The Role of Energy Consumption and Fuel Export in Supporting the Country's Economic Growth

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Abstract. Rapid progress and technology encourage the growth of industry and transportation facilities. The increase in the number of industries and transportation facilities in the world is also followed by an increase in fuel usage, especially fuel oil (BBM). The increase in fuel usage, especially fossil fuels, will also increase carbon dioxide (CO2) gas as a result of burning fossil fuels. As is known CO2 gas is one component of greenhouse gases, were estimated that around 18.35 billion tons of CO2 are released annually. As the atmosphere becomes richer in these greenhouse gases, it becomes an insulator that retains more heat from the sun that is emitted to the earth, causing global warming. The primary cause of global warming is the burning of fossil fuels such as oil, natural gas, and coal which releases CO2 and other gases known as greenhouse into the atmosphere. The method used in this research is Ordinary Least Square Multiple Linear Regression and simple panel data. The research variables used are Energy Consumption and Fuel Eco-sport, which in this study are used as independent variables that affect greenhouse emissions which function as the dependent variable, and economic growth worked as the dependent variable with the independent variable Greenhouse Emissions. The results show that (1) energy and labor consumption simultaneously or partially have a significant effect on changes in the number of greenhouse emissions by 89.5% (2) Changes in total greenhouse emissions partially have a significant and positive effect on the country's economic growth (3) research outcomes. The following variable is the increase in the country's Greenhouse Emissions is the most dominant variable having a significant positive effect on a country's economic growth of 70.74 percent.

Keywords: fuel exports; energy consumption; greenhouse emissions; economic growth

1 Introduction

Monetary advancement is a work to work on all parts of the existence of the local area, country, and state which is simultaneously a course of fostering the whole arrangement of state organization to understand a day to day existence that is equal and equivalent to other further developed countries.

Monetary differences or disparity in pay dissemination between big time salary and low-pay gatherings and the degree of neediness or the quantity of individuals underneath the destitution line are two significant issues in many agricultural nations (NSB), and Indonesia is no special case. Disparity can't be killed, however must be decreased to a level that is OK to a specific social framework so congruity inside the framework is kept up with in its development cycle. It is in this manner not shocking that imbalances will continuously exist in poor, creating,

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and, surprisingly, created nations. It is only that the thing that matters is the manner by which huge the degree of imbalance that happens in every one of these nations.

Rapid progress and technology encourage the growth of industry and transportation facilities. The increase in the number of industries and transportation facilities in the world is followed by an increase in fuel usage, especially fuel oil (BBM). The accumulation in the use of energy, especially fossil fuels, will of course also increase carbon dioxide (CO2) gas as a result of burning fossil fuels. As is known CO2 gas is one component of greenhouse gases, it is estimated that around 18.35 billion tons of CO2 are released annually. As the atmosphere evolves richer in these conservatory gases, it becomes an insulator that retains more heat from the sun that is emitted to the earth, causing global warming. The major reason for global warming is the burning of fossil fuels such as oil, natural gas, and coal which releases CO2 gas and other gases known as conservatory gases into the atmosphere. Global warming has become an international issue and problem because its impacts could endanger living things in the world, including advancing earth temperatures, climate change, sea level rise, ecological disruptions, and socio-political. The Kyoto Protocol is a convention carried out by countries around the world who care about the environment, devoted to reducing CO2 emissions and five other greenhouse gases. If the Kyoto Protocol (2012) is successfully executed, it is predicted that it will reduce the average global warming between 0.02°C - 0.28°C in 2050. Indonesia as a country that still has enough woodland has a chance to succeed in the Kyoto Protocol. The results of previous studies have proven, both in Indonesia and in adjoining countries (ASEAN), the production process of economic development activities has resulted in many externalities that can reduce the quality of the environment in the air, soil, and water. For Indonesia in terms of air pollution CO2 gas occupies the highest position (299.73 million tons in 1995), while the lowest is the Philippines, which is 61.02 million tons.[1]

In 2009, the Indonesian economy confronted various overwhelming difficulties, with the worldwide economy still under the strain of the emergency. These difficulties were very serious, particularly toward the start of 2009, because of the still solid effect of the worldwide monetary emergency which arrived at its top in the last quarter of 2008.[2] Vulnerability about the extent of the worldwide downturn and the speed of the worldwide financial recuperation not just postures high dangers to the monetary area yet in addition unfavorably influences monetary action in the homegrown area. The condition brought about extreme strain on money related and monetary framework steadiness in the principal quarter of 2009, while financial development was still on a descending pattern because of a profound compression in commodities of merchandise and services.[3]

Sends out assume a urgent part in the monetary exercises of a country. Commodities will create unfamiliar trade which will be utilized to back imports of unrefined components and capital merchandise required in the creation cycle would frame added esteem. The accumulation of the additional worth created by all creation units in the economy is the worth of the Total national output. Charges are utilized to do advancement in Indonesia.

2 Method

The kinds of information utilized in this study are subjective and quantitative information, with the accompanying explanation.[4] The logical strategy utilized in this study is board information relapse. Examination of the information is upheld by the Eviews program. The assessment strategy utilizing board information should be possible through three methodologies which include: normal impact, fixed impact, and arbitrary impact. The type of the board information relapse model in this review: The sort of information utilized in this study is

optional information as board information, which is a mix of time series information and cross-segment information.

The time series information in the review comprises of 1990-2014 (24 years), and the cross-segment incorporates ASEAN nations with an all out cross-part of 6 free and subordinate factors with a complete information of 864 information. The information in the review were gotten from a few wellsprings of world bank information data sets, articles, diaries, and data from the Service of the climate and different sources connected with research.

The board information relapse examination utilized in this study expects to decide the impact of the autonomous variable on the reliant variable, as well as to see the place of the catch or cross impact during the review time frame. The detail of the examination model was embraced from two investigations, to be specific the Assessment of various straight relapse models pointed toward foreseeing the boundaries of the relapse model, in particular the steady worth (α) and the relapse coefficient (βi). The consistent is known as the capture, and the relapse coefficient is known as the slant. Board information relapse has a similar objective as numerous direct relapse, in particular foreseeing the worth of the capture and slant.[5]

3 Result and Discussion

3.1 Result

Table 1. F Test Results Model 1

R-squared	0.895799	Mean dependent var	12.99274
Adjusted R-squared	0.895449	S.D. dependent var	0.895087
F-statistic	7187.518	Durbin-Watson stat	2.019886
Prob(F-statistic)	0.000000		

Table 2. F Test Results Model 2

R-squared	0.719158	Mean dependent var	2.094155
Adjusted R-squared	0.707375	S.D. dependent var	0.206017
F-statistic	61.03067	Durbin-Watson stat	2.004976
Prob(F-statistic)	0.000000		

The F test is utilized to see whether there is a synchronous impact of Energy Utilization and Fuel Commodities on Nursery Discharges in six ASEAN Nations. 1990-2014 utilizing a proper impact model which has a likelihood worth of 0.000000, and that implies the likelihood esteem is more modest than alpha 5% (0.05), so it very well may be presumed that the F test is huge while the autonomous factors together influence the reliant variable.

Table 3. T-Test Results Model 1

Variables	T-statistic regression coefficient	Prob	Standard Prob	
KE	0.048872	2.358581	0.0204**	0.05
EBB	0.017885	2.381065	0.0192**	0.05
ERK(-1)	0.759973	7.416795	0.0000**	0.05
ERK(-2)	0.097568	0.726602	0.4692**	0.05

Table 4. T-Test Results Model 2

Dependent Variable: PE?

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.918235	0.027069	70.86443	0.0000
ERK?	2.78E-07	4.03E-08	6.900454	0.0000
Fixed Effects (Cross)				
_AUS--C	-0.123297			
_IDN--C	0.082062			
_IND--C	-0.590496			
_MYS--C	0.070126			
_PHL--C	0.401076			
_THA--C	0.160528			
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.719158	Mean dependent var		2.094155
Adjusted R-squared	0.707375	S.D. dependent var		0.206017
F-statistic	61.03067	Durbin-Watson stat		2.004976
Prob(F-statistic)	0.000000			

From tables 3 and 4, each independent variable has a different effect on the dependent variable.

3.1.1 Effect of energy consumption variables on greenhouse emissions

The test results with board information relapse investigation above show the energy utilization coefficient worth of 0.048872 and the T-measurement worth of 2.358581 demonstrates that the heading of the coefficient is positive, while the likelihood of energy utilization of 0.0204 < 0.05 makes H0 be dismissed and H1 to be acknowledged. Thus, it very well may be reasoned that energy utilization essentially affects nursery outflows.

3.1.2 Effect of fuel export variable on greenhouse emissions

The test results with the board information relapse examination above show the fuel send out coefficient worth of 0.017885 and the T-measurement worth of 2.381065 which suggests that the heading of the coefficient is positive, while the likelihood of fuel trade is 0.0192 < 0.05 making H0 be dismissed and H1 to be acknowledged. In this way, it tends to be reasoned that the commodity of fuel fundamentally affects studio emanations.

3.1.3 The Influence of Greenhouse Emissions (ERK) on Economic Growth (PE)

The test results with the relapse examination of the FEM board information in table 4.14 above show the ERK coefficient esteem between ASEAN nations of 2.78 x 10-7 and the T-measurement worth of 6.900454 which shows that the course of the coefficient is positive, while the ERK likelihood of 0.0000 < 0.05 causes H0 is dismissed and H6 is acknowledged. So it tends to be reasoned that the expansion in Nursery Discharges (ERK) of ASEAN nations fundamentally affects the expansion in the monetary development of a nation (PE).

A variable test result of greenhouse gas emissions of energy consumption and fuel exports of 6 ASEAN countries from 1990 to 2014 yields an R2 value of 0.8954. It means that 89.5% of

greenhouse gas emissions come from energy. The consumption sector, and jobs, are affected by interest rates and fuel exports, while the remaining 10.5% is affected by variables other than those in this study.

From the results of the Greenhouse Emissions variable test in six ASEAN countries in 1990-2014, the R2 value of 0.9402 was obtained, which means that 94.02% of Economic Growth will affect the increase in greenhouse gas emissions. Meanwhile, the remaining 5.98% is influenced by variables outside this research variables.

The coefficient of assurance test was done to figure out how much the endogenous factors were all the while ready to make sense of the exogenous factors. The higher the R2 esteem, the better the forecast model of the proposed research model. The coefficient of assurance (R2) test is completed to decide and anticipate how enormous or fundamental the commitment of the impact given by the free factors alongside the reliant variable is.

The worth of the coefficient of assurance is somewhere in the range of 0 and 1. Assuming the worth is near 1, it implies that the free factor gives practically all the data expected to anticipate the reliant variable. In any case, assuming the worth of R2 is getting more modest, it implies that the capacity of the autonomous factors in making sense of the reliant variable is very limited.[6]

From the variable test consequences of energy utilization, work, loan costs, and fuel products of ozone harming substance outflows in six ASEAN nations from 1990 to 2014, a R2 worth of 0.8954 is identical to 89.5% of ozone harming substance discharges. The energy utilization area, workforce, loan costs, fuel trades, and the leftover 10.5% are impacted by factors other than those in this review.

3.2 Discussion

3.2.1 Effect of energy consumption variables on greenhouse emissions

Energy utilization 1 affects nursery discharges. The aftereffects of this study are by Friedman's energy utilization influences CO2 gas emissions.[7] In Lu (2017) energy utilization increments ozone depleting substance emanations level. The utilization of energy utilization that isn't yet well disposed in ASEAN part nations is as yet a mainstay of monetary development. In Mardani, et al (2019), the outcomes show that energy utilization affects CO2 gas emanations. As per Anser, et al (2021), the utilization of non-sustainable power in South Asian nations causes serious ecological corruption. The concentrate additionally shows that the utilization of non-environmentally friendly power is the essential determinant of CO2 gas discharges. Jun, et al (2021) make sense of the aftereffects of non-sustainable power utilization can build harm to the climate. The review shows an enormous reliance on fossil energy utilization that isn't harmless to the ecosystem in the South Asian locale. As indicated by BASHIR, et al (2021), uncontrolled energy utilization is because of an absence of supporting strategies.

A few factors that cause the utilization of sustainable power in a few ASEAN part nations are still low, to be specific the absence of government support and the absence of HR in dealing with the utilization of sustainable power. In view of information from Our Reality in Information, the elevated degree of fossil energy utilization in certain nations can be brought about by sustainable power that isn't grown as expected. It implies that the advancement of the 5 ASEAN nations is as yet reliant upon the utilization of fossil energy. In Arista's 2019 exploration, energy utilization influences CO2 gas outflows in ASEAN nations.

3.2.2 Effect of Exports on Greenhouse Emissions

Exports on greenhouse emissions in this study have a positive and significant effect. Export-related emissions are more heterogeneous between countries than those associated with imports. It can be attributed to the greater specialization of exports, while imports are more homogeneous (Cezar et al., 2017). Almost all sectors have contributed to the increase in trade-generating CO2 emissions since 2005. However, the most polluting sector is also the sector that contributed the most to this increase. Measured by sector of origin, the main contributors were "energy and waste" (which accounted for 29% of total)variation in 2015) and "base metals" (27%), followed by "transport and storage" (18%) and "agriculture, mining, and quarrying" (15%).

Product and import exercises depend relying on the prerequisite that no nation is genuinely free on the grounds that each other necessities and supplements one another. Every nation has various attributes of normal assets, environment, topography, monetary design, and social construction. These distinctions cause contrasts in the wares created, the piece of the expenses required, and the quality and amount of the item. The presence of relationship of requirements causes global exchange. Every nation enjoys benefits and burdens. Wares delivered by a nation may likewise not be utilized straightforwardly in light of the fact that they are natural substances that require further handling. These unrefined components may then be required by different nations as natural substances for their manufacturing plants.[8]

3.2.3 The Influence of Greenhouse Emissions (ERK) on Economic Growth (PE)

Nursery emanations on financial development in this study make a positive and massive difference. It is predictable with Febriyastuti, et al (2021) in ASEAN nations (Brunei, Laos, Myanmar, Malaysia, Singapore, Thailand, Philippines, Vietnam, Indonesia, and Cambodia) in 2000-2014 monetary development significantly affected carbon dioxide gas discharges. In view of the aftereffects of the review, it shows that the financial advancement that happened during the examination time frame in a few ASEAN part nations was at that point liable for the climate. The consequences of this study are fascinating in that an expansion in financial development as estimated in Gross domestic product per capita can decrease the degree of CO2 gas outflows following the Ecological Kuznets Bend hypothesis. The hypothesis makes sense of that natural harm or ecological debasement will increment alongside an expansion in Gross domestic product per capita however at one point an expansion in pay can diminish the degree of natural corruption. The more pay in a nation builds, it will actually want to work on the nature of the climate where individuals will more often than not pick harmless to the ecosystem innovations and diminish monetary exercises that can cause externalities.

Dependable financial development in these 5 ASEAN nations can be brought about by a few things, like expanded pay from the exchange area that utilizes practical innovation. This is likewise in accordance with the discoveries of Rambeli, et al (2021) that in Malaysia and Singapore the Ecological Kuznets Bend speculation applies, where CO2 delivery will increment alongside expanding state pay and at one point, subsequent to passing the ideal point, CO2 discharges will diminish. As per Fasikha and Yuliadi (2018), ASEAN nations like Brunei, Cambodia, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam in 2000-2015 showed the Ecological Kuznets Bend (EKC) speculation. As per Santi and Sasana (2020), the natural Kuznets bend (EKC) speculation is demonstrated in 8 ASEAN nations, specifically Indonesia, Thailand, Malaysia, Singapore, Vietnam, Brunei, Myanmar, and the Philippines. In Adeel-Farooq, et al (2021) the EKC speculation in ASEAN nations demonstrated legitimate.

4 Conclusion

In view of the consequences of information examination and conversation in the past part, the accompanying ends can be drawn:

a) The Fossil Energy Consumption (EC) variable has a positive and significant effect on greenhouse gas emissions in 6 ASEAN countries. This means that when fossil energy consumption increases, CO2 emissions will also increase.
b) Exports on greenhouse emissions in this study have a positive and significant effect. Export-related emissions are more heterogeneous between countries than those associated with imports. This can be attributed to greater specialization of exports, while imports are more homogeneous. Almost all sectors have contributed to the increase in trade-generating CO2 emissions since 2005. However, the most polluting sector is also the sector that contributed the most to this increase. Measured by sector of origin, the main contributors are energy and waste.
c) Variable Economic Growth (GDP per Capita) has a negative and significant effect on greenhouse gas emissions in 5 ASEAN countries. Which means that when economic growth increases, CO2 emissions decrease. The results of the study support the EKC theory in 5 ASEAN countries where after economic growth reaches a certain point it will reduce CO2 greenhouse gas emissions.
d) The variables of Energy Consumption (EC), Economic Growth (GDP per Capita) and Forest Area (Forest) together have a significant effect on the level of greenhouse gas emissions in 5 ASEAN countries.

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