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Analysis of Income and Environmental Degradation on Happiness

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Abstract: This study examines the effects of per capita income and environmental degradation on happiness. The increase in revenue lead the happiness increase, and the higher the CO_2 emission as an indicator of the increase of environmental degradation, the lower the happiness. This study employs a log-linear regression model on cross section data of 134 countries in 2015. The indicator of the happiness as the dependent variable is the world happiness index, and the independent variables are the Gross Domestic Product per capita and the level of CO_2 emissions. The empirical results show that the two of the independent variables influence the happiness, and in line with the hypothesis, the per capita income has a positive sign and statistically affects the happiness, and the CO_2 emission affects negatively the happiness. The implication of the study is the concerns of each country in the world to the quality of the environment and per capita income that need to be improved in their relation to the society happiness.

Keywords: Happiness, income per capita, CO_2 emissions

1. INTRODUCTION

The development of economic thought in the last decade leads to the concept of subjective well-being measurement. Welfare is not only measured by standard indicators such as GDP and its growth, but uses the preferences that compares the size of individual happiness levels. This evolution first appeared along with the fact that the rate of population between countries are very heterogeneous. There is a rich country but its population is also relatively large, otherwise there is a rich country but its population is low. There is also a poor country and the population is large and vice versa. Diversity of human capital that would have caused an error in the interpretation if the welfare indicator only use GDP alone. Accordingly, it appears the concept of per capita income as an effort to reduce these weaknesses. The next challenge arises when

there are differences in the cost of living standards between countries, which can not be ignored in the measurement of well-being.

Further developments that influence the welfare indicator for comprehensive views of measurement of the subjective well-being is happiness (Dolan, Peasgood, and White, 2008). Economists began to be interested in indicators of happiness and subjective well-being. Some economic research applied the economics of happiness approach to measure the welfare. Some economists are not only concern to the economic indicators include Easterlin (1974), Tella and Mac Culloch (2008), Frey and Stutzer (2010), Layard (2005), Blanchflower and Oswald (2004), Dolan *et al.* (2008). So it is not only income, spending, unemployment, poverty variables, but also the size of a degree of subjectivity as marital status and health. Happiness is also measured by the indicators of social capital and 'relational goods', such as membership of interest groups or friendly relations with neighbours, trust, and faith in God. Other indicators that affect happiness including the environmental quality characteristics such as climate, noise, air quality, water quality, waste management and access to green space - which will be specifically analysed in this paper.

Associated with the quality of the environment, some ecological economists began seeing happiness as a measure of well-being. There are two reasons why the environment affects happiness. First, concern for the environment usually direct conflict with the indicator of economic growth, production and consumption activities, for their externalities on the environment due to the activity. With the indicator of happiness as a measure of well-being, into consideration ecological economists to emphasize the quality of the environment as a success indicator of development (Gowdy, 2005). Second, the economics of happiness offers a new way to measure the quality of the environment (Welsch, 2009; Ferreira and Moro, 2010) - that the quality of the environment can be used as an approach that directly affect the happiness. This explanation shows that the problem of subjective well-being to get the attention of economists and economic policy makers and branches of happiness has attracted the attention of empirical research in recent years (MacKerron, 2011). This study aims to analyze how environmental quality as measured by the level of air emissions of CO_2 and influential state revenue for the happiness of the people of a country.

2. LITERATURE REVIEW

2.1. Happiness as a Dimension of Welfare

The "new economic welfare" approach which appeared in 1930, as the thought of John Hicks describes that no absolute size that affect human behavior in the perspective of economic utility, underlying the emergence of the concept of happiness as a measure of well-being. For the economics, the happiness is something that is hard to define but can be measured. Frey and Stutzer (2010) says that the economists "again" using the happiness as a mindset to measure the well-being of a group, the impact of policies, parameters of success of the government and others. Another consideration is submitted by Ng (1997), which defines the happiness as welfare, Clark and Oswald (1994) which define happiness as pleasure or satisfaction, and Easterlin (2001) that defines as subjective well-being, satisfaction, utility, well-being, and welfare.

The study of happiness that is associated with the income was first done by Easterlin in 1974. The study finds the paradox of happiness or income paradox known as the Easterlin Paradox, namely an increase in income does not increase a person's well-being or happiness (Easterlin, 2001). The similar study is conducted by Clark, Frijters, and Shields (2008) in the United States. Easterlin paradox also suggests the

existence of other factors besides income (material) that affect happiness. Absolute income is not the important factor in determining happiness but relative income or the ratio of income (income comparison) and income aspirations (Stutzer 2010). Factors non material that is important because it involves the social dimension, institutional and environmental, as described by several studies of Frey and Stutzer (2002), Rangel (2003), Helliwell and Putnam (2004), Gowdy (2005), Welsch (2009) , Ferreira and Moro (2010), and MacKerron (2011).

2.1. Happiness and Environmental Quality

The measurement of the welfare then again in the scientific stages of classical economics, that the subjective well-being can be measured from the behaviour of individuals when responding the determinants of happiness (Kahneman and Krueger, 2006). So it is important to understand and to further examine the factors that contribute to the welfare of individuals. It is necessary to evaluate the impact of macro-economic policies for the welfare of the individual which is reflected in the satisfaction (Layard, 2005; Frey and Stutzer, 2010) Welfare is not only measured by the utility which is equivalent to the consumption and income, but it is also influenced by subjective indicators as a measure of utilities such as the characteristics of pollution, noise, health, social and family.

The use of subjective variables can be more effective in assessing the success of the policy. The idea that welfare is not identic with income has a long been a topic of interest to study by the ecological economists as proposed by Scitovsky (1976), Hirsch (1976) and Easterlin (1974). The relationship between the environment and human psychology has been studied for several times but the relationship between subjective well-being and environmental quality and human behaviour towards the environment is new in the realm of research (Kellert and Wilson, 1983). Only a few economists examine the relationship between welfare and environmental factors. Rangel (2003) finds a positive relationship between economic well-being and concern for preserving the environment, especially related to the perception of quality for future generations. Welsch (2002) uses the size of individual perception to analyse the trade-off between the welfare and behaviour of individuals to environmental quality.

In the traditional economy, it is possible to trade-off between the welfare measurement and environment if it is applied the approach of a competitive normal goods and non-competitive goods such as leisure, beauty, and clean air. Layard (2005) argues that public policy that focuses on increasing the availability of non-competitive goods, such as environmental quality, it may be more effective to measure the subjective well-being. Perception of individual satisfaction of the environmental features have a positive effect (landscapes, interactions with plants and wildlife), as well as negative effects (pollution, degradation and piles of garbage) on welfare.

3. RESEARCH METHODOLOGY

This study employs the cross section data of 134 countries. The analysis is performed by the log-linear regression model with the dependent variable is the happiness index 2015 version of the World Happiness Report 2016 Volume 1. The independent variables that affects the happiness are variables that according to income with a constant price GDP in 2010 and environmental degradation variable is represented with the CO_2 emission indicator. Two independent variables used in this study comes from the Key Indicators, World Bank. Log-linear regression model used in this study are:

$$LogHI_i = a + b_1 logGDPCAP_i + b_2 logCO_{2i} + e_i \qquad (1)$$

HI is a Happiness Index and GDPCAP is Gross Domestic Product per capita in US $ million. GDPCAP represents the income variable which is hypothesized to affects positively on happiness. CO2 is CO2 emissions by kilotons unit, which is reflected the environmental degradation variables. The environmental degradation is the inverse of the quality of the environment, so that environmental degradation variable (CO_2) hypothesizes affect negatively on happiness. The subscript i refers to component of the cross section. Log-linear regression equation is then estimates through a series of classical assumption test to produce a best estimate coefficients, linear and unbiased (BLU).

4. RESULTS AND DISCUSSIONS

The estimation result of the empirical model of 134 countries in 2015 shows that the GDP per capita is statistically significant and has positive effect on the happiness (in the level of significant á=5 percent). The CO2 emissions as an indicator of environmental degradation, has a negative influence on happiness (á=5 percent) (Table 1).

This study provides empirical findings that revenue is still the main determinant affecting happiness. This is demonstrated by the high level of considerable significance. Easterlin Paradox has not been proven in this study, because the study did not distinguish the characteristics of countries (developed, developing and poor) and the study was only performed at one point period.

Table 1
Log-Linier Model Estimation

Variable	Coefficient	t-Statistic
LOG(GDPCAP)	0.094292	10.34192**
LOG(CO2)	-0.012492	-2.117187*
C	0.961213	12.23521**

Note: ** significant at $\alpha = 0.01$; * significant at $\alpha = 0.05$

As known from the parameter value of GDPCAP, it indicates that the rise in a country percapita income by 1 percent would increase the index of happiness at 0.094 percent. The economic variables like income, still indicated as the significant variable to influence the happines of people in the world. CO_2 parameter value is the -0012, which shows that the rise in CO2 emissions by 1 percent would lower the happiness index by -0.01 percent. According to the research of Welsch (2002), which emphasizes that environmental aspects influence towards the happiness. Society responds to the pollution that has negative effect to the welfare subjectively.

5. CONCLUSION

Empirically, this study proves that the income is the significant variable that affects the individual happiness in the world. In order to improve the welfare of society, the individual income indicators can still be used as a target to be raised. The environmental quality aspects is also proven to affect the happiness of the world community. Based on examination on the two variables in this study, it is suggested that to achieve a

comprehensive welfare, the policy maker not only pay attention to economic indicators but also other indicators that represent happiness. Besides that, it also suggests to using the more complex model like the panel data model to cover time series behaviour besides only one point period as the cross section data.

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