DIGITALES ARCHIV

Andjarwati, Tri; Panji, N. Anggoro; Utomo, Agus et al.

Article

Impact of energy consumption, and economic dynamics on environmental degradation in ASEAN

This Version is available at:
http://hdl.handle.net/11159/7992

Impact of Energy Consumption, and Economic Dynamics on Environmental Degradation in ASEAN

Tri Andjarwati[1]*, N. Anggoro Panji[2], Agus Utomo[2], Linda Nur Susila[3], P. Anton Respati[4], Abdul Talib Bon[5]

[1]Fakultas Ekonomi Dan Bisnis, Universitas 17 Agustus 1945 Surabaya, Indonesia, [2]Magister Manajemen, STIE AUB Surakarta, Solo, Indonesia, [3]Manajemen, STIE AUB Surakarta, Solo, Indonesia, [4]Sistem Informasi, STMIK AUB Surakarta, Solo, Indonesia, [5]Faculty of Technology Management and Business, UTHM, Malaysia. *Email: triandjarwati@untag-sby.ac.id

ABSTRACT

The study aims to investigate the impact of energy consumption, population size, economic growth, urbanization, industrialization and poverty on environmental degradation in Malaysia by using the data for the period of 1995-2017. Data was gathered from different sources such as Global Economy, World Bank and Index Mundi. Augmented Dickey-Fuller (ADF) test is used to check the stationarity of the data. While Auto Regressive Distributive Lag model (ARDL) to analyze the results. The study finds a positive impact of energy consumption on environmental degradation in short as well as in long run. Population, industrialization and poverty positively contribute in environment degradation while urbanization negatively contributes in environmental degradation in long run. Economic growth positively contributes in environmental degradation in short run only. The study suggests government to produce energy by using renewable sources that have less contribution in environmental degradation. This study provides guideline to the policy making authorities that they should enhance their emphasis towards energy consumption and environmental degradation.

Keywords: Energy Consumption, Economic Growth, Urbanization, Industrialization, Environment Degradation
JEL Classifications: A12, K32, O44

1. INTRODUCTION

Environment is a main area of interest of different researchers in the current period. Everything around us is environment. It can be living or non-living factors. It consists of chemical, physical and other natural forces. All the living things live in an environment, so they use natural resources. As these natural resources are continuously extracted, they degrade the environment. Degradation of environment is one of the main hazards of emerging nations (Dhami et al., 2013). It is a process of environment deterioration through extraction and depletion of natural resources like soil, air and water, habitats destruction, ecosystem's devastation and pollution etcetera. A degraded environment affects or changes the climate, due to which global temperature rises. As the temperature increases, the amount of carbon dioxide (CO_2) in the atmosphere also increases.

CO_2 is heavy and colorless gas that is formed by burning plants and animals, by burning fuels or by the act of breathing. It is absorbed, in the process of photosynthesis, by the plants from the air. With the gradual use of energy, increase in economic growth, industrialization, urbanization and population, and with the increased level of poverty, the CO_2 in the atmosphere also increases. The study, therefore, analyzes the impact of energy consumption, urbanization, industrialization, poverty, population and economic growth on environment degradation in Malaysia as Malaysia lists in top three most polluted countries. Energy consumption in one of the main factors that leads to environmental degradation because the energy usually produces from conventional sources that tends to increase CO_2 emissions which in turn increases the environmental pollution that degrades the environment (Haruna and Mahmood, 2018). There is increase in the consumption of energy due to increase in the size of

population. The energy makes the provision of basic necessities and whenever there is increase in population size, there will be increased basic needs and wants of people as they will require more space for their living arrangements. There will be increase in transportation, consumption of energy for the satisfaction of their needs that degrades the environment by increasing CO_2 emissions.

If people are unable to satisfying their needs, they become poor and they may start deterioration in the environment for the satisfaction of their basic needs. Therefore, there is a need to increase in production due increase in industrialization and economic growth. Basically, industrialization traditionally leads to urbanization by generating economic growth opportunities but the reality is that both urbanization and economic growth have enough contributions in environmental degradation. Urbanization leads to increase commercial energy consumption and CO_2 (Gasimli et al., 2019; Kamran and Omran, 2018; Yildirim et al., 2014; Sbia et al., 2017) while economic growth is an increase in per head level of production of goods and services over a specific period of time. There is no controvert that economic growth takes many benefits but the reality is that accumulative measures of production also deteriorates ecosystem and exhaust natural resources because economic growth is usually measured as a percentage increase in gross domestic product (GDP) that grows with the increase in the production of goods and services. A country's economy uses labor, energy, raw material and capital in the production of goods and services. In this process of production, raw material such as minerals, water, trees and metals etcetera are extracted from environment that deteriorate the environment.

This study contributes to the existing literature in such a way that this study uses all those independent variables (EC, POP, POV, IND, URB, EG) that have enough contributions in ED. Many study investigated the individual impact of these independent variables with ED but we didn't find any study in which the collective impact of all these variables has been investigated. There is a huge need to investigate the collective impact of all these variables on ED. Moreover, all the variables i.e. EC, EG, POP, IND, URB, POP have some effect on ED. The coefficient of independent variables will become more reliable which makes us able to draw best policy suggestions. Therefore, the study is an attempt to collectively examined the impact of all those important variables that have enough contributions in environmental degradation. The remaining paper has following structure: In section 2 there is brief review of literature and hypotheses. Section 3 represents the data and methodology while empirical findings are represented in section 4. Finally, section 5, concludes the research and paper ends with some practical implications and directions of further research.

2. LITERATURE REVIEW

This section provides the review of existing literature and construction of hypothesis.

2.1. Environmental Degradation (ED) and Energy Consumption (EC)

Hasnisah et al. (2019) empirically investigated the relationship between EC "renewable and non-renewable energy consumption"

and environment quality (CO_2) by using the data of 13 developing countries in Asia for a period of 1980-2014 and showed that non-renewable energy consumption (NRE) was inversely related with CO_2 whereas renewable energy consumption (RE) was insignificant in the contribution of less pollution respecting the emissions of CO_2 because EC share from RE foundations comparatively low and it had inadequate contributions in the total energy. The linkage between bio-mass EC and ED in west Africa from the period of 1980-2010 and showed that increase in mass EC increases ED because mass EC upsurges the CO_2 emission which in turn rises the environment pollution. Haruna and Mahmood (2018) explored the impact of conventional EC on CO_2 released and revealed that the EC caused environment pollution in short term as well as in long term. The bi-directional relationship between EC and CO_2 emissions by using the data of 28 provinces in china from 1995-2007 and found that the quality of environment and EC moves in opposite direction and EC is the cause of increase in CO_2 emissions in long term. So, it is proposed that:

H_1: "There is a positive relation between Energy Consumption and Environmental Degradation."

2.2. Environmental Degradation (ED) and Population (POP)

Shi (2003) investigated the impact of population on ED by using the data of 93 countries over the period of 1975-1996 and found a direct relationship between POP and ED. The study also found that this relation was more obvious in developing nations. Sherbinin et al. (2007) studied the relationship between size of POP and CO_2 emissions and showed that there was a positive association between size of POP and CO_2 emission. Ray and Ray (2011) also found the positive relationship between ED and POP size in the case of India. The study concluded that increasing POP contributes to the deterioration of land that tends to increase ED. So, it is proposed that:

H_2: "There is a positive relation between Energy Consumption and Environmental Degradation."

2.3. Environmental Degradation (ED) and Economic Growth (EG)

Alper and Oguz (2016) used the data of eight European member nations to examine the impact of economic progress on ED and showed that the EG was positively related with ED. A positive association between ED and EG. Aremu et al. (2014) investigated the relationship between ED and EG and found a long term relationship between EG and ED. Shahbaz et al. (2019) used the data of Vietnam over the period of 1974-2016 and revealed that the relationship between ED and EG follows N-curve pattern. Kahuthu (2006) revealed that there was inverted U-shape relationship between ED and EG. This study confirms the environment-Kuznet curve (EKC) in global context. So, it is proposed that:

H_3: "There is positive relationship between Economic Growth and Environmental Degradation."

2.4. Environmental Degradation (ED) and Urbanization (URB)

The influence of URB on ED by using the data of UAE and revealed a negative significant influence of URB on EG. Katircioglu et al., (2019) investigated the contributions of URB

on ED in the context of Turkey by using the structure of EKC. The results of the study concluded that consumption of traditional energy increases due to URB that in turn have direct effects on CO_2 emissions. It means that URB have positive effects on ED. Moreover, the EKC hypothesis is not confirm in the case of turkey. Similarly, Wang et al. (2016) also concluded that the level of URB have positive and significant effects on ED in western region while in the eastern region there is no any significant effects of URB on ED. Gasimli et al. (2019) conducted their study on the relationship between URB and ED in the case of Sri Lanka and found the negative impact of URB on ED and concluded that URB is not dangerous for environment as it is not responsible for increase in CO_2 releases. So, it is proposed that:

H$_{4:}$ "There is a relationship between Urbanization and Environmental Degradation."

2.5. Environmental Degradation (ED) and Industrialization (IND)

Bhandari and Garg (2015) examined the influence of IND on ED by using the data of India and concluded that IND has enough contributions in ED. The study also concluded that IND results increase in harmful releases in soil, water and air that tends to degrade the environment. Dhami et al. (2013) took support from environmental input/output analysis and examined the influence of IND on ED and found a significant positive effect of IND on ED. Thus, it is proposed that:

H$_{5:}$ "There is positive relationship between Industrialization and Environmental Degradation."

2.6. Environmental Degradation (ED) and Poverty (POV)

The relationship between environment degradation and poverty in Pakistan over the period of 1974-2016 and found a direct relationship between ED and poverty. They considered environment as a basis for the survival of poor people that became suspected when the environment was deteriorated. Aggrey et al. (2010) used the data of Katanga basin and found a positive impact of environment quality on poverty reduction and suggested that a flourishing environment was a main index for sustainable progress and the toxic environment condition executed adverse effects on the residents. Ravnborg (2003) also showed a positive link between ED and poverty in Nicaraguan Hillsides and suggested that the government should make policies that reduce poverty. Therefore, it is proposed that:

H$_{6:}$ "There is positive relationship between Poverty and Environmental Degradation."

3. DATA AND METHODOLOGY

The study empirically examined the impact of EC, EG, POP, POV, IND, and URB on POV. The data for the period of 1995-2017 are gathered from three different sources; Global Economy, World Bank and Index Mundi. Augmented Dickey Fuller (ADF) test is used for checking the stationarity of the data. The data achieved stationarity at level and first difference, so we take support from Auto Regressive Distributive Lag (ARDL) model for examining the results. EC, EG, POP, POV, IND, and URB are used as independent while POV is used as dependent variable.

The explanation and measurement of the variables are presented in Table 1.

3.1. Specification of the Model

The study uses following econometric model for analyzing the impact of EC, EG, POP, POV, IND, and URB on POV.

$$ED = \beta_0 + \beta_1 (EC) + \beta_2 (POP) + \beta_3 (EG) + \beta_4 (URB) + \beta_5 (IND) + \beta_6 (POV) + e \qquad (1)$$

Where "EC is Energy Consumption, POP is Population, EG is Economic growth, URB is Urbanization, IND is industrialization and POV is poverty"

4. EMPIRICAL FINDINGS

Table 2 demonstrates the results of descriptive statistics of the data. 6 variables are being used in our study. This Table 2 shows the mean, median and standard deviation of the data. Furthermore, it also shows skewness and kurtosis along with maximum and minimum values.

Normality of residuals has also been checked through Jarque-Bera test. The null hypothesis for this test is set as "the residuals are normal", as we can see that all the probability values are insignificant which states that we can't reject null hypothesis so that all the residuals are normal in our case.

Table 3 represents the findings of ADF test of unit root that has been used for testing the stationarity and order of integration of data. Here, we have a null hypothesis that "the series are non-stationary".

Results of ADF shows that all the variables EC, POP, EG, URB, POV are insignificant at level, while they become significant at first difference by rejecting the null hypothesis at 1% and 5% which states that all these variables are stationary at first difference and have an integration of order 1, I (1). While IND and ED are significant at level by rejecting the null hypothesis at 5% and it also become significant at first difference by rejecting the hypothesis at 1% which states that IND and ED are stationary at level and at first difference and have an integration of order 0 and 1, I (0) and I (1). As all the variables are integrated at I (0) and I (1), the study moves forward for ARDL approach.

Before using ARDL approach we use bound testing and after that we apply the ARDL approach to check the short and long run association among the independent and dependent variables.

Before proceeding to our further analysis, we have to ensure that our data must be free from serial correlation, and heteroscedasticity. Table 4 presents some diagnostic test for the diagnosis of heteroscedasticity and serial correlation. For testing the serial correlation, we used Breusch-Godfrey test of serial correlation while Breusch-Pagan test to check the heteroscedasticity. The null hypothesis is set as there is no serial correlation/heteroscedasticity in the model. The study found insignificant p values rejecting the null hypothesis which indicates that the model is free from the problem of serial correlation/heteroscedasticity.

Table 1: Description of variables

Variables		Definition/Source	Notation
Dependent variable	Environment Degradation "CO$_2$ Emissions per capita"	"Environment degradation is a process of environment deterioration through extraction and depletion of natural resources like soil, air and water, habitats destruction, ecosystem's devastation and pollution etcetera. A degraded environment affects or changes the climate, due to which global temperature rises. As the temperature increases, the amount of carbon dioxide (CO$_2$) in the atmosphere also increases. The study uses CO$_2$ emission as a measure of environment degradation." Data Source: Global Economy	ED
Independent Variables	Energy Consumption "Per Capita"	"Per capita "energy consumption contains all forms of energy sources from domestic creation and imports. Energy is expressed in kilograms of oil equivalent. Energy use refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport." Data Source: Global Economy	EC
	Population Size "In Millions"	"Population refers to the collection of humans. In simple words, population is the number of people living in a specific region, town, city, country or world. It is determined through a particular process known as census. It is measured as a total number of people (in millions) in a country." Data Source: Global Economy	POP
	Economic Growth "Rate of Change of Real GDP"	"Economic growth is an increase in per head level of production of goods and services over a specific period of time. Usually, it is measured as a percentage increase in gross domestic product (GDP). Economic growth rate is an annual growth rate in GDP between current and prior year over a specific time period." Data Source: Global Economy and Trading Economy	EG
	Poverty "Head Count Ratio"	"Poverty is defined as the "state of being extremely poor." It is a situation of not having enough possession of material or sufficient income to fulfill basic needs. It is a multilayered concept which includes political, social and economic elements. It is measured as headcount ratio at national lines as a percentage of total population. This headcount ratio is a percentage of people living below the poverty line." Data Source: Index Mundi	POV
	Urbanization "Urban Population"	"Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects. Aggregation of urban and rural population may not add up to total population because of different country coverage." Source: World Bank	URB
	Industrialization "Industry value added % of GDP"	"Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3 or 4." Source: Global Economy	IND

Table 2: Descriptive statistics

Variables	ED	EC	POP	EG	URB	IND	POV
Mean	0.8591	478.9774	158.1870	4.1226	34.1830	21.1244	46.2248
Median	0.9000	485.3400	157.0900	4.4000	34.1800	21.3200	51.7000
Maximum	0.9900	523.7600	197.0200	7.6700	36.4400	25.5300	64.3000
Minimum	0.6900	438.8700	122.8300	1.0100	31.8400	17.9400	24.2000
Std. Dev.	0.0932	22.9515	22.6093	1.7678	1.3920	1.8703	14.1081
Skewness	−0.3776	−0.1220	0.1269	0.1401	−0.0211	0.5384	−0.4129
Kurtosis	1.6199	2.0397	1.8533	2.4413	1.8376	3.3137	1.6438
Jarque-Bera	2.3720	0.9409	1.3219	0.3744	1.2965	1.2053	2.4162
Probability	0.3054	0.6247	0.5163	0.8293	0.5230	0.5474	0.2988

"Jarque-Bera test is used to check the normality of residuals"

The results of the bound test are depicted in Table 5. The null hypothesis for the bound testing is that there is a log run association between the variables. The value of F-Statistic is greater than upper and lower bound so we cannot reject the null hypothesis and conclude that there exists a long run association among the variables.

Table 6 shows the short run and long run results. The coefficient of ED is positive and significant at 5% level of significance in short run (0.0016) while at 1% level of significance in long run (0.0039). It depicts that if 1-unit increase in EC causes, on average, to degrade the environment by 0.001640 units and 0.003913 units in short run and long run, respectively. Here, H$_1$ is accepted in short run as well as in long run. The coefficient of POP is insignificant in short run while significant in long run (0.011124) at 5% level of significant and depicts that if there is 1-unit increase in POP, the ED will be increased by

Table 3: Augmented Dickey fuller (ADF) unit root

Variables	Level		First difference		Decision
	Intercept	Trend and intercept	Intercept	Trend and intercept	
EC	−1.8046	−1.1143	−3.6033**	−3.6881**	I(1)
POP	2.6762	−0.6922	−5.1492***	−6.5072	I (1)
EG	−2.1820	−2.2440	−4.2783**	−4.2326**	I(1)
URB	0.3213	−2.6775	−4.3697**	−4.3822**	I (1)
IND	0.2474**	−6.5717**	−2.9772**	−5.8877***	I(0), I(1)
POV	−1.8485	−2.9649	−5.6235***	−5.8255***	I (1)
ED	−1.7243**	−1.1166**	−4.2482***	−4.1571***	I(0), I(1)

"*, **, *** denotes statistical significance at 1%, 5% and 10% respectively"

Table 4: Diagnostic tests

Diagnostic tests	P-value
Breusch-Godfrey serial correlation	0.2885
Breusch-Pagan-Godfry HSK	0.8879

Table 5: ARDL bound test

F-statistics	ED	
Critical bounds	Values	K
	6.8729	6
	I_0 bound	I_1 bound
10%	2.12	3.23
5%	2.45	3.61
1%	3.15	4.43

Table 6: Short run and long run ARDL results

Variables	Short run ARDL: ED		Long run ARDL: ED	
	Coefficient	P-value	Coefficient	P-value
Constant	0.002863	0.0396**	1.905245	0.0483**
EC	0.001640	0.0109**	0.003913	0.0000***
POP	0.009591	0.1240	0.011124	0.0189**
EG	0.010373	0.0107**	0.002444	0.5702
URB	0.801426	0.1394	−0.153094	0.02661**
IND	0.003823	0.1736	0.004434	0.0767*
POV	0.000009	0.9937	0.002337	0.0442**
ECM (-1)	−0.862116	0.0018***	---	---
R^2		0.99300		
Adj. R^2		0.98531		
Hypothesis	H_1: ✓		H_1: ✓	
	H_2: ✗		H_2: ✓	
	H_3: ✓		H_3: ✗	
	H_4: ✗		H_4: ✓	
	H_5: ✗		H_5: ✓	
	H_6: ✗		H_6: ✓	

"*, **, *** denotes statistical significance at 1%, 5% and 10% respectively,
✓: Accepted, ✗: Rejected"

0.011124 units in long run. Hence, the H_2 is accepted in long run. EG is also positively related with ED in short run (0.0103) while there is no significant relationship between ED and EG in long run. The short run coefficient of EG shows that 1-unit increase in EG leads to enhance ED by 0.0103 units. Here, H_3 is accepted for short run while it is rejected for long run association. URB does not have significant contributions in ED in short run while it has significant negative contributions in ED in long run. 1-unit increase in URB tends to reduce ED by 0.153094 units. Rejecting (accepting) H_4 in short run (long run). Similarly, IND is insignificantly related with ED in Short run while it has significant and positive relation with ED in long

run. 1-unit increase in IND leads to 0.004434 units increase in ED. So, H_5 is also rejected in short run while accepted in long run. Coefficient of POV is also insignificant in short run and it becomes significant in long run at 5% level of significant and shows that 1-unit increase in poverty leads to degradation of environment by 0.002337 units. The coefficient of ECM (−0.862116) is negative and statically significant at 5% that emphasize the presence of long-run association among variables and represents that about 86.21% of inconsistency between long term and short-term ED can be corrected within a year. Value of adjusted R^2 represented that 98.531% variations in ED is collectively explained by EC, POP, EG, URB, IND and POV.

We checked the stability of the models by applying the CUSUM test suggested by Brown et al. (1975). Figure 1 represents the stability of the model. As we can see that the plots of our model remain in critical bounds so, we can say that our model is stable.

5. DISCUSSIONS AND CONCLUSIONS

Environment is a main area of interest of different researchers in the current era. Everything around us is environment. It can be living or non-living factors. It consists of chemical, physical and other natural forces. All the living things live in an environment. These living things use natural resources extracted from environment. As these natural resources are continuously extracted, they degrade the environment. Degradation of environment is one of the main hazards of emerging nations (Dhami et al., 2013). This study empirically examined the impact of EC, POP, EG, URB, IND and POV on ED in Malaysia. The data for the period of 1995-2017 are gathered from different sources such as Global Economy, World Bank and Index Mundi. ED is used as a dependent while EC, POP, EG, URB, IND and POV are used as independent variables. The study uses ARDL model for examining the results.

The present research finds positive and significant impact of EC on ED in short run as well as in long run because usually energy is produced from conventional sources that results an increase in CO_2 emissions which pollutes the environment. Results are consistent with previous studies (Hasnisah et al., 2019; Haruna and Mahmood, 2018; Among others). The study also finds that the size of POP positively contributes in ED in Long run. An increase in the size of POP leads to increase the basic needs of the people as they require more space for their living arrangements. There will be more increase in transportation, consumption of energy for the satisfaction of their needs which
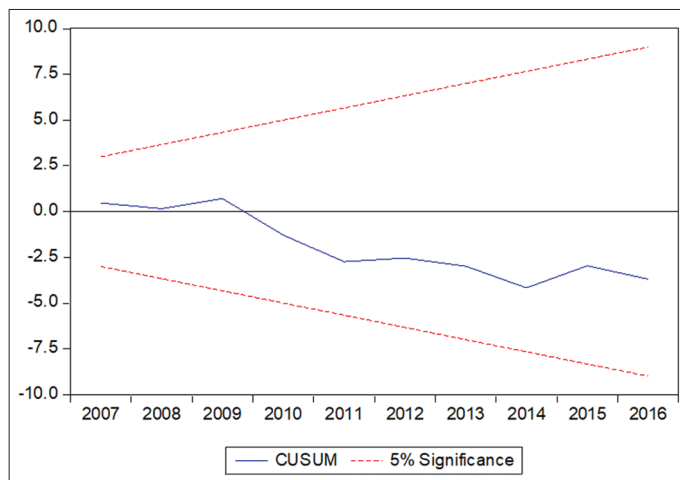
tends to degrade the environment by increasing CO_2 emissions. Results are consistent with previous studies (Ray and Ray, 2011; Sherbinin et al., 2007).

The study also finds a positive relation of EG with ED in Short run. The results can be linked with EKC because firstly, ED increases due to increase in EG, after that, economy will face turning point (after few years) then ED starts decreasing due to EG. The results are similar with previous studies (Alper and Oguz, 2016; Shahbaz et al., 2019). Findings show a negative impact of URB on ED which means that URB is not responsible in increasing in CO_2 emissions rather it fetches proficiency in public accommodations such as "public transport and electricity". Results are consistent with previous studies (Gasimli et al., 2019).

Result also shows positive contribution of IND in ED as fast progress of production and consumption results undesirable externalities such as increase in uproar, CO_2 emissions, and road blocking. Results are significant with previous studies (Bhandari and Garg, 2015; Dhami et al., 2013). Lastly, study also find a positive effect of POV on ED. One possible explanation of these outcomes is that if people are unable to satisfy their needs, they become poor and they may start deterioration in the environment for the satisfaction of their basic needs. The results are in line with previous studies (Aggrey et al., 2010).

5.1. Practical Implications

The implications derived from the study are following:

1. POV is an important factor that have enough contribution in ED. Poor people are deteriorating the environment for the satisfaction of their desires. Therefore, there is a need that government should make the energy assessable, so that the people may satisfy their needs.
2. EC is also an important factor that increase ED. Energy is produced from conventional sources that have enough contributions in ED. Therefore, the Malaysian government should produce energy from renewable sources that has less contributions in ED.
3. IND is also a main contributor in ED. Therefore, there is a need to reconsider the industrial policies.

5.2. Limitations and Future Directions

The study has some limitations: Firstly, this study is conducted in Malaysia by taking the data of 22 years. Future studies can be conducted by using the cross-country data and may also increase the data period. This study uses only one measure of each independent variable. Future study can be conducted by using different proxies of these variables.

REFERENCES

Aggrey, N., Wambugu, S., Karugia, J., Wanga, E. (2010), An investigation of the poverty-environmental degradation nexus: A case study of Katonga Basin in Uganda. Research Journal of Environmental and Earth Sciences, 2(2), 82-88.

Alper, A., Oguz, O. (2016), The role of renewable energy consumption in economic growth: Evidence from asymmetric causality. Renewable and Sustainable Energy Reviews, 60, 953-959.

Aremu, A.O., Plačková, L., Bairu, M.W., Novák, O., Plíhalová, L., Doležal, K., Van Staden, J. (2014), How does exogenously applied cytokinin type affect growth and endogenous cytokinins in micropropagated *Merwilla plumbea*? Plant Cell Tissue and Organ Culture, 118(2), 245-256.

Bhandari, D., Garg, R.K. (2015), Effect of industrialization on environment (Indian Scenario). Global Journal of Research Analysis, 4(12), 15-24.

Dhami, J.K., Singh, H., Gupta, M. (2013), Industrialization at the cost of environment degradation-a case of leather and iron and steel industry from Punjab economy. Innovative Journal of Business and Management, 3(2), 19-21.

Gasimli, O., Gamage, S.K.N., Shihadeh, F., Rajapakshe, P.S.K., Shafiq, M. (2019), Energy, trade, urbanization and environmental degradation nexus in Sri Lanka: Bounds testing approach. Energies, 12(9), 1655-1659.

Haruna, M.A., Mahmood, S. (2018), Impact of energy consumption and environmental pollution in Malaysia. Energy Economics Letters, 5(1), 31-43.

Hasnisah, A., Azlina, A.A., Taib, C.M.I. (2019), The impact of renewable energy consumption on carbon dioxide emissions: Empirical evidence from developing countries in Asia. International Journal of Energy Economics and Policy, 9(3), 135-143.

Kahuthu, A. (2006), Economic growth and environmental degradation in a global context. Environment Developement and Sustainability, 8(1), 55-68.

Kamran, H.W., Omran, A. (2018), Impact of Environmental Factors on Tourism Industry in Pakistan: A Study from the Last Three Decades the Impact of Climate Change on Our Life. Berlin: Springer. p197-212.

Katircioglu, S., Cizreliogullari, M.N., Katircioglu, S. (2019), Estimating the role of climate changes on international tourist flows: Evidence from Mediterranean Island states. Environmental Science and Pollution Research, 26(14), 14393-14399.

Ravnborg, H.M. (2003), Poverty and environmental degradation in the Nicaraguan hillsides. World Development, 31(11), 1933-1946.

Ray, S., Ray, I.A. (2011), Impact of population growth on environmental degradation: Case of India. Journal of Economics and Sustainable Development, 2(8), 39-44.

Sbia, R., Shahbaz, M., Ozturk, I. (2017), Economic growth, financial development, urbanization and electricity consumption nexus in UAE. Economic Research-Ekonomska Istraživanja, 30(1), 527-549.

Shahbaz, M., Haouas, I., Van Hoang, T.H. (2019), Economic growth and environmental degradation in Vietnam: Is the environmental Kuznets Curve a complete picture? Emerging Markets Review, 38, 197-218.

Sherbinin, A.D., Carr, D., Cassels, S., Jiang, L. (2007), Population and environment. Annual Review of Environment and Resources, 32, 345-373.

Shi, A. (2003), The impact of population pressure on global carbon dioxide emissions, 1975-1996: Evidence from pooled cross-country data. Ecological Economics, 44(1), 29-42.

Wang, Y., Li, L., Kubota, J., Han, R., Zhu, X., Lu, G. (2016), Does urbanization lead to more carbon emission? Evidence from a panel of BRICS countries. Applied Energy, 168, 375-380.

Yildirim, E., Aslan, A., Ozturk, I. (2014), Energy consumption and GDP in ASEAN countries: Bootstrap-corrected panel and time series causality tests. The Singapore Economic Review, 59(2), 1450010.