

# THE IMPACT OF DEMOCRACY, CORRUPTION AND MILITARY EXPENDITURE ON ENVIRONMENTAL DEGRADATION: EVIDENCE FROM TOP SIX ASEAN COUNTRIES

Gholamreza Zandi<sup>1\*</sup>, Muhammad Haseeb<sup>2</sup>, Irwan Shah Zainal Abidin<sup>3</sup>

<sup>1</sup>Associate Professor, Business School, University Kuala Lumpur (UniKL), Malaysia, <sup>2</sup>Taylors Business School (TBS), Taylors University Lakeside Campus, 1 Jalan Taylors Subnag Jaya Selangor Malaysia, <sup>3</sup>School of Economics, Finance and Banking (SEFB), College of Business (COB) University Utara Malaysia (UUM), Sintok 06010 Kedah Malaysia.  
E-mail: \*zandi@unikl.edu.my

Article History: Received on 30<sup>th</sup> June 2019, Revised on 30<sup>th</sup> July 2019, Published on 11<sup>th</sup> September 2019

## Abstract

**Purpose of the study:** The current study aims to examine the relationship between corruption, democracy, military expenditure and environmental degradation in a panel of six ASEAN countries including Malaysia, Indonesia, Philippines, Thailand, Singapore and Vietnam using a panel data from 1995 to 2017.

**Methodology:** In addition, the current study is unique in applying the sophisticated methods of panel Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) that have been adopted in several earlier quality research.

**Main Findings:** The results of panel estimations conclude that corruption, military expenditure, and democracy have a noteworthy and significant impact on carbon dioxide emission in ASEAN countries. The results of FMOLS and DOLS confirm that there is a positive and significant impact of military expenditure and corruption on carbon dioxide emission. However, we found a negative and significant impact of democracy on carbon dioxide emission in all selected ASEAN countries.

**Implications:** In general, the consequences of both statistical estimations affirm that corruption, democracy, and military expenditure are the critical and noteworthy determinants of carbon dioxide emission in ASEAN nations.

**Keywords:** Corruption, democracy, military expenditure, carbon dioxide emission, ASEAN countries.

## INTRODUCTION

The growing environmental changes around the globe are persistently changing the living dynamics and potential concerns of the people all around the World (Okon, 2016; Diekmann and Franzen, 2019). The extensive carbon emanations from several domestic and corporate processes are playing their part in disrupting ecological conditions. Keeping in mind the inevitable role of power utilization, the economies are striving to explore the eco-friendly ways of generating power through renewable sources. However, apart from economic indicators, there are certain socio-political measures that exert influence on environmental quality (Khalid and Mustapha, 2014; You *et al.*, 2015; Mohamed *et al.*, 2018; Oluwaseun and Samuel, 2018).

The contribution of political stability is fundamental for bringing confidence and reliability in the country's policies. The notion of good governance is highly dependent on fair and unbiased political systems that can work in favor of generating productive opportunities for the economies and environment. In this regard, the role of corruption is greatly important in disrupting environment, both directly and indirectly. As a direct impact, corruption can influence environment in disrupting ecological policies and regulations especially in cases where it leads to disregard ecological laws and enhancements in the culture of subordination (Winbourne, 2002; Sundström, 2013; Alkali and Imam, 2016; Gibson, 2016). In terms of indirect impact, the corruption can affect environmental degradation through augmenting the levels of income inequality, poverty and permitting diminution of natural resources (Frhd *et al.*, 2012; Okoli, 2017; Masron and Subramaniam, 2018; Mungwari, 2018; Özmaden *et al.*, 2018; Rosli and Siong, 2018).

Likewise, the stability of the political regime is considered crucial for ensuring environmental quality. In similar context, democracy or political freedom is vital in influencing environment through sound and stable eco-policies and effective legislation. In addition, corporate sector is considered more influential in the presence of democratic political regime that helps economic goals of future sustainability (Nekooei *et al.*, 2015; Khan and Ali, 2017). Similarly, it is also viewed that political privileges and choice of information encourage the objectives of sustainable development and thus bring positive impact on environmental quality (Rehman *et al.*, 2012). In addition, the freedom of speech in democratic regimes tends to supplement the motives of ecological interest groups that ultimately enhance societal awareness and motivate ecological legislation (Parks and Roberts, 2010; Cossiga, 2018).

The growing technological advancements and militarization are also referred as the critical inducer of environmental degradation. Many studies argued that greater levels of greenhouse gases emanations are the outcome of augmented militarization (Clark *et al.*, 2010; Jorgenson *et al.*, 2012; Bildirici, 2018). At present, the increasing race for militarization is causing abruption in the atmosphere by enhancing the levels of pollutions by emitting toxic emissions and higher energy consumption, therefore crucial to be investigated (Bildirici, 2017a; 2017b; 2017c).

Therefore, acknowledging the vitality of socio-political indicators in influencing environmental quality (Bae *et al.*, 2017), the current study aims to examine the relationship between corruption, democracy, military spending and environmental degradation in a panel of six ASEAN countries including Malaysia, Indonesia, Philippines, Thailand, Singapore, and Vietnam. The importance of present study lies in exploring the potential impact of military expenditures, level of democracy and corruption in growing trends of carbon emission in the sampled nations. In addition, against the orthodox methods that can raise the queries on the authentication and reliability of the derived findings, the current study is unique in applying the sophisticated methods of panel Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) that have been adopted in several earlier quality research. Thus, the results obtained from rigorous adopted methodology in exploring the critical dynamic of social-political and environmental association would be helpful to establish the trustworthy role of democracy, military spending, and corruption in changing the levels of environmental quality in ASEAN region.

The remaining of the investigation is outlays as below. Section-2 portrays the relevant studies on the association of democracy, military expenditure and corruption with environmental degradation across the globe. Section-3 defines the adopted methods of the current investigation. Section-4 displays the derived results and their interpretations. Lastly, Section-5 concludes the research findings and offers future recommendations.

## LITERATURE REVIEW

Many studies explored the direct and indirect link between several socio-political measures with environmental. In recent years, the shift of interest in identifying the potential link between socio-political indicators such as corruption, democracy, military spending, etc. have been recognized in several studies. Among them, Duong (2016) inspected the association between corruption and carbon emanation in a panel investigation. Utilizing the sample of forty-two economies, the study applied the methods of three-stage least squares (3SLS) to identify the long-run connection among the variables. The outcomes of the study reported that there existed a positive significant relationship between corruption and carbon emanation in the sampled economies.

Similarly, Habib *et al.* (2018) also examined the association between corruption and carbon emanation in a panel of African countries. Utilizing the sample of eighteen economies between the period of 1992 to 2013, the study applied the methods of Generalized Method of Moments (GMM) to identify the long-run connection among the variables. The outcomes of the study reported that there existed a positive significant relationship between corruption and carbon emanation in the African region. For the countries of Asia-Pacific Economic Cooperation (APEC), Zhang *et al.* (2016) examined the association between corruption and carbon emanation. Utilizing the sample of nineteen economies between the period of 1992 to 2012, the study applied the methods of Panel quantile regression to identify the long-run connection among the variables. The outcomes of the study reported mixed findings. In particular, the outcome confirmed that there existed a negative association between corruption and carbon emanation in low carbon emitting economies. However, the findings failed to find any significant relationship between carbon emission and corruption in high carbon emitting nations.

For Morocco, Ul-Haq *et al.* (2016) investigated the association between corruption and carbon emanation. The study utilized the data from the period of 1971 to 2011. Applying the methods of J-J cointegration, the outcomes of the study confirmed that there existed a negative significant association between corruption and carbon emanation in the country. Similarly, Rehman *et al.* (2012) also examined the association between corruption and carbon emanation for the South Asian countries. Utilizing the sample of developing economies of India, Sri Lanka, Pakistan and Bangladesh between the period of 1984 to 2008, the study applied the methods of Fixed Effect Model to identify the long-run connection among the variables. The outcomes of the study reported that there existed a positive significant relationship between corruption and carbon emanation in the South Asian region. In another panel investigation, Wang *et al.* (2018) investigated the association between corruption and carbon emanation in BRICS countries. The study utilized the data from the period of 1996 to 2015 to investigate the moderating role of corruption in influencing environmental quality. Applying the method of PLS-SEM, the outcomes of the study confirmed that there existed a significant positive direct impact of corruption on environmental degradation of the panel economies. Furthermore, the findings also established that corruption positively moderated the relationship of urbanization, population growth and economic development with carbon emission of the selected countries. In addition, Masron and Subramaniam (2018) also examined the association between corruption and pollution in a panel of emerging economies. Utilizing the sample of sixty-four countries between the period of 2005 to 2013, the study applied the methods of Generalized Method of Moments (GMM) to identify the long-run connection among the variables. The outcomes of the study reported that there existed a positive significant relationship between corruption and pollution in the sampled countries.

Identifying the rise in the international military race, Bildirici (2017a) investigated the relationship between militarization and carbon emanation. The study utilized the sample of the G-7 countries from the period of 1985 to 2015. Applying the method of panel ARDL, the outcomes of the study reported a significant positive impact of military spending on carbon emanation in G-7 countries. On the other hand, the findings of causal investigation established that there existed a uni-directional causal association from military expenditures to carbon emission in G-7 region. Likewise, in United States, Bildirici (2017b) examined the link between militarization and environmental degradation. The study utilized the data from the period of 1960 to 2013 to investigate the long-run association between military expenditures in influencing environmental degradation. Applying the method of ARDL Bound testing approach, the outcomes of the study confirmed

that there existed a significant positive impact of military spending on carbon emanation in Unites States. Applying the different methods, [Bildirici \(2017c\)](#) also examined the connection between militarization and environmental degradation in U.S. The study utilized the data from the period of 1985 to 2015 to investigate the long-run association between military expenditures in influencing environmental degradation. Applying the method of FMOLS and DOLS, the outcomes of the study confirmed that there existed a significant positive impact of military spending on carbon emanation in Unites States. In addition, the causal investigation established that there existed a bi-directional causal connection between militarization and carbon emission in the country.

In the panel investigation, [Bildirici \(2018\)](#) investigated the relationship between militarization and carbon emanation in G-seven countries. The study utilized the data from the period of 1985 to 2015 to investigate the long-run association between military expenditures in influencing environmental degradation. Applying the method of DOLS and FMOLS, the outcomes of the study confirmed that there existed a significant positive impact of military spending on carbon emanation in G-7 countries. Furthermore, the test of the causal investigation reported the presence of uni-directional causal association among the variables and the direction of causality run from military expenditures to carbon emission in the sampled countries. Assessing the political stability and environmental connection, [Mao \(2018\)](#) inspected the association between democracy and carbon emanation in Indonesia. The outcomes of the study reported that transition towards a democratic regime has enhanced the environmental degradation of the country from the period of 1999 to 2010.

Similarly, [Joshi and Beck \(2018\)](#) also examined the association between political freedom and carbon emanation in a panel investigation. Utilizing the sample of twenty-two OECD and eighty-seven non-OECD economies between the period of 1995 to 2010, the study applied the methods of Generalized Method of Moments (GMM) to identify the long-run connection among the variables. The outcomes of the study reported that there existed a significant relationship between political freedom and carbon emanation in the sampled countries. For the countries of Organization of Islamic Cooperation (OIC), [Nekooei et al. \(2015\)](#) examined the association between democracy and environmental quality. Utilizing the sample of selected OIC economies between the period of 2000 to 2010, the study applied the methods of Panel regression to identify the long-run connection among the variables. The outcomes of the study confirmed that there existed a significant positive association between democracy and environmental quality in the sampled nations.

In another panel investigation, [Ghodrati et al. \(2018\)](#) investigated the association between democracy and environmental degradation. The study utilized the data from the period of 2002 to 2012. The outcomes of the study confirmed that there existed a significant association between democracy and environmental degradation and suggested that improvement in a democracy tends to improve environmental quality. Similarly, [Adams and Klobodu \(2017\)](#) also examined the association between democracy and carbon emanation in African countries. Utilizing the sample of thirty-eight African economies between the period of 1970 to 2011, the study applied the methods of panel DOLS to identify the long-run connection among the variables. The outcomes of the study reported that there existed a negative significant relationship between democracy and carbon emanation in the selected African region suggesting that level of democracy reduced environmental degradation in the sampled countries.

## METHODOLOGY

In the current examination, we utilize yearly information on corruption, democracy, military expenditure, and carbon dioxide emission. Corruption perception index is used as a proxy of corruption which is represented by (CPI). Moreover, democracy index is used as a proxy of democracy which is explained by (DEMO). Also, military expenditure is denoted by (MILEX) and finally carbon dioxide emission is used as a proxy of environmental degradation which is used as a (CO<sub>2</sub>). The data of corruption perception index is collected from the website of Transparency International. However, the information of democracy index is collected from the website of Polity IV project. Finally, the data on military expenditure and carbon dioxide emission is collected from the website of World Bank (World Development Indicator). The current investigation is analyzing the effect of corruption, military expenditure, and democracy on environmental degradation in ASEAN nations including Thailand, Singapore, Indonesia, Malaysia, Vietnam, and the Philippines. In the current investigation, we utilize corruption, military expenditure, and democracy as a determinant of carbon dioxide emission in different ASEAN nations. Additionally, the current investigation covers the time range from 1995 to 2017 for selected ASEAN nations. In the current investigation, the carbon dioxide emission is exhibited according to the below equation:

$$CO2_{it} = f(CPI_{it}, MILEX_{it}, DEMO_{it})$$

Where,  $CO2_{it}$  is the carbon dioxide emission and measure in (kilo tons of oil equivalent),  $CPI_{it}$  is corruption perception index and measured from the range of 0 (highly corrupt) to 100 (very clean).  $MILEX_{it}$  is a military expenditure which is measured in (US Dollars) and  $DEMO_{it}$  is the democracy index which is measured from the range of 0 (no democracy) to 10 (full democracy). At long last,  $I$  speak about the numbers of nations use in the current study and  $t$  explains the timeframe of the current investigation. In a recent study, we explore the long-term connection among the factors by consuming a panel long-run relationship. Correspondingly, current study explains the long-run impact of corruption, military expenditure, and democracy on carbon dioxide emission by utilizing FMOLS and DOLS approaches. At last, we utilize a new method of heterogeneous panel causality analysis to deal with inspect the possible causal connection among corruption, military expenditure, democracy and carbon dioxide emission in top six ASEAN countries.

## DATA ANALYSIS AND DISCUSSION

### Descriptive Statistics

Primarily, we investigate the essential statistics of the selected number of ASEAN nations. The outcomes associated with the estimations are displayed in table-1. As saw from the table the most noticeable estimation of CO2 is 3225.557 and the minimum value is 1473.836. The maximum value for the selected countries of CPI is 65.148 and maximum value is 89.324 while the minimum value is 24.077. Besides, the most noteworthy estimation of MILEX is 3284.363 with the minimum value of 1299.279 and maximum value of 5462.166. Finally, the greatest value for the sampled countries of DEMO is 8.318 with the minimum value of 4 and maximum value of 10. The standard deviation of all the selected variables is positive.

**Table 1: Descriptive Statistics of the variables**

Variables	Mean	Max	Min	Std. Dev.	Obs.
<b>Full Sample</b>					
CO2	2088.785	3225.577	1473.836	6.214	138
CPI	65.148	89.324	24.077	2.355	138
MILEX	3284.363	5462.166	1299.279	1.326	138
DEMO	8.318	10	4	0.462	138

**Note:** CO2 is the carbon dioxide emission, CPI is the corruption perception index, MILEX is the military expenditure and DEMO is the democracy index. **Source:** Authors' Estimation

### Panel Unit Root tests

In the current study, we use [Shin and Zhou \(2003\)](#) and [Levin et al. \(2002\)](#) & IM, Pesaran and unit root test which focusses on the theory of integration of variables. This panel unit root test is the key to apply panel long-run relationship systems. This methodology is utilized to research the pattern of integration of the components. For example, if every single chosen factor is not stationary of the level, for instance  $I(0)$ , by then this implies the majority of the variables have a unit root issue at level and are stationary at first differential arrangement. Consequently, it might be observed that all the chose variable in the present examination might have a connection in the longer-term period.

**Table 2: Results of Stationary Test**

Variables	IM, Pesaran, and Shin				Levin, Lin, and Chu			
	I(0)		I(1)		I(0)		I(1)	
	C	C&T	C	C&T	C	C&T	C	C&T
CO2	0.325	0.301	-4.367***	-4.093***	0.453	0.482	-4.483***	-4.389***
CPI	0.882	0.792	-4.335***	-4.475***	0.774	0.768	-4.225***	-4.887***
MILEX	0.302	0.334	-5.245***	-5.217***	0.302	0.311	-4.136***	-4.445***
DEMO	-0.821	-0.773	-5.003***	-5.102***	-0.732	-0.801	-5.117***	-5.349***

Single, double, and triple asterisks indicate significance level respectively at 1, 5, and 10%. Source: authors' estimation

Table-2 describes the outcomes for the [Levin et al. \(2002\)](#) and [Im et al. \(2003\)](#) unit root test. The unit root test results for the top six ASEAN countries exhibit that the dismissal of the null hypothesis of unit root test at the 1% significance level for all variables, implying that each of the variables is non-stationary at level and become stationary at first differential series. Therefore, the results of unit root confirm that each of the selected variables is showing up non-stationary property at the level series and exhibiting stationary properties at the first difference stage. In general, all components are integrated at  $I(1)$ . Thusly, there must be a sign of long-run association between the components in long run.

### Panel Cointegration tests

We additionally apply [Kao \(2003\)](#) and [Pedroni \(2004\)](#) panel long-run relationship procedures to examine the long-run connection between corruption, democracy, military expenditure, and carbon dioxide emission in the ASEAN countries. So as to run this approach, every factor ought to be stationary at first differential, for example,  $I(1)$ . In light of the existence of long-run relationship, the long-run estimation remains calculated. In a cross-sectional examination, the error fluctuation changes over the groups which affect the consistency of the parameters. So as to adapt up this issue the generalized least squares strategy (GLS) could be used. In any case, the difference consistency still happens, for example, the relationship of the squared residuals with the regressor in each group. As such, to deal with the issue giving the issue of heteroskedasticity, we finally apply fully modified ordinary least square (FMOLS) and dynamic ordinary least square (DOLS) strategy.



**Table 3: Results of Pedroni (Engle-Granger based) Panel Cointegration**

Estimates	Stats.	Prob.
<b>CO<sub>2</sub> = f (CPI + MILEX + DEMO)</b>		
Panel v-statistic	-18.328	0.000
Panel rho-statistic	-13.332	0.000
Panel PP statistic	-9.366	0.000
Panel ADF statistic	-10.494	0.000
Alternative Hypothesis: Individual AR Coefficient		
Group rho-statistic	-12.326	0.000
Group PP statistic	-57.323	0.000
Group ADF statistic	-22.311	0.000

Note: The null hypothesis of [Pedroni \(1999\)](#) panel cointegration procedure is no cointegration

Source: Authors' estimation.

Table-3 defines the outcomes of Pedroni panel cointegration analysis results. This approach rejects the null hypothesis of no cointegration at the 1 % significance level since all seven estimations of within estimation (Panel v-stats, Panel rho-stats, Panel PP stats and Panel ADF stats) and three estimations of the between-group (group rho, PP stats and group ADF stats) second this rejection of no cointegration in the favour of alternative hypothesis. Consequently, seven tests disclose that the variables move together over the long haul relationship in corruption, democracy, military expenditure, and carbon dioxide emission model.

**Table 4: Results of Kao (Engle-Granger based) Panel Cointegration**

Estimates	Stats.	Prob.
<b>CO<sub>2</sub> = f (CPI + MILEX + DEMO)</b>		
Panel ADF-statistics	-33.546	0.000

Note: The null hypothesis of Kao residual co-integration panel co-integration procedure is no co-integration

Source: Authors' estimation.

The cointegration among all factors confirms by using the Kao test. As saw from the outcomes presented in table-4, the null hypothesis is rejected and the alternative hypothesis is accepted, i.e., long-run relationship exists between corruption, military expenditure, democracy and carbon dioxide emission in the top six ASEAN nations.

### Long Run Estimations

Present investigation utilizes pooled conventional least squares (OLS) to look at the effect of corruption, military expenditure, and democracy on carbon dioxide emission in top six ASEAN nations. Moreover, [Pedroni \(2001a; 2001b\)](#) opposed that as a result of regression result, inconsistent controls could affect the presence of sequential correlation and endogeneity issue among the regressor. Likewise, to deal with these issues, the present examination uses the FMOLS procedure. This system focuses on the non-parametric strategy so as to choose the issue of endogeneity and sequential correlation ([Ametorwo, 2016; Sharif et al., 2019](#)). In like way, we use FMOLS and DOLS methodologies to examine the long haul association among corruption, military expenditure, democracy, and carbon dioxide emission in top six ASEAN countries.

The long-run association between the variable is examined by utilizing the FMOLS and DOLS approaches. These approaches were displayed by [Phillips and Hansen \(1990\)](#) and sometime later adjusted by the [Pedroni \(2001\)](#). We select these methods since they talk about to endogeneity and autocorrelation problems and provide healthy outcomes. Likewise, we investigate the long-run checks by taking the FMOLS and DOLS coefficients. The consequences of FMOLS and DOLS have been shown to in table-5. The long-run coefficient evaluated utilizing two novel strategies which are particularly proportional and basic at the 10% essentialness level. The results of FMOLS and DOLS attest that every one of the determinants of carbon dioxide emission, corruption, military expenditure and democracy in the best six ASEAN countries. The consequences of the long-run coefficient further recommend that every one of the determinants considered in this investigation significantly affect carbon dioxide emission in ASEAN nations.

**Table 5: Results of long-run estimation through FMOLS and DOLS**

Variable	FMOLS			DOLS		
	Coeff.	t-stats	Prob.	Coeff.	t-stats	Prob.
CPI	0.226	4.679	0.000	0.249	5.336	0.000

MILEX	0.332	4.877	0.000	0.382	5.643	0.000
DEMO	-0.393	6.445	0.000	-0.414	5.848	0.000

Table-5 explains that the results of panel estimations conclude that the long-run impact on carbon dioxide emission by corruption perception index to 0.226; a per unit variation in the corruption will impact on carbon dioxide emission by 0.226 unit. The outcomes further suggested that military expenditure have also a significant and positive impact on carbon dioxide emission. The outcomes confirm that a per unit increase in military expenditure causes 0.332 unit change in carbon dioxide emission. Finally, results also confirmed that democracy has also negative and significant impact on carbon dioxide emission. Results suggested that a per unit increase in democracy causes 0.393 unit decrease in carbon dioxide emission in ASEAN countries. In general, the consequences of FMOLS and DOLS affirm that corruption, democracy, and military expenditure are the critical and noteworthy determinants of carbon dioxide emission in ASEAN nations. The outcomes recommend that ASEAN countries need an environmental efficiency and good governance system which is free of corruption also when they are cooperating with one another. The outcomes additionally affirmed that the more the corruption and military consumption the more will be the carbon dioxide emission in these ASEAN countries.

## CONCLUSION

The growing environmental changes around the globe are persistently changing the living dynamics and potential concerns of the people all around the World. The extensive carbon emanations from several domestic and corporate processes are playing their part in disrupting ecological conditions. Keeping in mind the inevitable role of power utilization, the economies are striving to explore the eco-friendly ways of generating power through renewable sources. However, apart from economic indicators, there are certain socio-political measures that exert influence on environmental quality.

Therefore, acknowledging the influencing nature of environmental indicators, the current study aims to examine the relationship between corruption, democracy, military expenditure and environmental degradation in a panel of six ASEAN countries including Malaysia, Indonesia, Philippines, Thailand, Singapore, and Vietnam. The importance of present study lies in exploring the potential impact of military expenditures, level of democracy and corruption in growing trends of carbon emission in the sampled nations. In addition, against the orthodox methods that can raise the queries on the authentication and reliability of the derived findings, the current study is unique in applying the sophisticated methods of panel Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) that have been adopted in several earlier quality research. Thus, the results obtained from rigorous adopted methodology in exploring the critical dynamic of social-political and environmental association would be helpful to establish the trustworthy role of democracy, military spending, and corruption in changing the levels of environmental quality in ASEAN region.

The results of panel estimations conclude that corruption, military expenditure, and democracy have a noteworthy and significant impact on carbon dioxide emission in ASEAN countries. The results of FMOLS and DOLS confirm that there is a positive and significant impact of military expenditure and corruption on carbon dioxide emission, however, we found a negative and significant impact of democracy on carbon dioxide emission in all selected ASEAN countries. In general, the consequences of both statistical estimations affirm that corruption, democracy, and military expenditure are the critical and noteworthy determinants of carbon dioxide emission in ASEAN nations. The outcomes recommend that ASEAN countries need an environmental efficiency and good governance system which is free of corruption also when they are cooperating with one another. The outcomes additionally affirmed that the more the corruption and military consumption the more will be the carbon dioxide emission in these ASEAN countries.

## REFERENCES

- Adams, S. and E.K.M. Klobodu, 2017. Urbanization, democracy, bureaucratic quality, and environmental degradation. *Journal of Policy Modeling*, 39(6): 1035-1051. Available at: <https://doi.org/10.1016/j.jpolmod.2017.04.006>.
- Alkali, M.Y. and M.I. Imam, 2016. Accountability and environmental sustainability: Nigerian maritime experience. *Asian Journal of Economics and Empirical Research*, 3(1): 1-5. Available at: <https://doi.org/10.20448/journal.501/2016.3.1/501.1.1.5>.
- Ametorwo, A.M., 2016. Managing work family conflict among female entrepreneurs in Ghana for development. *International Journal of Economics, Business and Management Studies*, 3(1): 21-35.
- Bae, J.H., D.D. Li and M. Rishi, 2017. Determinants of CO<sub>2</sub> emission for post-soviet union independent countries. *Climate Policy*, 17(5): 591-615. Available at: <https://doi.org/10.1080/14693062.2015.1124751>.
- Bildirici, M., 2017a. CO<sub>2</sub> emissions and militarization in G7 countries: Panel cointegration and trivariate causality approaches. *Environment and Development Economics*, 22(6): 771-791. Available at: <https://doi.org/10.1017/s1355770x1700016x>.
- Bildirici, M., 2018. Impact of military on biofuels consumption and GHG emissions: The evidence from G7 countries. *Environmental Science and Pollution Research*, 25(14): 13560-13568. Available at: <https://doi.org/10.1007/s11356-018-1545-x>.
- Bildirici, M.E., 2017b. The causal link among militarization, economic growth, CO<sub>2</sub> emission, and energy consumption. *Environmental Science and Pollution Research*, 24(5): 4625-4636. Available at: <https://doi.org/10.1007/s11356-016-8158-z>.

8. Bildirici, M.E., 2017c. The effects of militarization on biofuel consumption and CO2 emission. *Journal of Cleaner Production*, 152: 420-428. Available at: <https://doi.org/10.1016/j.jclepro.2017.03.103>.
9. Clark, B., A.K. Jorgenson and J. Kentor, 2010. Militarization and energy consumption: A test of treadmill of destruction theory in comparative perspective. *International Journal of Sociology*, 40(2): 23-43. Available at: <https://doi.org/10.2753/ijso020-7659400202>.
10. Cossiga, G.A., 2018. Signals from the world of economics. The price constant and the democratic issue. *International Journal of Social and Administrative Sciences*, 3(1): 1-21.
11. Diekmann, A. and A. Franzen, 2019. Environmental concern: A global perspective. In *Einstellungen und Verhalten in der empirischen Sozialforschung*. Wiesbaden: Springer. pp: 253-272.
12. Duong, N.T., 2016. The linkage between corruption and carbon dioxide emission: Evidence from Asian countries.
13. Frhd, N.B., O.U. Grace and V.C. Iwuoha, 2012. Military operations associated with internal security and special rules for opening fire in Armed conflicts. *International Journal of Asian Social Science*, 2(7): 1151-1160.
14. Ghodrati, S., J. Harati and A. Nazari, 2018. The democracy and environment quality in selected countries: An application of panel data. *Iranian Economic Review*, 22(1): 21-49.
15. Gibson, J.A., 2016. Elementary school male aggression: Framing aggression reduction programs for effectiveness. *Asian Journal of Education and Training*, 2(1): 7-10.
16. Habib, S., S. Abdelmonem and M. Khaled, 2018. The effect of corruption on the environmental quality in African countries: A panel quantile regression analysis. *Journal of the Knowledge Economy*. pp: 1-17.
17. Im, K.S., M.H. Pesaran and Y. Shin, 2003. Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1): 53-74. Available at: [https://doi.org/10.1016/s0304-4076\(03\)00092-7](https://doi.org/10.1016/s0304-4076(03)00092-7).
18. Jorgenson, A.K., B. Clark and J.E. Givens, 2012. The environmental impacts of militarization in comparative perspective: An overlooked relationship. *Nature and Culture*, 7(3): 314-337. Available at: <https://doi.org/10.3167/nc.2012.070304>.
19. Joshi, P. and K. Beck, 2018. Democracy and carbon dioxide emissions: Assessing the interactions of political and economic freedom and the environmental Kuznets Curve. *Energy Research & Social Science*, 39: 46-54. Available at: <https://doi.org/10.1016/j.erss.2017.10.020>.
20. Kao, C., 2003. Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics*, 90(1): 1-44.
21. Khalid, M.A. and A.B. Mustapha, 2014. Long-run relationships and causality tests between military expenditure and economic growth in India. *The Economics and Finance Letters*, 1(4): 49-58. Available at: <https://doi.org/10.18488/journal.29/2014.1.4/29.4.49.58>.
22. Khan, S.N. and E.I.E. Ali, 2017. The moderating role of intellectual capital between enterprise risk management and firm performance: A conceptual review. *American Journal of Social Sciences and Humanities*, 2(1): 9-15. Available at: <https://doi.org/10.20448/801.21.9.15>.
23. Levin, A., C.-F. Lin and C.-S.J. Chu, 2002. Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1): 1-24. Available at: [https://doi.org/10.1016/s0304-4076\(01\)00098-7](https://doi.org/10.1016/s0304-4076(01)00098-7).
24. Mao, Y., 2018. Does democratic transition reduce carbon intensity? Evidence from Indonesia using the synthetic control method. *Environmental Science and Pollution Research*, 25(20): 19908-19917. Available at: <https://doi.org/10.1007/s11356-018-2165-1>.
25. Masron, T.A. and Y. Subramaniam, 2018. The environmental Kuznets Curve in the presence of corruption in developing countries. *Environmental Science and Pollution Research*. pp: 1-16.
26. Mohamed, B.M., G.A. Rasheli and L.R. Mwangike, 2018. Marginal effects of factors influencing procurement records management: A survey of selected procuring entities in Tanzania. *International Journal of Social and Administrative Sciences*, 3(1): 22-34.
27. Mungwari, T., 2018. Media framing of ZANU PF internal succession struggles: Mnangagwa and the military factor. *American Journal of Social Sciences and Humanities*, 3(1): 1-21. Available at: <https://doi.org/10.20448/801.31.1.21>.
28. Nekooei, M.H., R. Zeinalzadeh and Z. Sadeghi, 2015. The effects of democracy on environment quality index in selected OIC countries. *Iranian Journal of Economic Studies*, 4(2): 113-133.
29. Okoli, A.C., 2017. Disarmament, demobilization and reintegration (DDR) in Rwanda, 1997-2008: A desk exegesis and agenda for praxis. *International Journal of Emerging Trends in Social Sciences*, 1(1): 1-8. Available at: <https://doi.org/10.20448/2001.11.1.8>.
30. Okon, E.O., 2016. Business development in Nasarawa State: Effect of poor sanitation and waste management system. *International Journal of Economics, Business and Management Studies*, 3(1): 36-46.
31. Oluwaseun, P. and O. Samuel, 2018. Military regimes and Nigeria's economic development, 1966-1999. *Journal of Social Economics Research*, 5(1): 29-38. Available at: <https://doi.org/10.18488/journal.35.2018.51.29.38>.
32. Özmaden, M., F. Soter and H. Özmaden, 2018. The physical education and sport studies in the framework of social demands-institutional structuring and teacher training the developments before and during Turkey training community alliance period (1922-1936). *Asian Journal of Education and Training*, 4(3): 170-175. Available at: <https://doi.org/10.20448/journal.522.2018.43.170.175>.
33. Parks, B.C. and J.T. Roberts, 2010. Climate change, social theory and justice. *Theory, Culture & Society*, 27(2-3): 134-166.

34. Pedroni, P., 1999. Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and statistics*, 61(S1): 653-670. Available at: <https://doi.org/10.1111/1468-0084.61.s1.14>.
35. Pedroni, P., 2001. Purchasing power parity tests in cointegrated panels. *Review of Economics and Statistics*, 83(4): 727-731. Available at: <https://doi.org/10.1162/003465301753237803>.
36. Pedroni, P., 2001a. Fully modified OLS for heterogeneous cointegrated panels. *Advances in Econometrics*, 15: 93–130. Available at: [https://doi.org/10.1016/s0731-9053\(00\)15004-2](https://doi.org/10.1016/s0731-9053(00)15004-2).
37. Pedroni, P., 2001b. Fully modified OLS for heterogeneous cointegrated panels. In *nonstationary panels, panel cointegration, and dynamic panels*. Emerald Group Publishing Limited. pp: pp. 93-130.
38. Pedroni, P., 2004. Panel cointegration: Asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric Theory*, 20(3): 597-625.
39. Phillips, P.C. and B.E. Hansen, 1990. Statistical inference in instrumental variables regression with I (1) processes. *The Review of Economic Studies*, 57(1): 99-125. Available at: <https://doi.org/10.2307/2297545>.
40. Rehman, F.U., M. Nasir and F. Kanwal, 2012. Nexus between corruption and regional Environmental Kuznets Curve: The case of South Asian countries. *Environment, Development and Sustainability*, 14(5): 827-841. Available at: <https://doi.org/10.1007/s10668-012-9356-6>.
41. Rosli, A. and T.I. Siong, 2018. Determinants of customers satisfaction towards services provided by agencies in urban transformation centre (UTC). *International Journal of Economics, Business and Management Studies*, 5(1): 9-15. Available at: <https://doi.org/10.20448/802.51.9.15>.
42. Sharif, A., S.A. Raza, I. Ozturk and S. Afshan, 2019. The dynamic relationship of renewable and nonrenewable energy consumption with carbon emission: A global study with the application of heterogeneous panel estimation. *Renewable Energy*, 133: 685-691. Available at: <https://doi.org/10.1016/j.renene.2018.10.052>.
43. Shin, S.J. and J. Zhou, 2003. Transformational leadership, conservation, and creativity: Evidence from Korea. *Academy of Management Journal*, 46(6): 703-714. Available at: <https://doi.org/10.2307/30040662>.
44. Sundström, A., 2013. Corruption in the commons: Why bribery hampers enforcement of environmental regulations in South African fisheries. *International Journal of the Commons*, 7(2): 454-472. Available at: <https://doi.org/10.18352/ijc.370>.
45. Ul-Haq, I., S. Zhu and M. Shafiq, 2016. Empirical investigation of environmental Kuznets Curve for carbon emission in Morocco. *Ecological Indicators*, 67: 491-496. Available at: <https://doi.org/10.1016/j.ecolind.2016.03.019>.
46. Wang, Z., B. Zhang and B. Wang, 2018. The moderating role of corruption between economic growth and CO2 emissions: Evidence from BRICS economies. *Energy*, 148: 506-513. Available at: <https://doi.org/10.1016/j.energy.2018.01.167>.
47. Winbourne, S., 2002. *Corruption and the environment*. Management Systems International and USAID, Washington.
48. You, W.-H., H.-M. Zhu, K. Yu and C. Peng, 2015. Democracy, financial openness, and global carbon dioxide emissions: Heterogeneity across existing emission levels. *World Development*, 66: 189-207. Available at: <https://doi.org/10.1016/j.worlddev.2014.08.013>.
49. Zhang, Y.-J., Y.-L. Jin, J. Chevallier and B. Shen, 2016. The effect of corruption on carbon dioxide emissions in APEC countries: A panel quantile regression analysis. *Technological Forecasting and Social Change*, 112: 220-227. Available at: <https://doi.org/10.1016/j.techfore.2016.05.027>