# ANALYSIS OF GREEN ECONOMIC GROWTH CONCEPT IN THE ASEAN COUNTRIES

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**Abstract—** This study examines the rate of economic growth with the concept of green economy in the Asean group of States, in this case the green GDP which is the conventional GDP minus depletion and degradation of natural resources with the variables suspected to affect its value is capital, labor and economic openness. From the data processed by the data panel showed that for Asean Countries, turns on a fixed effect model found that, the value of capital and trade openness affects the formation of green GDP, but the workforce has a negative influence.

**Index Term—** Green GDP, Capital, Labor, Trade Openness.

## I. INTRODUCTION

Economic development requires a change in policy and behavior in economic activities (human evolution). This is caused by the limited natural resources, coupled with population growth, so that the changes in policy and behavior are expected to create a steady state between resources and the environment for the long term [1].This has led to efforts to conserve resources and limit the usage ratio. At present, an indicator of economic development is not accompanied by information about the waning value of natural resources (depletion) and environmental damage and environmental pollution (degradation). So a concept which accommodates this is required. The green economy approach is a concept that has taken into account the impact of depletion and degradation which is a model of economic development approach that no longer rely on economic development based on the exploitation of natural resources and environmental overload.

The green economy is a model of economic development based on knowledge of the ecological and economic green aimed at answering the interdependence between the economy and the ecosystem as well as the negative impact of economic assets, including climate change and global warming. Green economic growth is also needed to address climate change, because economic growth resulted in environmental damage such as global warming[2].This is also supported by Kuznets statement stating that GNP is not the most important thing in determining the size of a country's economic growth because it should describe the quantity and quality between the short run and the long run.

On the other hand, the concept of conventional economics does not take into account the environmental dimension in the form of depreciation (depletion) of natural resources and damage or degradation of the environment even though it obviously is the contribution of natural capital (natural capital) to economic development[3].This was apparent in conventional GDP only enter human resource depletion artificial (man-made capital), but not yet showing depletion of natural resources and environmental degradation as the depletion of natural capital (natural capital) in the production process. Depletion of natural resources reduces the natural capital (natural capital) and environmental degradation, reduce production capacity and simultaneously absorb the financial capital for the improvement of environmental conditions that were damaged by the activities of production, thereby reducing the production capacity during the period.

The values obtained from the conventional concept is supposed to provide the perception and the consequences of wrong on the direction of development and does not take into account the concept of sustainable development in the future, namely the economic and social development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Furthermore, ekonomimengadopsi what is known as the capital approach, which only focus on the availability of capital as the basis for development and achieve sustainable development without giving and taking into account the scarcity of resources and environmental damage caused by the construction process. It is expressly regarded as a weakness in conventional GDP.

On the other hand, it is known that the globalization of capital lead to bad consequences such as loss of habitat and species [4]. Marginal benefit from the quality of the environment related to the addition or reduction of pollution, where this is necessary in achieving the social optimum in the case in Japan [5]. In addition, the next issue is if the cost of environmental policy shifted to consumers (in the form of higher prices), the level of consumer prices will rise, this condition implies a reduction in real returns factor [6]. Therefore there is market failure. For that we need a comprehensive model in setting a policy, so that the negative effects of the development process can be reduced. So that the costs inherent in

building the clean economy is much lower given the negative externalities on the environment, economy and politics.

Economic openness trade has long been debated. Although it has been markedly absent from the growth model, now, the relationship between greater openness and GDP growth has had considerable theoretical support [7] .Studi empirically describe openness through a variety of approaches to try to describe the various forms and behavior of trade policy. As a consequence, created a lot of measure openness and trade policy.

## II. LITERATURE REVIEWS AND HYPHOTHESIS

### *2.1The development of the Green Economy Theory*

In his study, Maltus incorporate environmental constraints into its economic model. Maltus the view that growth in food production at a time is no longer able to support the growth of the population. It can be seen as a form of concerns. Concerns about the carrying capacity of the environment is what is the seed of the birth of the green economy. While [8] states green economy as a new school of thought that started to show its form and begin sailing the goal, roots and philosophical foundations. According Kennet, green economy is based on the philosophy of "How to regulate the economy for the usual nature and not set the environment for business as usual". UNEP explained that the green economy is an economic model or concept in economic development based on knowledge of ecological economics, while Margulis, wider and loose defines green economy as any economic theory that economies are considered as a component of the ecosystem in which it is located. Therefore, in a discussion at Bappenas, Sudarsono Soedomo tried to explain the concept of a green economy through social, cultural and technological approach in his paper [9].

### *2.2 Green Economy Comparison with Conventional Economics*

The Comparison between conventional economy and green economy in the perspective of ecological economics as follows:

Table 1. Comparison between Conventional Economy and the Green Economy (Eco-Economy)

| Conventional Economy | Green Economy (Eco-Economy) |
|---|---|
| • Market forces lead.<br>• Not sustainable: maximum profit regardless of the ecosystem.<br>• Many of the consumption of fossil fuels.<br>• Damaging the environment and climate.<br>• carbon-based car industry.<br>• Pollution, noise, and loss.<br>• Decreasing the continuing depletion of natural resources. | • Respect the principles of ecology.<br>• Sustainable.<br>• Identify ecosystem services.<br>• Rely on renewable resources.<br>• Minimize pollution.<br>• hydrogen-based car industry.<br>• Develop a bicycle friendly city. |

Source: [10]

### *2.3Several studies on Green Growth*

One of popular theory used by ecologists in conducting research is the Environmental Kuznets Curve (EKC) which adopted form Kuznets Curve (KC). Kuznets curve is a curve that was created by Simon Kuznets (1955) to explain the relationship of income per capita (x-axis) with inequality (y-axis). Kuznets said at first increase in per capita income will lead to increased inequality in income up to a certain point (turning point), then the increase in revenue will be lower levels of economic inequality [11].

Environmental Kuznets Curve (EKC) is widely used in various studies the relationship between the economy with the environment. EKC is a curve that was adopted from the Kuznets curve inverted U-shape to explain the relationship between the environment and revenue. EKC concept emerged in the research report [12] on the environmental impact of North American free trade agreement to the National Bureau of Economic Research. EKC The term was later popularized in the World Bank Development Report 1992 [13].

Besides EKC, other researchers also tried to explain the relationship between the Solow-Swan growth model with EKC. Brock, for example, tried to explain his argument will be a close relationship between modern macroeconomic core model, Solow-Swan model with a curve which is a standard curve of the economic environment, the Environmental Kuznetz Curve (EKC). They explained that by modifying the Solow model to incorporate technological progress into pollution reduction concluded that EKC is a derivative product that needs to be out of convergence to a Sustainable Growth [14].

Investigated a Green Solow model to obtain the optimal environmental policy that is optimal allocation of government budget for productive capital and reduction of pollution [5]. Concluded, after a long-term optimum is reached, the environmental quality optimally supported by the investment policy environment, the relationship of income and pollution has a V-slanted-inverted, so EKC perhaps reflecting the policy development and the environment.

### *2.4. Green GDP*

Theoretically, GDP has failed as a measure of economic welfare. Nevertheless, GDP is still a major macro-economic indicators in the System of National Accounts (SNA), which is a measure of a country's economic activity.

According to the concept of sustainable development, GDP is a poor measure of welfare. Therefore, the green economists are trying to build a better system (theory). In relation to the environment, the Green GDP has been used as a new indicator of economic openness research [15]. While the issue of theoretical and computational make Green GDP accounting system was not universally accepted but Green GDP

presents data in a time sequence (time series) that can be used to examine the relationship between GDP and a factor that is included in the traditional economic growth model.

One factor that is subject of intensive testing is economic openness. A model was built for growth Green GDP [7]. Part of the macro-economic influence by the green economy is the aggregate supply and aggregate demand. In anggregate Supply, the number of natural capital stock, and a production process from input provided by nature will be highly dependent on the availability of supply and will ultimately affect demand in an economy.

### *2.5 Gross Fixed Capital Formation*

Fixed capital formation refers to the process of a company increases its share of the fixed capital. The fixed capital is an asset that is used in the production process, which is usually calculated in a year's time. Fixed capital can also be referred to as asset and equipment. For example, if a company builds a new factory or invest in new machines, this will be the accumulation of fixed capital.

Physical capital and human capital is relevant as the decisive factor of economic growth, as also stated in the conventional theories, economic growth is largely determined by the availability and quality of production factors such as human resources, capital, technology, raw materials, entrepreneurship, and energy. These factors will determine the long-term economic growth

Greater investment in human capital or physical capital formation cause positive things to sustainable economic growth. The purpose of investment in capital investments such as asset expenditures andbuying engine aims to increase production in the future.

It can be seen that the domestic fixed capital formation have a significant effect on economic growth. In other words, these two factors have an important role in promoting economic growth.

### *2.6 Labor Force*

Labor force generally describes the workers in the company or industry or could also describe the worker to a geographic area such as a city or country. Employment data is an important indicator to describe the labor market and the level of labor productivity, which in turn will give an idea of how the level of national production and economic growth.

Labor has a significant impact on economic growth of a country, through increased productivity, labor could encourage an increase in national production and economic growth. In fact, sometimes also is a measure of economic progress in addition to the national income also employment.

Labor one factor that may affect economic growth in addition to the natural resources. Population growth and labor force growth is considered a positive factor that spurs economic growth. Large amount of labor that will increase the level of production

## III. METHODOLOGY

The data used in this study is the annual time series data for the period 2001-2013, and the cross section data Asean countries. Due to the limited availability of research data is only done in the State of Indonesia, Malaysia, Singapore, Thailand, philipne, Brunei Darussalam. Because the data time series and cross section is relatively short, then these limitations can be overcome by using panel data (pooled data).

### *3.1 Model of Green Economy Growth*

Study concept of economic growth with due regard to the environment or the scarcity of resources continue to evolve with the emergence of new variables. One solution to achieve sustainable development within the framework of environmentally sustainable green economy is to control economic growth and balance output with a potential resource [1].

The model of research used as the base model of the GDP of green is on the basis of theoretical considerations that this model is a variant of the economic conventional model and able to adopt the green economy concept with formulations calculation of GDP. That would include depletion and environmental degradation, and also take into account the state of progress of the world economy to include the concept of openness economy as a component that is quite a role determining economic growth rates [7].This model became the basic model that is widely used in the study of the growth of the green economy.

A change made by the concept of green growth (GDPgreen) is a revolutionary concept that wants to change the method of recording the performance of the economy. It is the concept of sustainable earnings that will not reduce consumption in the future.

This concept can be seen from the depletion of natural resources and environmental degradation as one of the capital should be sacrificed for the construction of capital in addition to the results of human creation, human capital and social capital (man-made capital, human capital and social capital). Green GDP is a measure of the economy that is more comprehensive than the conventional GDP.

Green GDP calculation in this study starts with the concept of Gross Domestic Product (GDP) by expenditure approach which is the sum of total income received by all producers in a country, in general can be written as [7]:

$GDP = C + I + G + (X – b\ M)$

Where:

C = private consumption

I = Gross investment

G = Government Spending

X = exports

M = Imports

X - M = Net exports

Formula Green GDP growth model can be described with a standard conventional model variant proposes that real output is a function of the state capital stock and workers and affected by other economic factors affecting the productivity of inputs such as economic openness, [7]:
In general notation is written:

$$GDP_{grn_t} = f(K_t, L_t, O_t)$$

Where
GDPgrn is per capita GDPhijau at t
K is the size of the state capital stock at time t
L is a measure of labor input at time t
O is the index of economic openness at t
By following [17], this relationship can be written in the form of the aggregate production function of type Cobb-Douglass in the form

$$GDP_{grn_t} = \delta_0 K_t^{\alpha} L_t^{\beta} O_t^{1-\alpha-\beta} e^{u_t}$$

This equation is very well known. this model is consistent with the objectives of this study as a starting point for investigating the growth of green GDP.

$$GDP_{grn_t} = \alpha_0 + \alpha_1 GFCFpct_t + \alpha_2 Lt + \alpha_3 DOPEN_t + u_t$$

Where:
GDPgrn: green GDP of each country in year t
GFCFpct: Gross fixed capital formation of the State in year t
L : Labor force in the country in year t
DOPEN: State the value of trade to GDP in year t
α; constants
ε; Error term.

In this model it is assumed there is a linear relationship between openness and green GDP. Generally Green GDP can be described as below
Green GDP = GDP – Natural Res. Depletion – Pollution Cost

### *4.3 Definition of Operational Variabel*

In this research, data analysis on a number of variables that can be defined as follows:

*1. Green GDP*
There are many sets of indicators that can be used to measure the progress of a green economy. Green GDP can be regarded as an important indicator for the green economy. Green GDP is a macroeconomic aggregate of the most popular has been adjusted based on green accounting framework. Based on the standard framework of the UN SEEA (System of Environmental and Economic Accounting),Green GDP is the conventional GDP minus all forms of capital depreciation (man-made capital and natural capital)
*2. Gross Fixed Capital Formation*
Gross Fixed Capital Formation formerly had known Gross domestic fixed investment, including site upgrading plant, machinery and equipment purchase, road construction and similar railroads, including schools, offices and hospitals. Residential and commercial buildings as well as the industry, based on the SNA 1993, the net value of the acquisition is also considered as capital formation data in applied US $.
*3. LaborForce*
Population aged 15 years and above are based on the definition of economically active population of the International Labour organization (ILO); everyone who can work to memperoduksi goods and services within a specified time and informal sector workers
*4. Trade Openness*
Calculating the size of a country's economic openness in terms of international trade, (X + M) / GDP in units of $ US.

## IV. RESULTS AND ANALYSIS

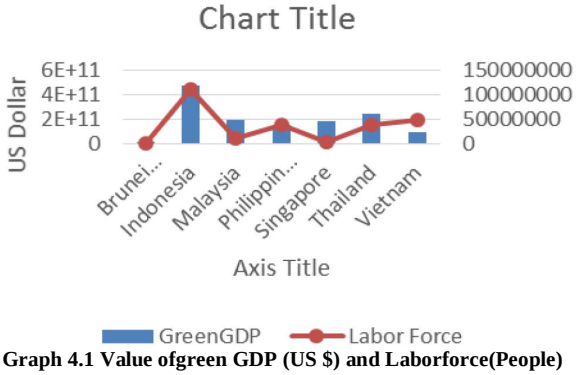
The results of data processing in the research model can be found in the table below;

Table 4.1 Resume results of data processing by the panel regression green economic approach (Green GDP)

| Independent Variabel | Negara Asean |
|---|---|
| LogGFCF | 1.250969***(9.76)) |
| LogLaborforce | -0.4049107***(-4.02) |
| Logopeness | 1.045734***(9.20) |
| Constan | -7.1873968***(-4.80) |
| Log likelihood | 11.01298 |
| Wald Chi2(2) | 426.84 |
| Prob> Chi2 | 0.0000 |

Source : Processed Data Research
Value of Z-statistics *, **, and***is notationtodegree significancyat level 0.10, 0.05 and 0.01

From the results, it was found that the value of the green GDP is positively influenced by capital and economic openness. This implies that the greater the capital the greater the value of green GDP, where clean technology can be improved. While, the economic openness can stream technologies that can increase GDP.But labor was associated negatively, allegedly as more and more workers, the greater the potential unfriendly exploitation of natural environmentally who are only after profit.




**Graph 4.1 Value ofgreen GDP (US $) and Laborforce(People) Aseancountries during the years 2001-2013**

It is seen that the value of the green GDP at the highest Asean countries are Indonesia, followed by Thailand and Malaysia and the lowest was Vietnam. As for labor were highest for Indonesia and Thailand as well as the Philippine and the lowest was Singapore and Brunei Darussalam

## CONCLUSION

From the results of data processing can be concluded that the value of the green GDP for ASEAN countries positively influenced by capital and economic openness. But labor was associated negatively. So government Asean countries should be more focus on labor regulations, how to control the amount of labor so as not to burden the economy and blindly exploiting the environment, which is also caused because there are many workers with low skills so that workers tend to rely on the environment

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