

Green economy as an environment-based framework for Indonesia's economic reposition structure

Evi Susanti Tasri¹, Syafruddin Karimi²

¹ Faculty of Economics, Universitas Bung Hatta, Padang, Indonesia.
e-mail: evitasri@yahoo.com

² Faculty of Economics, Ekonomi, Universitas Andalas, Padang, Indonesia.

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Abstract

Economic development should consider the negative effects it creates. This will help to achieve a sustainable economic development. The green economic concept can be a solution to development process that works on natural resources conservation. This paper proposes a discriminant analysis to describe the green economic development. It analyses a group of countries, classified by their income levels. The analysis result suggests that environment factors such as emissions and area of the forest are important variables.

Abstrak

Pembangunan ekonomi harus mempertimbangkan efek negatif yang diciptakannya. Pertimbangan semacam ini akan membantu menciptakan pembangunan ekonomi yang berkelanjutan. Konsep ekonomi hijau dapat menjadi solusi untuk proses pembangunan yang berlandaskan pada konservasi sumber daya alam. Makalah ini mengusulkan sebuah analisis diskriminan untuk menggambarkan proses pembangunan ekonomi hijau. Makalah ini menganalisis sekelompok negara, yang diklasifikasikan berdasarkan tingkat pendapatan mereka. Hasil analisis menunjukkan bahwa faktor lingkungan seperti emisi dan kawasan hutan merupakan variabel penting.

Introduction

All members of ASEAN agree to establish economic integration, namely the ASEAN Economic Community (AEC) to improve the competitiveness of the overall region in the world markets, promote economic growth, reduce poverty and improve the standard of living, which are expected to be achieved by 2015. To realize the AEC by 2015, all members of ASEAN need liberalization of trade in goods services, investment and labour as stipulated in AEC blueprint.

Currently, the economic growth of individual ASEAN countries has increased, including Indonesia as the ASEAN member with the largest population (40% of the to-

tal population of ASEAN). It is the potential and challenges to be able to bring economic integration to realize the welfare of Indonesia's population. Subsequently, one of the important indicators is the level of economic growth that is resulted from the economic development process. However, the process of economic development is often regarded as a target of the economic growth rather than as an indicator of development. Therefore, the process of achieving these targets sometimes ignores the negative effects that might be arisen.

Human activities often damage the environment and deplete the natural resources. The limited capacity of the earth should motivate people and governments to

care for the environment. The economic growth has affected on the destruction of the environment such as global warming. The environmental crisis is one of the negative effects of the economic development process. Therefore, the concept of economic development process based on green economic becomes important, especially if we consider resource constraints.

Currently, the climate change has been a crucial topic. As mandated by the Copenhagen Accord in Pittsburg in 2009, Indonesia commits to reduce green house gas emissions between 26% to 41% by 2020. It is also reinforced by the commitment of Indonesia in 2010 in Bali, where the president called for the importance of economic growth with equity by running the 10 directives; one of them is the strengthening of the economy with the green economy. Indonesia's vulnerability to climate change makes Indonesia as a country that has a high risk.

Recently, Indonesia has been conducting the implementation of a green economy. The core of the green economics is a long-term national development plan. The Law No. 32/2009 regards the environmental protection and management of a strategy to achieve the goal of a green economy. The law uses the economic instruments to achieve a safe environment management without sacrificing economic growth and national targets for the reduction of CO₂ emissions by the National Action plan. However, the Indonesian government has enormous challenges such as spending a large amount of its budget on fuel and electricity subsidies. Despite its emission reduction targets by 2020, Indonesia is still considered as the most advanced developing country committed to reduce emissions.

Morrissey (2012) stated that the green economy can protect the bad effects of the capitalism such as systemic effects of injustice and bad environmental problems. It is known that 5% of the earth's popula-

tion consumes 25% of energy sources, and therefore it is necessary to guarantee the country's ability to develop natural resources (Bran and Ioan, 2012). This problem is reinforced by the findings that in 2030 only 30% of the city is predicted to care of the environment of the city and 80% of greenhouse gas emissions are from urban areas, as stated by Morrissey (2012). It is estimated that a half of the world's population living in urban uses more resources, produces more waste and emissions of greenhouse gases. Furthermore, it is also the reduction of cultivable land which causes the global climate change. Meanwhile, if a country applies the concept of green economic, the world income per-capita could be higher than 16% with the increasing variety of environmental indicators, (Ocampo, 2011).

Based on Kyoto Protocol in 1997, the several steps have been performed to set up the clean development mechanism. At the first step, 37 countries were committed to reduce greenhouse gases of 75% by the maximum level of greenhouse gas emissions in period 2008-2012 and also has offset with an increasing emissions in other countries (Richard et al., 2013). The quality of the environment is associated with the reduction of emissions by the accumulation of productive capital. In the early stages, the accumulation of productive capital is driven by policy. Environmental quality declines with environmental emissions (Saito and Yakita, 2008). Then the growth of the environmental crisis must be balanced by human behavior. The environmental crisis needs changes in public policy and also changes in the individual attitudes. Human beings and the natural world determine the quality of the environment. Often, the human activities damage the environment and deplete resources. To solve the problem, the community may adopt the green technologies based on innovation and further research in human brain (Docksai, 2012).

However, according to Popescu and Zamfir (2002), there is no definition of "how to be the better". For an example, when a company has claimed the ecological product, often the consumers give a skeptical response. So, it can be noted that it is very difficult to change the consumer orientation. It is suspected, as a consequence, that they have to pay more than other products (Roper, 2007), and is reinforced by other findings which convey that 42% of consumers does not believe that ecological product works for environmental conservation (Hanas, 2007). In fact, the data shows only 12% of US residents who uses environmentally friendly products and the other 68% only sometimes uses them (Roper, 2007). It is also found that companies that expand environmentally friendly products in the market variations have increased profit and competitive advantage compared to other companies that do not produce environmentally friendly products.

On the other hand, the fact said that not all countries can be more green, especially in economic terms. The developing countries cannot set an efficient policy. They can only benefit from the international aid agencies establishing an effective environment, such as a model of the politico-economic by John and Manuelli in their paper. In addition, Stokey in his paper also assumed that the poor countries use unclean technology, but after a certain point, they might switch to use clean technology. This is because economic agents behave without taking into account of the natural resource values and no one has an incentive to preserve the environment.

The green economy has emerged in Indonesia. However, to measure achievement and effectiveness of green economy is still too far away. Hence, it is realized that financing green economy as a major issue needs a shift of financial resources. The Law No. 32/2009 potentially shifts the macro-economic paradigm because the law explicitly mentions how environmental is-

ues need to be integrated with the economic management. And it was reinforced by a presidential decree No. 16 of 2012 which says that the policy direction towards the development of an investment should be green economic development programs. The economic development targets must be in line with the objectives of development issues. The development of macro-economic environment is still far from the green concept. This happens for the economic development ignores sustainability. The green economic requires comprehensive efforts to drive sustainable environment.

It concludes that the green economic concept is important. However, the community and the government pay a little attention to the concept. This might stem from the difficulty in changing the mindset and the basic policy in economic development by understanding the importance of the implementation of green economy to preserve resources and the achievement of sustainable development. Therefore, the purpose of this study is to determine the factors that influence the implementation of green economy.

The development of an economy requires human awareness of limitation of the natural resources, along with the population growth. Therefore, it needs to create long-term of steady-state between the resources and the environment (Bran and Ioan, 2012). This attempts to protect the resources and decrease of the resources usage ratio.

So far, indicators of economic development do not involve the value of natural resources depletion, environmental degradation and pollution. Therefore, the green economy method can be interpreted as a model of economic development approach. This method does not rely on economic development based on the excessive exploitation of natural resources and the environment. The green economy is a model of economic development based on

knowledge of the ecological and green economics. It is aimed for the interdependent solution between economies and ecosystems as well as the negative impact of economic assets, including climate change and global warming.

Meanwhile, according to the United Nations in the General Assembly in 1985, the development is a comprehensive process of social and political culture in order to further improve the living standards of the population and the individual. Population growth has a negative effect on the environment; it reduces the productivity of natural resources. As a consequence, a basic model for stability in economic growth is needed.

Indeed, the green economic growth in anticipation of climate change is needed, because economic growth damages the environment such as global warming. It is also agreed by Kuznets statement that the GNP is not the most important thing in determining the economic growth of a country. It is because the economic growth should consider the quantity and quality between the short run and the long run.

On the other hand, many researches state that the globalization of capital leads to bad consequences such as loss of habitat and species. Another consequences is a decrease in marginal benefits of environmental quality associated with the addition of pollution reduction, as was found for the state of Japan by Saito and Yakita (2008). But the next problem is the cost of environmental policy shifted to consumers in the form of higher prices, which leads to a rise in the level of consumer prices. This implies a decrease in the real factor returns (Goulder, 2013). These conditions lead to market failure. Furthermore, it needs a comprehensive model in establishing this policy to reduce negative effects. The inherent costs of a clean economy are much lower for external value of the negative environmental, economic and political security risk.

Another genesis of the green economy in the development of the theory of distribution is driven by the uneven distribution of wealth. Income inequalities, exploitation and unfair policies are received by workers, such as law "iron wage" and corn law; these are some of the triggers of European uprising such as the working class (labour) revolution and the murder of the noble class in 1848.

Another consequence of the social revolution in the mid-19th century was the development of Socialist and Marxist economics as the opposite the Capitalist economy. The capitalist economy came to a standstill. But at the end of the 19th century, revolution marginal utility which was a genesis the micro-economics capitalist pushed capitalism forward. Kennet and Heinemann (2006) stated that green economics as a new school of thought began to show its shape exploring the purpose, roots and philosophical foundations. They also stated that the green economic philosophy is to regulate the economy as usual nature, instead of setting the environment for business as usual (Kennet and Heinemann, 2006).

Mainstream economics does not account the social order and the environment of the households and business place. For several hundred years the mainstream economics has viewed the abundant nature as a source of free and been drained for accumulating capital. Environmentalism adjusts the economy in the form of neo-liberal economic sustainable development. Park (2013) states that the green economy is a sub-pillars of sustainable development. According to Kennet and Heinemann (2006), in line with the philosophy of ecologies, the green economic is generated by discipline of economics.

Park (2013) highlighted the importance of the green growth concept presented by policy makers and practitioners of international organizations in 2009. The concept originally comes from the Green New Deal of the UN Environment Pro-

gramme (UNEP). The green growth was used firstly in 2005 in the 5th ministerial conference in the ESCAP (Economic and Social Commission for Asia and the Pacific). They discussed the Development and Environment in Asia and the Pacific after they mentioned them in the Davos Forum and *The Economist* in 2000. The main reason to hold the discussion are the disappointing results of the concept of economic growth that fails to internationally promote the principles of tangible environmental and policy frameworks and the emergence of the concept of sustainable development. Economic growth has been proposed as an alternative to foster the dynamics of the global environmental organization and give new energy to the world economy (Park, 2013).

The development of "green economy" to "green economics" is not separated from the development of the study of the green growth. The awareness of physical capital and the reduction of the supporting capacity of the environment shifted consumer demand from the maximum utility towards optimum utility that took into account environmental sustainability. In 1972, a report written by Meadows for the Club of Rome revived discussion on environmental capacity in the era of modern economics, which raised Maltus's concern nearly two hundred years ago. The Economists are so passionate to study and disassemble economic theories and test them with the data, in order to prove the necessity of environmental value such as natural resource pricing in economic (Park, 2013). Pollutant is one aspect of environmental impurities as a theme that has been accepted and become a global policy. The term ecological economist is created to distinguish between mainstream economists (environmental economist) and green economists.

Popular theories have been used by ecologists to conduct research such as the Environmental Kuznets Curve (EKC), which adopted from Kuznets Curve (KC).

This curve explains the relationship between income per capita and inequality. Kuznets concerns with the character and cause of long-term changes in the distribution of income of individuals with income data taken from the American, the UK and Germany (Prussia, Saxony and others Germany area) with a span of several decades. Several studies prove that this curve is not applicable to Latin American countries or countries of East Asia and prove that Simon Kuznets hypothesis was rejected (Yandle et al., 2002).

Environmental Kuznets Curve (EKC) is widely used in various studies of the relationship between the economy and the environment. EKC is adopted from the Kuznets curve inverted U-shape to explain the relationship between environment and income. The EKC term was popularized in the World Bank Development Report 1992 (Stern, 2004).

The validity of the EKC as standard curve of ecological economic is an interesting research theme. In some cases, EKC is the best approach to the relationship between changes in the environment with revenue growth, and in some cases, it is not. The GDP growth created the conditions which the environmental quality improvement needed. In addition, resources can be allocated to improve the quality of the environment (Yandle et al, 2002).

Other researchers also tried to explain the relationship between the Solow growth model and the EKC. Brock and Taylor (2010), for example, try to explain their arguments on the close relationship between the core model of modern macroeconomics and Solow-Swan model, which is a standard curve of environmental economics, the EKC. Furthermore, the EKC was a derivative product that needs of convergence to a Sustainable Growth (Brock and Taylor, 2010). Saito and Yakita (2008) investigated a green Solow model to obtain optimal environmental policy. This was optimal allocation of government funding

to the productive capital and reduction of pollution.

Therefore, after long-term optimum is reached, environmental quality is optimally supported by policies regarding investment environment. In addition, the relationship between income and pollution has a V-oblique-reverse. The EKC might be reflecting the development and environmental policies.

Methods

Various economic growth models have suggested that pollution decrease is parallel to per-capita income increase. In this paper, the model is developed to investigate the environmental factors that influence the degree of a country's economic growth. The model also adopts determinant variables that could influence a country's economic growth.

An estimation method of discriminant analysis model is hoped to be able to determine variables that are able to be a decisive group of countries by income. The formula is as follows:

$$D = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \quad (1)$$

where

D = Discriminant score; $D = 1$ represents high-income countries, and $D = 2$ represents low income countries.

α_0 = Constant

$\beta_{1...5}$ = Determination coefficient

X_1 = Emission

X_2 = Population

X_3 = Foreign Direct Investment (FDI)

X_4 = Forest area

X_5 = Unemployment

The environment variables selected in this model were emissions, forest area and unemployment as proxies for poverty. FDI

and population are expected to influence economic growth.

The environmental quality declined is parallel to environmental emissions (Saito and Yakita, 2008). Poor countries usually use dirty technology at the beginning, but after a certain point, they switch to a cleaner method. Citizens can be inputs of the development process. In developed countries that adopt the clean technology, the people can serve inputs for more green development. Countries with low level quality of population tend to exploit resources, and become major source of emissions.

Brock and Taylor (2010) discuss the influence of technology adoption to pollutants value, in their publications Green Solow model. The globalization of capital leads to some negative effects such as a loss of habitat and species. The bad consequences were caused by the high level of exploitation of natural resources.

Forest area is an important factor of the environment quality. The GDP growth is important as it can provide the funds to improve the environmental quality (Yandle et al., 2002). In addition, forest fires are also the largest contributor of CO₂ emissions.

Unemployment is a proxy for poverty. Inequality in income distributions is a topic of Kuznets curve. The Kuznets curve is popularly used in view of economic relations to the environment. Kuznets said that the increase in per capita income would lead to an increase in inequality of income up to a certain point, and then the increase in income would reduce the level of economic inequality (Yandle et al., 2002).

Discriminant Coefficient Test

The discriminant coefficient test is formulated as follows:

$$F = \frac{SS \text{ between}}{SS \text{ within}}$$

Canonical correlation is used to measure the relationship between the dependent and the independent variables.

$$r_i = \sqrt{\frac{d_i}{1 + d_i}}$$

Where r_i = canonical correlation for i^{th} group, and d_i = the eigen value for the i^{th} value.

The variable definition is as follows. Foreign direct investment, namely net inflows (BoP, current USD), is the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors. The data of this variable are in current USD.

Total Unemployment (% of total labor force) is the share of the labor force without work but available for and seeking

employment. According to the World Bank, forest area (% of land area) is the land under natural or planted stands of trees of at least 5 meters in site from, whether productive or not, and excludes tree stands in agricultural production systems (for example, in fruit plantations and agro-forestry systems) and trees in urban parks and gardens.

Carbon dioxide (CO₂) emissions are those stemming from the burning of fossil fuels and the manufacture of cement. They include carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring. Population in this paper is the total population of a country in a given year. The data used in this study are time series data during 2010 in the form of cross section data between countries by income level as many as 52 countries. Data were obtained from the World Bank online database.

Result and Discussion

From the statistical results in Table 1, there was a significant difference to emissions with the value of Wilks' lambda of 0.915 and significant at 0.029 (97%) and forest area with Wilks' lambda of 0.896 (99%) and significant at 0.015.

Table 1: Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Emission	.915	5.004	1	54	.029
Population	.992	.458	1	54	.502
FDI	.937	3.610	1	54	.063
Forest	.896	6.285	1	54	.015
Unemployment	.961	2.200	1	54	.144

Table 2: Canonical Discriminant Function Coefficients

	Function
	1
Emission	.002
Population	.000
FDI	-.001
Forest	.038
Unemployment	.123
(Constant)	-2.036
Unstandardized coefficients	

These results indicated that these two variables can be used to form the discriminant variable. Un-standardized discriminant function estimation equation can be seen from the canonical output (Table 2). The resulted discriminant function equation is as follows:

$$Z = -2.036 + 0.002\text{emission} \\ + 0.000\text{population} - 0.001\text{FDI} \\ + 0.038\text{forest} + 0.123\text{unemployment}$$

Table 3 lists the value of Wilks' lambda of 0.758 or the chi-square of 14.297 and significant at the 0.014. It can be concluded that the discriminant function is statistically significant for both groups of the countries. In other words, there was a significant dif-

ference in the mean value of the discriminant cores for the two groups of countries.

In conclusion, the variation of the independent variables provide a discriminant of 0.492^2 and the observations have been classified with an accuracy of 75%.

The current condition of Indonesia might lead to a vulnerable environment. As seen from Figure 1; the Indonesian economic growth, the value of Indonesia's GDP was lower than that of the developing Asian countries. This condition absolutely affects the competitiveness of Indonesia in the International market.

Table 3: Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	Df	Sig.
1	.758	14.297	5	.014

Table 4: Eigen values

Function	Eigen value	% of Variance	Cumulative %	Canonical Correlation
1	.320 ^a	100.0	100.0	.492

a. First 1 canonical discriminant functions were used in the analysis.

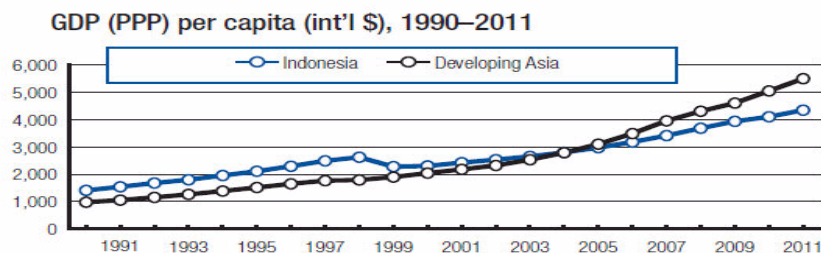
Table 5. Classification Results b,c

		Negara	Predicted Group Membership		Total
			high income	low income	
Original	Count	high income	20	8	28
		low income	6	22	28
	%	high income	71.4	28.6	100.0
		low income	21.4	78.6	100.0
Cross-validated ^a	Count	high income	19	9	28
		low income	6	22	28
	%	high income	67.9	32.1	100.0
		low income	21.4	78.6	100.0

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

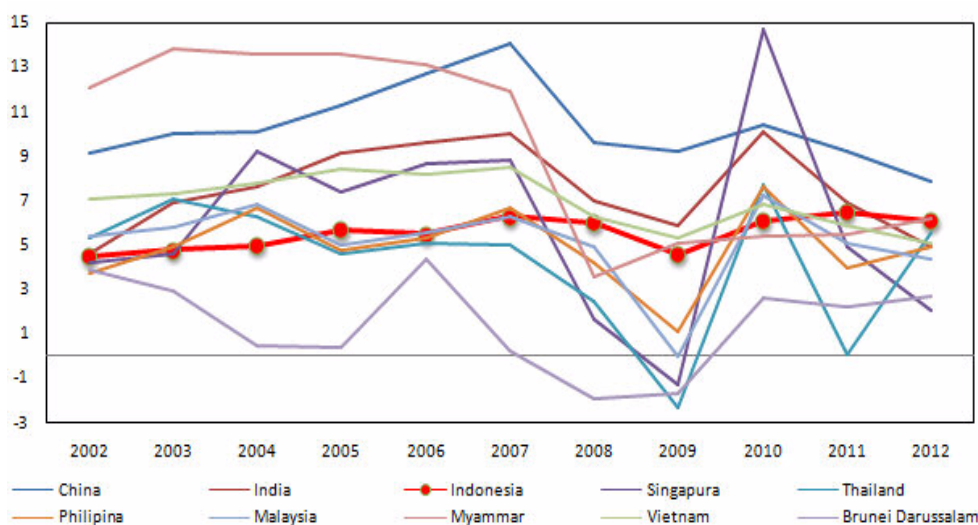
b. 75,0% of original grouped cases correctly classified.

c. 73,2% of cross-validated grouped cases correctly classified



Source: World Bank Online Database

Figure 1: Comparison of GDP per capita Indonesia and Developing Asia



Source: World Bank online database

Figure 2: The Economic Growth in ASEAN, China and India (2002-2012)

Table 6: The Global Competitiveness Index 2012-2013

ASEAN Countries	Rank in The Global Competitiveness Index 2012-2013
Brunei Darussalam	28
Cambodia	12
Indonesia	50
Lao	19
Malaysia	25
Myanmar	60
Philippines	65
Singapore	2
Thailand	38
Viet Nam	75

Source: The Global Competitiveness Index, 2013

In the world economy context, the economic growth of the ASEAN countries, China and India can be seen in Figure 2. The Figure 2 shows that Indonesia got a relatively lower level of the economic growth comparing with the other ASEAN countries, China and India. However, the rate of economic growth of Indonesia was relatively stable. Meanwhile, the Global competitiveness index of Indonesia was the lowest in ASEAN countries as in Table 6. The Global competitiveness index is one of the factors that influence a country to do business. Therefore, according the value of the Global competitiveness index of Indonesia, that can be explained why the Indonesian economic growth tends to be lower.

However, Indonesia was only better than Myanmar, the Philippines and Vietnam among ASEAN countries. Consequently, Indonesia might be less priority in international business. This condition can affect the reduction in the value of investments and the development of economic activity in Indonesia. Therefore, that would influence the Indonesian economic growth.

Conclusion

This paper proposed a discriminant analysis to describe the green economic development. It analyzed a group of countries, classified by their income levels. The analysis result suggests that environment factors such as emissions and area of the forest

are important variables. It also noted that all countries in the world should be responsible for the environment quality, an important key for sustainable life and economic development. Future researches might focus on investigating various trends of country's income level as well as determining how the environmental conditions of the country concerned. Poor countries tend to have a low level of awareness on the environment. They exploited the environment to increase their income.

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