



The Role of Economic Growth on Sustainable Development: Evidence in Asia

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ABSTRACT

This research aims to investigate the effect of sustainable development variables on economic growth in the Asia continent with a total of 46 countries. The period used in this research is 2014-2018. This study uses a quantitative approach. The population research includes Sustainable Development considers the effects of CO2 emissions, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry on economic growth in Asia 2014-2018. By using purposive sampling technique. The data analysis method used is the Generalized Method of Moment (GMM). The findings of this research showed that there are six variables of sustainable development that show significant results. Such as CO2 emissions, foreign direct investment (FDI), international tourism arrival, agriculture, fishery, and education.

Keywords: Economic Growth, Sustainable Development, Asia Continent, Generalized Method of Moment (GMM).

1. INTRODUCTION

There was a global economic crisis in mid-2008 where the type and magnitude had never happened since the Great Depression period. This crisis marked the collapse of Lehman Brothers which made investors withdraw and the market fell resulting in a recession. The global economic crisis is supported by several influencing economic indicators, such as rising world oil prices, food prices and rising unemployment. The global economic crisis of trading partners that occurred in the United States and Europe experienced a depreciation which caused countries to cut costs to reduce spending. This has caused regional and global economic growth to decline. Economic growth in macroeconomic indicators is always associated with the global crisis, supported by Jambor [1].

The Asia continent felt the effects of the liquidity crisis, markets plunged, trade fell rapidly, capital flows reversed, and growth weakened and contracted in several economies. After the crisis, the financial situation in several Asian countries experienced extreme economic growth and strong capabilities against external weakness, based on Adb 2012 [2]. Growth in 2013 in developing countries in Asia grew by 7.3%, which after recovering from the global economic crisis reached 9.1% in 2010, supported by Harlow et al.[4].

Based on statistics, the impact of the crisis in 2008 showed that countries in several parts of the Asia region were not as bad as in 1997. In this case, this happened because many countries learned a lot and survived the crisis from 1997, as a result of a strengthened fundamental strategy. Asia region in the great recession and Eurozone crisis to face the great challenges of future economic changes by contributing to various sources of growth, by allocating financial resources more effectively and efficiently, productive foreign investment, and increasing domestic and regional demand. A country can be said to be well developed if there is significant economic growth in that country, supported by Backe[5]. Developing countries in Asia have greater influence and power due to the crisis that did not start from the Asia continent, making the place for all economic growth in the world region in 2009, supported by Leitiao[6]. In the economic development of a country, one of the main focuses is sustainable economic growth, based on WCED [7].

There are three main pillars in sustainable development namely, social equity between generations, environmental management and economic growth, supported by Kurniawan [8]. The problems currently

occurring in the Asia region can be minimized by incorporating sustainable development instruments. The concept of sustainable development can fulfill and benefit the development of the world economy to be able to meet human needs in the future, supported by Munir et al. [9]; Bozkurt et al. [10]. However, the literature seems to have only concentrated on single factors and countries as examples. This paper aims to establish the link between carbon dioxide emissions, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry and economic growth for the Asia region in 2014-2018. The rest of the paper is organized as follows.

2. LITERATURE REVIEW

Sustainable development to provide socio-economic welfare with a wealth approach that shows the sustainability of a country's economic growth. The correlation of economic development and wealth that changes over time shows that when natural capital decreases, it will result in a decrease in natural resources and a worsening of various environmental services. The obtained effect of economic growth is used to measure wealth, prosperity, and sustainability. Sustainable development is a development strategy that can meet its own needs without reducing the portion of meeting the needs of future generations, supported by Panahi et al. [11]. There is a strong connection and influence between socio-economic, development and socio-political factors with sustainable development, supported by Popescu et al. [12]. Inclusive wealth here is defined as per capita human welfare that does not decrease and requires a production base as a source of welfare. From the context of inclusive wealth itself, there are three categories: human capital, physical capital, and natural capital.

Sustainable development helps in economic growth. Al-Awad [13] explained that based on research results, it shows that environmental pollution is responsible for economic growth. This research is also supported by Barro [14] explaining that environmental quality will affect zero growth in the future. Previous research has shown the impact of the CO₂ emission gas variable which has a positive influence on economic growth. CO₂ emission gas is measured in kilotons and data source is from World Development Indicators (WDI) [15].

Foreign direct investment has a positive effect or has an impact on economic growth. Based on previous research analyzing foreign direct investment, as well as economic growth in Central Europe and Eastern Europe, where a strong positive influence was found on the relationship foreign investment and economic growth, supported by Arellano [16]; Aslan [17].

Domestic credit encourages economic growth. According to Mihail [18] consider if domestic credit and economic growth have a positive relationship. Bank credit and economic growth in the European Union in 1990-2010 showed that private credit and inflation inhibited, while public savings stimulated economic growth. Domestic credit originating from the financial sector is calculated as part of the Gross Domestic Product (GDP), data comes from the World Development Indicators (WDI).

International tourism drives economic growth using the fixed effect model and the GMM-system to measure the relationship between tourism demand and economic growth in Portugal. This research shows that the arrival of tourists for tourism contributes greatly to economic growth. Relations between international tourism have a positive influence on economic growth. International tourism data is measured from the number of arrivals, and the data is taken through the World Development Indicators (WDI).

Natural capital is divided into several sub-sections. The focus in this research is to take three variables that are part of natural capital, such as Agriculture, Fishery, and Forestry. These three variables have a relationship to sustainable development to encourage economic growth. Shows that natural capital has good ties to the growth of an economy. The data is measured based on agricultural areas, fishing, and forestry areas and the data is taken from the World Development Indicators (WDI).

There is a subsection of human capital, in this study focus on the quality of education as a sustainable development. The quality of education contributes greatly to economic growth. Linked human capital as an important factor in increasing growth and showed positive results on economic growth. The data is measured by quality of education. The data comes from the World Bank Database.

Export, import goods and services encourage economic growth. The relationship between trade in economic growth is a valuable instrument of value in economic development between developed and

developing countries Research shows that trade produces a positive relationship to economic growth. Trade is calculated from a portion of the Gross Domestic Product (GDP). Data comes from World Development Indicators (WDI) and CEIC.

3. DATA & METHODS

3.1 Data

Data conducted from forty-six countries in Asia 2014-2018. This research explains the correlation of independent variables, as well as CO2 emissions, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade, and forestry. Data used to take from World Bank Database and World Development Indicators (WDI), which is a secondary data type. Data processing is done using dynamic panel data regression and method estimate with System Generalized Method of Moments (GMM).

Table 1. Descriptive statistics of the variables

Variable	Unit	Obs	Mean	Std. Dev.	Min	Max
Growth	Per capita in (US dollars)	230	13357.941	16577044	485,668	83858344
CO2	In gigatons	230	658378.13	2056998	520	10502930
FDI	In net inflows	230	1.463e+10	3.877e+10	-1.018e+10	2.681e+11
Credit	In net inflows	230	78557.82	369969.21	3,512	2616096
Tourism	Number of arrivals	230	12277870	23101947	6000	1,586e+08
Agriculture	Land area	230	35,247	23.94	.931	80,772
Fishery	Production in metric tons	230	3283846.7	11761026	15	80966368
Education	Education Statistics	230	7320585	24835.71	78.56	120000

	Export					
	Import					
	in net					
	flows	23	726	348	24.7	2.0
Trade	(curren	0	999	348	02	83e
	t US		9.8	75		+08
	dollars					
)					
Fores	Land	22	24,0	23,9	008	72,
try	area	5	31	73		801

Notes: Mean = arithmetical average; SD = standard deviation; Min = minimum; and Max = maximum; Estimates of y, k, l, m and e are the natural logarithm of their value minus the natural of their geometric mean.

Hypothesis 1, CO2 emissions are measured in gigatons and data is coming from the World Bank Database. Hypothesis 2, Foreign direct investment is measured as net inflows in billions of current USD. Hypothesis 3, Domestic credit provided by the financial sector is measured as the share of Gross Domestic Product (GDP). Hypothesis 4, International Tourism is proxied by the number of inbound tourists or number of arrivals. Hypothesis 5, Agriculture is measured by the land area. Hypothesis 6, Fishery is measured by production in metric tons. Hypothesis 7, Education provided by the quality of education statistics. Hypothesis 8, Trade is measured as the sum exports and imports of goods and services. And Hypothesis 9, Forestry is measured by the land area.

This research explained correlation independent variables, as well as CO2 emissions, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry to variable economic growth in the Asia region.

3.2 Methodology

Theoretically, the analytical method used in the context of panel data is the "Augmented Solow Growth Model". In the system-GMM estimator, suggest the transformation of the first difference. By carrying out this transformation, it will reduce the average of all the future observation values rather than reducing the value of previous observations, estimates with one and two step variants. Nevertheless, the two step variants worked better than the GMM with one step variants. Even if the estimation of two step variants is asymptotically more efficient, the standard error tends to be downward biased.

The general model of the Generalized Method of Moment model is as follows:

$$y_{it} = \beta_y y_{it} + \beta_x x_{it} + \mu_{it} \tag{1}$$

$$uit = vit + e_{it} \tag{2}$$

where y_{it} is the endogenous variable and y_{it-1} is the lag value. The subscripts i and t denote the individual companies and time periods. Which consist of unobserved individual specific effects (vit) and observed specific errors (e_{it}).

Based on variable already determined following form dynamic panel data regression:

$$\text{LnGrowth}_{it} = \beta_0 + \beta_1 \text{LnGrowth}_{it-1} + \beta_2 \text{LnCO2}_{it} + \beta_3 \text{LnFDI}_{it} + \beta_4 \text{LnCREDIT}_{it} + \beta_5 \text{LnTOURISM}_{it} + \beta_6 \text{LnAGRICULTURE}_{it} + \beta_7 \text{LnFISHERY}_{it} + \beta_8 \text{LnEDUCATION}_{it} + \beta_9 \text{LnTRADE}_{it} + \beta_{10} \text{LnFORESTRY}_{it} + \mu_{it} \tag{3}$$

All declared variables formed in logarithm. The score constant is β_0 and the value coefficient for every variable is β_x , for variable gas CO2 emissions, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry. The value of μ is the score error in the region i and time t .

Decision on the results of hypothesis testing conducted with comparison the probability of the independent and dependent variables at 10% significance. Whereas in a manner Partial based score probability results processing data. The probability value in question if level significance $\leq 10\%$ then H_0 is rejected while H_a is accepted, and vice versa.

4. RESULT & DISCUSSION

This research used secondary data. Which one is used in this research: Growth Economy (Growth), CO2 Emission, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry. This fact can be found from the World Bank Database in 2014-2018. The dependent variable or can be called the dependent variable is Economic Growth (Growth), on the other hand the independent variables where to choose include CO2 Emission, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry.

Table 2. Unit Root Test

Variable	Im, Pesaran and Shin W-Stat	S/N
Growth	-88.1813 (0.0000)	S
CO2	-39.3290 (0.0000)	S
FDI	-0.3615 (0.0000)	S
Credit	-17.1074 (0.0000)	S
Tourism	-29.4781 (0.0000)	S
Agriculture	-14.0002 (0.0000)	S
Fishery	-71.4362 (0.0000)	S
Education	-47.0104 (0.0000)	S
Trade	-22.3803 (0.0000)	S
Forestry	-25.2364 (0.0000)	S

Note: Probabilities for Im, Pesaran, and Shin W-stat tests are calculated using a symphotic Chi-square distribution. All other tests assume a symphotic normality. Values in parentheses are the probability values for the tests. S denotes stationery and N denotes non-stationery.

The unit root analysis output utilizing the method Im, Pesaran and Shin W-stat with withdrawal to a conclusion that variable growth, CO2 emissions, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry show level probability worth 0.0000. Has the meaning that the data is safe from detection of root units or already stationary because they have probability less than 5 percent.

Table 3. Cointegration Test

Hypotesis Alternative (Ha): Common AR coefficient	Critical Value	Prob.
PP-statistics panel	-22.4057	0.0000

Note: Denotes rejection of the hypothesis at the 0.05 level

Cointegration test is a statistical implication of the long-term relationship between economic variables. (Mansoer, 2005). Based on table 3 Referring to the output of the cointegration test analysis utilizing the Pedroni Residual Cointegration Test method which can be drawn from a common thread that all variables have probability less than 0.05, namely 0.0000 on the PP-statistics Panel. Can be interpreted as cointegration between variables.

Table 4. Instrument Validity Test

Hypothesis (H ₀): Condition of Moment Valid	Coefficient of Validity	Conclusion
Sargan -Hansen Specification Test	0.202	Valid

Note: Denotes rejection of the hypothesis at the 0.05 level

Validity test is used to measure the legitimacy of the data used in this study. Referring to table 4 the output of the instrument validity analysis with use Sargan - Hansen Specification Test, whose conclusion is found variable which has probabilities 0.202. Which means that there is an instrument being analyzed is valid. Therefore, the result of the system GMM on Table5.

Table 5. Results of System Generalized Method of Moment (GMM) Analysis

Variable	SD
	Coeff
Constant	3.642 (0.027)
lngrowth _{it-1}	0.039 (0.087)
lnCO _{2it}	-0.153 (0.024)**
lnfdi _{it}	0.066 (0.048)**
lncredit _{it}	0.021 (0.239)
ln tourism _{it}	0.309 (0.000)***
lnagriculture _{it}	0.562 (0.000)***
lnfishery _{it}	0.115 (0.054)**
lneducation _{it}	0.115 (0.010)**

Intrade _{it}	0.054 (0.210)
Inforestry _{it}	0.067 (0.283)

Note: Presents test results applying two step system GMM estimation. Indicate that the coefficients are significant at 1,5, and 10% respectively. Estimated use. Dynamic panel system GMM estimation.

As to CO₂ emission on economic growth in this analysis has an effect negative and significant. Research shows that development economics that occurred in the period of research in 46 (forty-six) countries in the Asia region is responsible for the environment. Following the negative CO₂ Emission to Growth Economy shows that the more CO₂ emissions will decrease will increase the growth economy. According to data from the International Energy Agency (IEA), ten countries in the world, five of them are located on the continent of Asia. China is a contributing country emission world carbon reaches 11.94 gigatons of CO₂. CO₂ emissions in China will keep increasing because they use massive amounts of coal, which is up to 60 percent of total consumption state energy.

There are several factors that contribute to the problem of CO₂ emissions in Asia, such as transportation and electricity being one factor main contributors to CO₂ emissions. Based on growth data Asian economies 8% in the 2002-2016, on the other hand emission from sector transportation go on more significant, on average 10.1% one conditions that exist in the country of Indonesia, namely with increase in CO₂ emission followed increasing usage energy, so moment the use of too many energy sources by the community of natural resources and dirty technology can cause environmental damage without being balanced with countermeasures. Which states if a quality environment occurs that can later be influenced to zero growth in the future. This means that the continued impact of CO₂ emissions experience enhancement will hinder the growth economy of a country.

Foreign investment (FDI) on economic growth show that investment in the form of FDI that approaching Asia continent is expected to be able to increase productivity so that it can increase national income, which can encourage infrastructure development and encourage Gross Domestic Product (GDP) to be better as well as helping companies that are in the capital market to develop their business. Refer to the WorldBank Database, Singapore is the most dominant country in investment from year to year followed by China, Russia, and Qatar. The high industrial sector encourages foreign investors to invest in FDI.

Domestic credit to the private sector advantage the development of employment; this becomes income where the consumption will increase. Based on this research, domestic credit to the private sector in this time period from 2014 to 2018 due to the effect of the global crisis which resulted in a large stock of problem loans. The banking crisis and the recovery from the global crisis resulted in a relatively underdeveloped credit market contribution to growth and the economy became limited. This causes banks to create new policies that can provide institutional improvement, encourage competition, and contribute to increase efficiency especially in terms of risk management.

Relations of international cooperation are also growing, particularly in the tourism industry. Development in the tourism sector can increase revenue in foreign currencies, encourage investment in new infrastructure and industry rivalry, create jobs, take advantage of economies of scale, and build up human capital. This research indicates that there is a relationship between international tourism and economic growth, and that the weight of tourism on a country's economy is a determinant of the extent to which tourism influences economic growth.

Agricultural sector has become one of the sectors with the main attention in economic development, especially in relation to the management of agricultural areas and the utilization of strategic results, especially those concerning food commodities. The Asia continent is the most productive region in producing agriculture compared to other regions because it is supported by a climate for agricultural activities.

In the theory of production which consists of labor, capital, raw materials, energy sources, land, information, and entrepreneurial abilities. Fishery production is the result of fishermen's activities by catching aquaculture products that produce marine products. According to the FAO (Food and Agricultural Organization) globally the fisheries sector grew 2.3 percent due to increased production and high demand for fish worldwide. The fisheries sector contributes to increasing world income.

The quality of education can be seen from the higher a person's education degree, the greater their knowledge and skills, encouraging an increase in work productivity. Explains that human capital is characterized

as a labor force idea in a classical perspective, akin to a property, and is visualized as a productive ability of humans that is far bigger than all shared wealth. The contribution of human capital, specifically education, and the role of the government in the new growth theory in increasing the development of human capital to increase human productivity.

Trade has a positive and insignificant effect on economic growth. This occurred because the East Asia continent came up against a slowdown in economic growth in 2014 as a result of the 2008 global economic crisis. Many Asian countries, particularly in East Asia, are still in recovery mode. Exports to industrialized countries are decreasing, as is income from exporting countries, which has the impact of reducing economic growth. Falling commodity prices, weaker government spending, and slower credit expansion are all effects of this situation.

Forestry in every Asian country with a big area of forest has shrunk year after year. This reduction is due to the fact that the forestry sector has an important role, such as providing forest land for sector development, and the development of other sectors that require forest technology. The forestry industry is one of the agricultural sector's economic sub-sectors. In the last ten years, the forestry sector in Indonesia contributed around 10.01% to the formation of agricultural growth. The agricultural industry contributes an average of 16.15% to national economic growth each year.

5. CONCLUSION

This paper analyzed the impact of carbon dioxide emissions, foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry on economic growth in Asia. Our results confirm that economic growth can significantly be explained by carbon dioxide emissions, foreign direct investment (FDI), international tourism arrival, agriculture, fishery, and education variables. The econometric regression confirms forty-six countries developed capacities to specialize in certain regional clusters, and these are associated with the economies of scale. Descriptive statistics suggest a huge diversity and differently changing patterns of the determinants of economic growth in the Asia region. As to our model runs, results suggest a positive relationship between foreign direct investment (FDI), domestic credit, international tourism arrival, agriculture, fishery, education, trade and forestry and economic growth, while CO₂ emissions were found to be negatively related to economic growth in the Asia region in line with previous findings.

Policy and decision making in the Asia region might find our results useful when thinking about drivers of economic growth. Research might want to include more variables or focus on different regions in the future to obtain a better picture on the global level. In this context, future research might also assess economic growth by taking into account other ecological variables such as renewable energies and energy consumption as a part of sustainable development goals in order to evaluate the status of sustainable development in the Asia region.

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