness does not increase as a country's income rises. As a result, the sample of such studies were limited to developed countries. In this paper they show that even for a number of developing countries, Eastern European countries transitioning from socialism to capitalism, and a bigger sample of developed countries, there is still no long-term relationship between happiness and income. They do however confirm the short term positive relationship across the three groups mentioned. As a result, they comment that Stevenson and Wolfers (2008) may have confused the long-term effect with the short one. The use of differing methodology (cross country and time series) explains this conundrum. The answer that absolute income does not have an impact on happiness has significant policy implications. If increases in national income (and thus economic growth) does not improve social welfare, then governments should not make it a goal. Even more inclusive measures like the HDI which include income are not widely used and not taken as seriously as measures like GDP per capita. Easterlin argues his research on happiness "undermine[s] the view that a focus on economic growth is in the best interests of society." This is research focuses a step prior to look at how economic growth is measured. The next sections cover the Data and Methodology, results and its analysis, and finally discussions and relevant conclusions.

3. Data and Methodology

This research examines the relationship between happiness and GDP per capita. To be clear no causality is inferred, simply a correlational one. It is a cross-sectional level study with 107 countries over a 32 year span (1981 to 2016). The overarching idea is to ascertain if income is in people's happiness function, and thus if GDP per capita is indeed a good well-being measurement. Theoretically in order to accurately assess the happiness and GDP per capita dynamic there needs to be a mixture of micro, macro data, and merge of both. This is what this

research attempts to do. Happiness data comes from the World Values Survey and the Gallup World poll. The main traditional economic measure as mentioned is GDP per capita. Globalization characteristics, national health average, institutional effects, trade openness, and secondary school enrollment rates are also utilized. Table 1 (see Appendix) shows the summary statistics.

WVS is the largest cross-national and times series investigation of human beliefs and values. It has interviews of about 400,000 respondents. The data is separated into 6 waves. The different waves are: Wave 1 (1981-1984), Wave 2 (1990-1994), Wave 3 (1995-1998), Wave 4 (1999-2004), Wave 5 (2005-2009), and Wave 6 (2010-2014). Year fixed effects are therefore done at the wave level. WVS has two happiness indices. There are two measures of happiness: happiness and satisfaction. The happiness data comes from the survey question: *“Taking all things together, would you say you are: very happy; quite happy; not very happy; not at all happy?”* It is ranked from 1 being the lowest and 4 being the happiest. The satisfaction comes from the survey question: *“All things considered, how satisfied are you with your life as a whole these days?”*

The WVS also has other survey data that are also used in this analysis. A few examples are, the importance of family and friends, religiosity, self reported health, etc. The Gallup poll happiness comes from the question that asks people from 150 countries to rate their lives on a scale of zero to 10. Zero being the worst possible life and 10 being the best possible life. Globalization data will come from Konjunkturforschungsstelle (KOF) and the Center for the Study of Globalization and Regionalization (CSGR). Khaled Elmawazini and Sonny Nwankwo (2013) make use of this index in their research. Secondary school enrollment rates (SSE), which is a proxy for human capital. It is widely used as a proxy for human capital. Literacy rates are also used but the literature shows that Secondary school enrollment rates is a more accurate proxy. Mankiw, Weil, and Romer use the percentage of the working-age population that is in secondary school as a proxy for the rate of human-capital accumulation.

The main regression (see below) has the non-traditional measures as the dependent variables and log GDP (traditional measure) as the independent variable; along with the appropriate controls. The controls will differ depending on if macro and micro data is being used. The varying controls will be discussed in tandem to each specific regression result.

$$Happiness = \beta_0 + \beta_1 \ln GDP + \beta_2 Controls + \epsilon$$

An age and sex interaction are the main controls used. Log GDP is the preferred method in past papers, and rightfully so. Due to wide variation in values taking the log helps take care of heteroscedasticity. Therefore, upon visual inspection and past literature, the relationship between happiness and GDP is a log-linear relationship. Figures 1, 2, 3 (see Appendix) show graphs of the happiness indices regressed on both GDP and log GDP. The positive upward sloping result is clearer when using the log of GDP per capita.

Three main specifications are used. Due to the nature of the WVS surveys the first is an ordered probit. It allows for the fit of the ordered categorical nature of happiness and satisfaction. Measuring average levels of subjective well-being is not easy because it means aggregating individual responses to a qualitative question. Nevertheless, since the goal is to as rigorous as possible, we need to make comparison with varying happiness measures. We therefore normalize the well-being measure by use of happiness ordered probit regressions on country-wave fixed effects; and regard the fixed effects as average level of happiness within the country-year. This method is called OLS-adapted probit and it was first introduced by Van Praag and Ferrer-i-Carbonell (2004). The purpose of using the index is so we also have macro estimates of happiness to use in the analysis. The last specification is a basic OLS using Gallup poll happiness, which is also macro estimate of average national happiness. In addition to this, different types of fixed effects are used generally to help zero in on either across or within country variation. WVS data is individual survey data so it tells us more about within country variation. Nevertheless, wave, country, and country by wave fixed effects are used interchangeably for robustness. Primarily, wave fixed effects. Clustering is done mostly at the country level and weights are used to ensure observations are nationally representative for each country in each wave.

4. Analysis and Results

In short, the results of this research confirm that of Stevenson and Wolfers (2008). Happiness and GDP per capita are positively related. This research is not causal so nothing is said of if income increases citizen's happiness. Results of WVS happiness is mainly presented. Tables for WVS satisfaction are excluded in order to be concise. They are however discussed when significantly different from WVS happiness results¹. In general, results for WVS satisfaction show very similar results; just slightly bigger coefficients. Table 2 details the main

¹ All tables relevant for WVS Satisfaction (and others) can be replicated using uploaded do-files.

results of the ordered probit for WVS happiness² and this paper. The positive correlation holds (and at the 1% level) when using either wave, country, and country by wave³ fixed effects. This shows that within or across countries, happiness is indeed positively correlated with GDP per capita. Standard errors are clustered at the country level and observations are weighted starting from column 3. Controls as mentioned is an interaction of age and sex. Table 5 shows the same table but for WVS satisfaction.

Regional analysis is where we start to see differences in WVS happiness and satisfaction. Table 3 shows the WVS happiness results⁴. We see no significance for Sub-Saharan, Latin American and Caribbean, South Asian, and East Asian and Pacific countries. It is unclear why we don't see significance for these regions. Europe and Central America and Middle East and North Africa have the expected positive and significant results. We see an interesting thing for North America, a negative and highly significant result. This is unusual but expected because it confirms Easterlin's findings. As income goes up North Americans experience declining happiness. The United States and Canada are one of the wealthiest nations and yet we see this result. Although this is not a time series study we can somewhat confirm what Easterlin said concerning North America. This adds to the happiness mystery in North America. Results for WVS satisfaction is interesting. There is no significance for only East Asia and Pacific and Latin America and Caribbean. SSA has the expected positive and significant result. However South Asia shows a negative and 1% significant result; just like North America. This is novel and adds to the literature. Southern Asian countries seems to be experiencing North America's happiness conundrum. Cultural reasons may be insinuated.

Another interesting result is the differences in income groups (see Table 4). Categorizing all the countries into basic rich and poor⁵ is what Stevenson and Wolfers do. We see similar results; a positive and significant result for both rich and poor. Rich countries do have a larger coefficient which means they experience higher happiness when GDP per capita goes. This may tell us information as to how poor countries view the incremental dollar. A more detailed classification of income groups is used in this study. Income groups are further split into: *Low income*, *Lower middle income*, *Upper middle income*, and *High income*. Despite this being a more

² See Appendix for all Tables and Figures.

³ Country by wave FE are utilized due to the sparse yearly data in WVS waves. Country and wave FE thus will be a misspecification.

⁴ All ordered probit results are just coefficients and not marginal effects.

⁵ Cut-off is above and below GDP per capita of \$15,000.

detailed way of categorizing wealth, we only see the expected result for Upper middle income and High-income countries. No significance for Low and Low middle income countries. To be clear this analysis was just run on subsets of the data and therefore not to be viewed as a comparison of income groups.

Table 6 and 7 show the same the basic finding in Table 2 but using the happiness index created and Gallup poll happiness as dependent variables. These indices are to be interpreted as average national happiness. Using these indices is one more robustness check to see if the income-happiness positive result holds true at the national macro level. Results of the happiness index are similar to that of WVS happiness and satisfaction. The relationship between national average happiness and GDP per capita is positive and significant at the 1% level. Another difference is that we see higher R-squared for Gallup Poll happiness. A plausible reason is that both GDP and Gallup poll happiness are macro national estimates. This dynamic is understood more in Table 8. We may not be seeing this for the Happiness index because it was calculated from survey data. In general, we still see a positive and significant relationship with GDP per capita even using national average of happiness.

Table 8 shows analysis of the relationship between happiness and other traditional measurements. This is split using macro and micro versions of the data. For example for institutions there are two types of proxies. For the national average column we use an index of known variables of institutional quality (aggregate of corruption, law and order, etc). For the individual level we use a WVS freedom variable, which comes from a survey question asking individuals how free they feel in their respective countries. This is the same with Health and Education. The individual level variables are therefore subjective. Openness and globalization can only be interpreted on the macro level. There was survey reported income which could have been used instead of GDP however analysis shows that they reveal similar results. GDP per capita in itself can be viewed as individual citizen income anyway.

In a nutshell Table 8 shows us that the traditional measures perform better when regressed on individual level data. Institution quality and health as we would expect is important to people's happiness. We don't see much of a result for openness and globalization which is what we would expect. However the result for education is not immediately intuitive. A negative coefficient could mean that educated people are teased with potentially unattainable great opportunities opened up by education. One can imagine that when these opportunities are not

realized it could make one less happy. This is the hamster wheel effect. Of course there may be other reasons for this result.

Three more analyses are conducted as supplements to this research. The first is the relationship between importance of friends and family and happiness. As we would think people who value these things more, experience higher happiness levels. This shows us that of course there are other things in people's happiness function⁶. The second analysis is the relationship between the GINI index and happiness. Inequality is a proxy for relative income here. Results (see Table 9) shows a puzzling result: inequality increases with happiness. We would expect the exact opposite based on the literature and intuition. The more concentrated a national wealth becomes we would assume that people would be less and less happy. If most of the wealth in a nation belongs to the 1% that means less money for the rest of the population. As we've seen in this analysis as income rises happiness rises as well. We can therefore assume that the other direction holds as well. Therefore people should be unhappier with increasing inequality. There's also the potential jealousy effect of seeing someone else doing better than you.

This is what makes this result puzzling. However there are a few possible explanations. One, this is simply a new result. This is the least likely of the explanations because it goes up against logic and most of the current literature. Second is that it might be a simple issue of not having enough data. The data was collected from the World Bank and unfortunately it is sparse. The best collection of GINI data was put together manually from different sources and is not immediately accessible. Observations for each regression, as in the tables, are not the effective observations because it is repeated for each individual in each country/year. Thirdly, since income inequality is known to increase as GDP increases, and we've seen GDP increase with happiness, we may be just experience the effect of this result. Therefore wealthier countries may also have more income equality. Either, a combination, or none of these explanations could be the reason. However relative income in regards to happiness is definitely an interesting spinoff off of the income/happiness issue.

The last analysis is GDP per capita growth versus happiness. We would of course assume that we would see a similar result to the one in this paper. People should be getting happier as their income/well-being experiences growth. However results (see Table 10) show that there is no relationship between GDP per capita growth and people's happiness. This is definitely not

⁶ The adjusted R-squared on a lot of the happiness analysis is the primary prove of this.

the expected result. Reasons for this probably stem from the econometrics. The implications of all these results will be discussed next.

5. Conclusion

Results of this paper show that there is indeed a positive relationship between happiness and GDP per capita. This is consistent for varying income subgroups and regions. The effect of income on both poor and rich countries is largely the same. Splitting our analysis in regions also tells us how people within that region view the different survey questions. Results show that South Asians may view satisfaction differently from other parts of the world. This result is a key contribution to literature that may be a signal of a new narrative; such as the influence of cultural in happiness levels. This has been my experience. People from poorer countries seem to be happier. Of course there may certain things other income and culture in North America and South Asia that may be responsible for this result. Results of this research also show that personal family and friends positively influences one's happiness.

More generally the takeaway from this is that happiness is not as bad an economic measure as we may think it is. Happiness appears to be a good indicator and not a great economic measure. Why? Well as said people are sponges and are therefore influenced by all kinds of things and interact with all aspects of life. Therefore having no family and friends, experiencing a coup, a country's recession, will affect a person's happiness. How much they relatively affect personal happiness is an entirely different question. Nevertheless, this shows that at the very least governments should find a way of incorporating happiness measures into their economic analysis and policy making. This research has shown that happiness contains imprints of economic activity as well as social activity; both on a personal and national level. It is a great holistic measure of citizen well-being, and therefore can be very useful for analysis.

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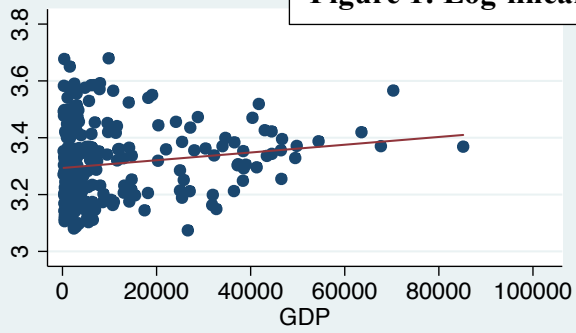
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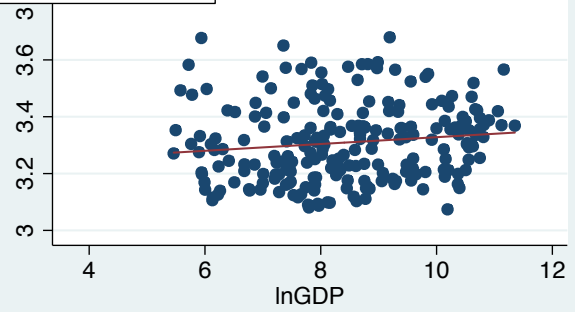
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Appendix

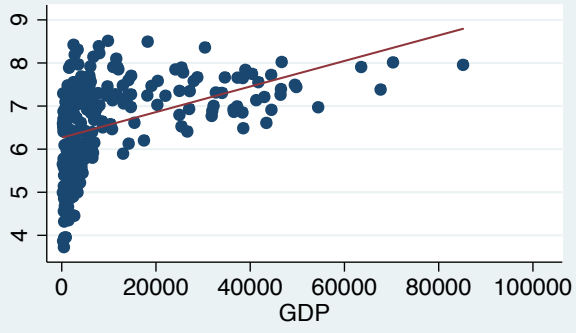
Figure 1: Log-linear relationship



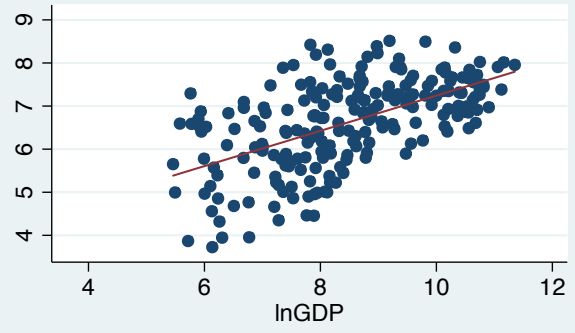
• (mean) happiness — Fitted values



• (mean) happiness — Fitted values



• (mean) satisfaction — Fitted values



• (mean) satisfaction — Fitted values

Table 3: Ordered Probit Happiness and GDP Regions

| | SSA | EU and Cntl Amer | Lat Amer & Carib | Midd E & Nth Af | N Amer | S Asia | E Asia & Pac |
|--------------------------|--------------------|-----------------------|---------------------|-----------------------|------------------------|---------------------|--------------------|
| HAPPINESS | | | | | | | |
| GDP | 0.0147 (0.0280) | 0.2549*** (0.0323) | -0.0064 (0.1163) | 0.2445*** (0.0928) | -0.5535*** (0.0101) | -0.0958 (0.2255) | 0.0496 (0.0411) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Weighted | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cluster | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No | No |
| Country x Wave FE | No | No | No | No | No | No | No |
| Pseudo R-squared | 0.008 | 0.055 | 0.017 | 0.021 | 0.007 | 0.01 | 0.009 |
| Observations | 38289 | 98201 | 45757 | 36561 | 10238 | 16944 | 47378 |

Table 4: Ordered Probit Happiness and GDP Income Groups

| | Rich | Poor | Low Inc | Low Mid Inc | Upper Mid Inc | H Income |
|--------------------------|-----------------------|-----------------------|---------------------|---------------------|----------------------|-----------------------|
| HAPPINESS | | | | | | |
| GDP | 0.4126*** (0.1285) | 0.08062** (0.0381) | -0.2056 (0.1899) | -0.0201 (0.1275) | 0.2572** (0.1170) | 0.2487*** (0.0593) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Weighted | Yes | Yes | Yes | Yes | Yes | Yes |
| Cluster | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE | No | No | No | No | No | No |
| Country x Wave FE | No | No | No | No | No | No |
| Pseudo R-squared | 0.013 | 0.014 | 0.012 | 0.013 | 0.021 | 0.026 |
| Observations | 64724 | 236906 | 13353 | 73751 | 113932 | 92332 |
| | Rich | Poor | Low Inc | Low Mid Inc | Upper Mid Inc | H Income |

Table 5: Ordered Probit Satisfaction and GDP

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------|
| SATISFACTION | | | | | | | |
| GDP | 0.1622*** (0.0013) | 0.1723*** (0.0013) | 0.1770*** (0.0014) | 0.1795*** (0.0015) | 0.1795*** (0.0235) | 0.1546*** (0.0454) | 0.9707 (0.8189) |
| Controls | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Weighted | No | No | Yes | Yes | Yes | Yes | Yes |
| Cluster | No | No | No | No | Yes | Yes | Yes |
| Wave FE | No | No | No | Yes | Yes | No | No |
| Country FE | No | No | No | No | No | Yes | No |
| Country x Wave FE | No | No | No | No | No | No | Yes |
| Pseudo R-squared | 0.007 | 0.012 | 0.014 | 0.017 | 0.017 | 0.059 | 0.070 |
| Observations | 306830 | 301630 | 301630 | 301630 | 301630 | 301630 | 301630 |

Table 6: Happiness index and GDP

| | (1) | (2) | (3) | (4) | (5) |
|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| HAPPINESS INDEX | | | | | |
| GDP | 0.06534*** (0.0003) | 0.06948*** (0.0003) | 0.07106*** (0.0003) | 0.06704*** (0.0003) | 0.06704*** (0.0165) |
| Controls | No | Yes | Yes | Yes | Yes |
| Weighted | No | No | Yes | Yes | Yes |
| Cluster | No | No | No | No | Yes |
| Wave FE | No | No | No | Yes | Yes |
| R-squared | 0.111 | 0.121 | 0.132 | 0.186 | 0.186 |
| Observations | 313628 | 308327 | 308327 | 308327 | 308327 |

Table 7: Gallup Poll Happiness and GDP

| | (1) | (2) | (3) | (4) | (5) |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| GALLUP | | | | | |
| GDP | 0.6073*** (0.0016) | 0.6061*** (0.0016) | 0.6159*** (0.0014) | 0.6265*** (0.0014) | 0.6265*** (0.0543) |
| Controls | No | Yes | Yes | Yes | Yes |
| Weighted | No | No | Yes | Yes | Yes |
| Cluster | No | No | No | No | Yes |
| Wave FE | No | No | No | Yes | Yes |
| Pseudo R-squared | 0.546 | 0.545 | 0.587 | 0.594 | 0.594 |
| Observations | 123406 | 122291 | 122291 | 122291 | 122291 |

Table 8: Happiness and traditional measurements

| | National Averages | | | Individual Level | | |
|----------------------|-----------------------|-----------------------|-------------------------|------------------------|-------------------------|------------------------|
| | Happiness | Happ Index | Ghap | Happiness | Happ Index | Ghap |
| GDP | 0.2034*** (0.0311) | 0.03703 (0.0259) | 0.6430*** (0.1089) | 0.1313*** (0.0191) | 0.05571*** (0.0170) | 0.6283*** (0.0649) |
| Institutions | -0.002586 (0.0043) | 0.0001286 (0.0034) | -0.009256 (0.0087) | 0.1704*** (0.0080) | 0.01485*** (0.0031) | 0.03011*** (0.0075) |
| Health | -0.003442 (0.0145) | -0.01594 (0.0104) | 0.009409 (0.0306) | 0.3257*** (0.0140) | 0.06521*** (0.0129) | 0.05904 (0.0485) |
| Openness | -0.001037 (0.0009) | -0.001169 (0.0008) | -0.002259** (0.0010) | -0.001109* (0.0006) | -0.001025** (0.0005) | -0.001054 (0.0017) |
| Globalization | -0.002580 (0.0030) | 0.001620 (0.0025) | -0.0001911 (0.0073) | -0.001346 (0.0016) | -0.001075 (0.0016) | -0.0006736 (0.0054) |
| Education | 0.0004742 (0.0042) | 0.003062 (0.0032) | 0.0009816 (0.0076) | 0.008742 (0.0066) | -0.007820** (0.0036) | -0.03391** (0.0159) |
| Observations | 115724 | 117287 | 58072 | 192765 | 194157 | 85106 |
| R-squared | 0.020 | 0.112 | 0.575 | 0.069 | 0.198 | 0.597 |

| Table 9: Happiness and GINI index | | | | |
|--|-----------------------|-----------------------|--------------------|-----------------------|
| | Happiness | Satisfaction | Gallup | Happ Index |
| GINI | 0.0187*** (0.0054) | 0.0240*** (0.0057) | 0.0276 (0.0153) | 0.0131*** (0.0035) |
| Observations | <i>117,104</i> | <i>117,153</i> | <i>68,102</i> | <i>194,157</i> |
| R-squared | <i>0.021</i> | <i>0.015</i> | <i>0.067</i> | <i>0.252</i> |

| Table 10: Happiness and GDP Growth | | | | |
|---|--------------------|---------------------|---------------------|-------------------|
| | Happiness | Satisfaction | Gallup | Happ Index |
| GDP growth | -0.5088 (1.813) | -2.042 (1.338) | -12.654 (11.714) | -0.396 (1.270) |
| Observations | 296,916 | 299,689 | 122,291 | 303,529 |
| R-squared | 0.008 | 0.003 | 0.045 | 0.072 |