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The analysis of green growth indicators in predicting the economic development of southeast Asian Countries[1]

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Abstract

Green Economic Accounting and reporting through various green growth indicators is needed because it maintains the balance between profit, people, and the planet. This study examines the green growth indicators and economic development from 2010-2019 of four countries in Southeast Asia, namely: Philippines, Singapore, Indonesia, and Cambodia. The green growth indicators were examined in four aspects and are measured through the growth rates of environmental and resource productivity, environmental dimension of quality of life, economic opportunities and policy responses, and socio-economic context in specific measures, while the economic development is captured by the growth rates of gross domestic product and gross national income per capita. This paper asserts that the four countries have different economic statuses and green growth performances. It then goes on to claim the following. First, the green growth indicators tested in the study have no significant relationship with the economic development variables. Second, the green growth indicators have no significant influence on the gross domestic product per capita. Third, two of the green growth indicators tested in the study have a significant influence on the growth rates of gross national income per capita. Fourth, the means of green growth indicators and economic development presented in the study are statistically different from each other. Finally, it evaluates whether the green growth indicators can predict the Economic Development of Southeast Asian Countries. The study conducts country-panel regression analyses through random-effects and variability econometrics based on presupposes conceptual basis of empirics and practices.

1. Introduction

Society must grow and progress in economic dimensions and environmental aspects. There are various strategies to achieve greener growth that is currently being introduced to various countries. It can be measured by several indicators that can make progress in living standards. The balance between economy, health, environment, and cultural aspect should be construed and maintained (Gurría, 2011). Protection and conservation of natural capital should be prioritized while utilizing these resources into revenue-producing services.

To monitor progress towards green growth, indicators are required based on internationally comparable data. There is a need to scrutinize green growth data based on embedded measures in a conceptual framework per organization or nation. Effective measurement is based on valid indicators. While this system is newly introduced and most information is estimated, a study analyzing its effects and influence should be pursued.

Green growth aims to integrate economic and environmental pillars of sustainable development into a single intellectual and policy planning process, thus recasting the very essence of the development model so that it is capable of producing versatile and sustainable growth simultaneously (Samans, 2013). Furthermore, fostering

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economic growth and development are the primary goals of green growth. It also ensures that natural assets are used efficiently, sustainably, and continuously providing resources and environmental services on which the growth and well-being depend (OECD, 2011). The World Bank in 2012 stressed the growth that is efficient utilizing natural resources, minimizing pollution, and lessening environmental impacts should be promoted. Thus, the researcher believed that a study analyzing green growth and economic development among the countries in Southeast Asia should be developed. In Asia-Pacific, most countries are not fully oriented yet of the green growth and further development should be introduced for the betterment of the society and economy. However, information concerning green growth is accessible and countries in the region are cooperating by providing data to the advocates of green growth. To evaluate the status of green growth specifically in Southeast Asia, a study concerning indicators and their implications to economic development should be conducted. Thus, this paper is produced.

1.1 Statement of the problem

Recently, viable measurements of green growth were developed. These measures are referred to as green growth indicators. Many economists, environmentalists, policymakers, and experts have differing claims about green growth and its impact on economic growth. Furthermore, few types of research were conducted as of the present concerning this economic evolution. Countries that are members of the Association of Southeast Asian Nations (ASEAN) are not hardly devoted yet to green growth movements. There is a necessity to evaluate the influence of green growth on the economic development of the nations in Southeast Asia. To promote green growth and uplift economic status, an analysis of these Indicators as Predictors of Economic Development should be conducted.

1.2 Objectives

This study aims to analyze the Green Growth Indicators in predicting the Economic Development of Selected countries that are members of ASEAN, namely: Philippines, Singapore, Indonesia, and Cambodia. Specifically, it desires to:

1. compare the green growth through green growth indicators of the four aforementioned countries in Southeast Asia;
2. analyze the relationship of selected green growth indicators to the economic development variables of four selected countries in Southeast Asia; and
3. evaluate the influence of Green growth indicators on the economic development of four selected countries in Southeast Asia.

1.3 Scope and limitation

This research is limited to the four countries that are members of the ASEAN, namely: Philippines, Singapore, Indonesia, and Cambodia. These are objectively selected because the researcher wants to compare and analyze the influence of Green growth indicators on the economic development of the countries that have a different level of GDP and GNI per capita. The Philippines and the extremes of ASEAN Members in terms of economic performance with the median-like country have been evaluated. No comprehensive study has been conducted yet in the Philippines regarding the analysis of Green Growth Indicators to the Economic Development of these four countries which are ASEAN Members. Besides, no study has been conducted yet in Bicol Region focusing on Macroeconomic perspectives, incorporating environmental and developmental economics. The green growth has five indicators/variables, environmental and resource productivity, natural asset base, environmental dimension of quality of life, economic opportunities and policy responses, and socio-economic context based on OECD Framework. The researcher preferred OECD framework for comparability clauses, data adequacy, and borderless economics. However, in the study, only four variables are utilized. The Natural asset base was excluded because of scarce data which may affect significantly the result of the study.

2. Research methods

This study used research mixed-method (qualitative and quantitative method). The qualitative data (case study) of the study are the findings based on the documentary analysis/data mining on the environmental status and institutional policies and regulations regarding Green growth. On the other hand, the quantitative data (causal-explanatory research design) emerged from the secondary data which was used as an input for data analysis (i.e., Green Growth Indicator values, GNIs, and GDPs).

2.1 Sources of data

The study utilized secondary data from Organization for Economic Co-operation and Development (OECD) and World Bank (WB). The researcher employed data mining to generate necessary information which served as input for the conduct of the analyses.

2.2 Data collection/gathering procedure

The secondary data were mined from OECD and WB open stat data repository. The data were downloaded through excel files, and ccv, and were filtered or screened objectively to select the inputs that would be useful for the study. The researcher utilized MS Excel, SSR, and Stata for data treatment and analyses.

2.3 Population and sampling design

The researcher used four countries among ASEAN members where the comparison and statistical treatment were based. The Philippines was selected since that the study is being conducted in the Philippines (Rank 8). Moreover, the three countries have been impartially selected based on the Gross Domestic Product Per Capita measured through Purchasing power parity (PPP), which allows comparison of economic productivity and standards of living between countries. Please refer to Table 1 for complete details. The country which has the highest per Capita (Rank 1), the country which has the median GDP per Capita (Rank 6), and the country with the lowest GDP Per Capita (Rank 10). These countries are Singapore, Indonesia, and Cambodia, respectively.

Table 1. Vital Economic Statistics of ASEAN Countries as of Third Quarter of year 2020

No.	**Country**	**Population in million**	**GDP Nominal millions of USD**	**GDP Nominal per capita USD**	**GDP (PPP) millions of USD**	**GDP (PPP) per capita USD**
	ASEAN	654.306	3,173,141	4,849	8,454,651	12,921
1	*Indonesia* (Rank 6)	*266.998*	*1,088,768*	*4,038*	*3,328,288*	*12,345*
2	Thailand	67.913	509,200	7,295	1,261,485	18,073
3	*Philippines* (Rank 8)	*108.307*	*377,362*	*3,372*	*933,913*	*8,574*
4	Vietnam	96.801	340,602	3,498	1,047,318	10,755
5	*Singapore* (Rank 1)	*5.67*	*337,451*	*58,484*	*578,204*	*95,603*
6	Malaysia	32.801	336,300	10,192	900,426	27,287
7	Myanmar	53.019	71,690	1,333	275,513	5,179
8	*Cambodia* (Rank 10)	*16.494*	*26,316*	*1,572*	*74,348*	*4,441*
9	Laos	7.163	18,653	2,567	59,736	8,221
10	Brunei	0.447	13,469	23,117	28,470	61,816

Source: TradingNomics's Quarter 3-2020

2.4 Econometric modeling and data analysis

This study used descriptive statistics as statistical tools and panel econometrics models as an analytical tool. The researcher utilized *Panel Regression Analysis.* It is employed to examine the effects/influence of Green Growth Indicators on the Economic Development of ASEAN Countries. The econometric models below were used for panel regression analysis. There are two econometric models used in this study, these are following:

Model 1

$$GRGDPC = B1 + \alpha i + B2EcoDevit + B3EnResProdit + B4EnviDiQLiit + B5EconOppPolResit + B6SocEconCon + \varepsilon it$$

Model 2

$$GRGNIPC = B1 + \alpha i + B2EcoDevit + B3EnResProdit + B4EnviDiQLiit + B5EconOppPolResit + B6SocEconCon + \varepsilon it$$

Where:

αi (i=1….n) = is the unknown intercept for each sample (n entity-specific intercepts).

Yit = is the dependent variable (DV) where i = entity and t = time.

Xit = represents one independent variable (IV),

$\beta 1$ = is the coefficient for that IV,

uit = is the error term

Dependent Variables

1. Growth Rate of Gross Domestic Product Per Capita (GRGDPC)
2. Growth Rate of Gross National income (GRGNI)

Independent Variables

1. Environmental and resource productivity
2. The environmental dimension of quality of life
3. Economic opportunities and policy responses
4. Socio-economic context.

Table 2. List of Variables used in the Study

Variables		**Description**	**Measures**
Dependent Variables	GRGDPC	Growth Rate of Gross Domestic Product Per Capita	The Gross Domestic Product per capita or person is the ratio of total GDP to the total population. The Growth Rate can be computed by dividing the quantity of the difference of Current Year's GDP per capita by the Preceding Year's per Capita divided by the Preceding Year's per Capita
	GRGNIPC	Growth Rate of Gross National income Per Capita	The Gross National Income per capita or person is the ratio of total GNI to the total population. The Growth Rate can be computed by dividing the quantity of the difference of Current Year's GNI per capita by the Preceding Year's per Capita divided by the Preceding Year's per Capita
Independent Variables	EnResProd	Environmental and resource productivity	The Growth rate of Production-based CO2 productivity, GDP per unit of energy-related CO2 emissions. This variable indicates whether the economic growth is becoming greener with more efficient use of natural capital and to capture aspects of production which are rarely quantified in economic models and accounting frameworks.
	EnviDiQLi	Environmental dimension of quality of life	The Growth Rates of Access to Water and Sewage Treatment. It indicates how environmental conditions affect the quality of life and wellbeing of people.
	EconOppPolRes	Economic opportunities and policy responses	The Growth Rate of Environmental taxes and transfers. It indicates the effectiveness of policies in delivering green growth and describes the societal responses needed to secure business and employment opportunities.
	SocEconCon	Socio-economic context	The Growth Rates of Value-Added in Agriculture. It indicates the socio-economic transformation of values towards a greener and progressive society.

Source: World Bank and Organization for Economic Co-operation and Development (OECD), Summarized by E. Onsay, 2021.

The Analysis on Variance was also used to compare the means between the groups and determines whether any of those means are significantly different from each other.

2.5 Statement of hypotheses

The null hypothesis proposes that there are no differences or relationships between the characteristics of the data observed. There is no significant relationship between green growth indicators and economic development variables. There is no significant difference between the means of green growth indicators and economic development variables. The green growth indicators cannot be used effectively as a predictor of economic development among the four nations of the ASEAN region.

3. Results and Discussions

3.1 Economic development

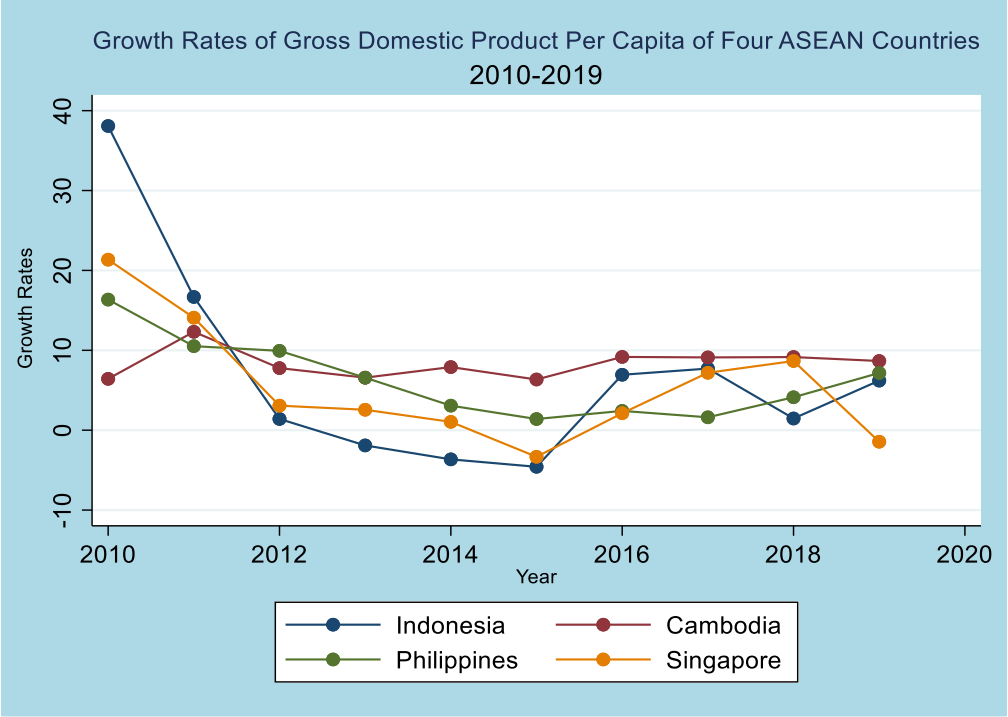

Figure 1. Growth rates of GDP per capita of four ASEAN countries

Source: World Bank, Graphed/Illustrated by E. Onsay, 2021)

The Nominal Gross Domestic Product was used in the observation. The GDP Per Capita was computed by dividing the GDP by the entire population of respective ASEAN Countries. The researcher preferred Nominal GDP because it is not adjusted with inflation and reflects the current values. To match with Green Growth Indicators that are reflected with the current values, the current GDP has been utilized. It is in consonance with the assertion of Dylan, et. al (2019) and Summer (2014) that the nominal GDP is best used for comparison of current values. Based on the graph, the Growth Rates of GDP Per Capita of Four ASEAN Countries significantly differ.

Singapore which has the highest Nominal GDP and GDP Per capita reflects a lower plot of growth rates due to base effects since that they already achieved higher bases, thus changes are immaterial. Cambodia which has the least nominal GDP and GDP Per capita among ASEAN neighbors reflects an almost stable growth rate of GDP per capita. The GDP per capita is being affected by the number of populations. Indonesia has the highest population while Singapore has the least. The Philippines and Indonesia are almost at par, but the latter has greater GDP per Capita than the former, but the trend of the growth rates of the latter is declining. This is the first dependent variable that serves as an indicator of economic development.

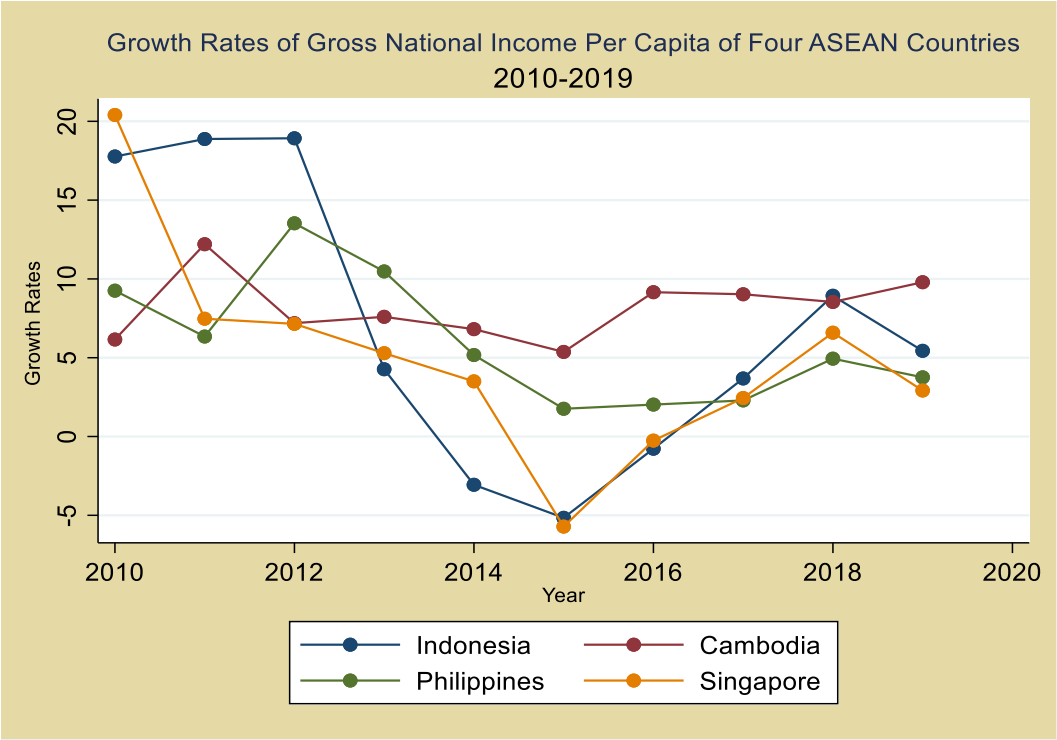

Figure 2. Growth Rates of GNI per capita of four ASEAN countries

Source: World Bank, Graphed/Illustrated by E. Onsay, 2021

The GNI per capita is the gross national income of selected ASEAN countries, converted to U.S. dollars using the World Bank Atlas method, divided by the total population of respective countries. The GNI is the sum of value added by all resident producers plus any product taxes (fewer subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad (World Bank, 2020). The researched used GNI as a variable of economic growth because according to august economists, the GNI is GDP plus the income earned by residents from abroad minus income earned in that country by residents of other countries abroad. Thus, the GNI is higher compared with the GDP. Based on the graph, it is noticeable that Singapore which has the highest GNI per capita has an average to lower GNI growth rates because they already reached the optimal level of GNI which could be possibly generated through satisfying their population and land area constraints.

Indonesia has significant declines in its GNI per capita growth rates, although the GNI is increasing, its population is booming. Thus, it compensates for the corresponding increase by a greater denominator of an economic variable. Moreover, the Philippines and Cambodia are almost stable with a slightly increasing trend of growth rates as developing countries. The GNI per capita growth rate is the second utilized variable of economic development.

3.2 Green growth indicators

Selected indicators towards green growth in monitoring progress was contained in OECD Green Growth database. This aims to inform the public in general, and support policy making and decisions (OECD, 2021). The researcher studied, filtered, and scrutinized the information and the green growth indicators to facilitate the relevance of these variables as a determinant, indicator, or predictor of economic development in the modern context.

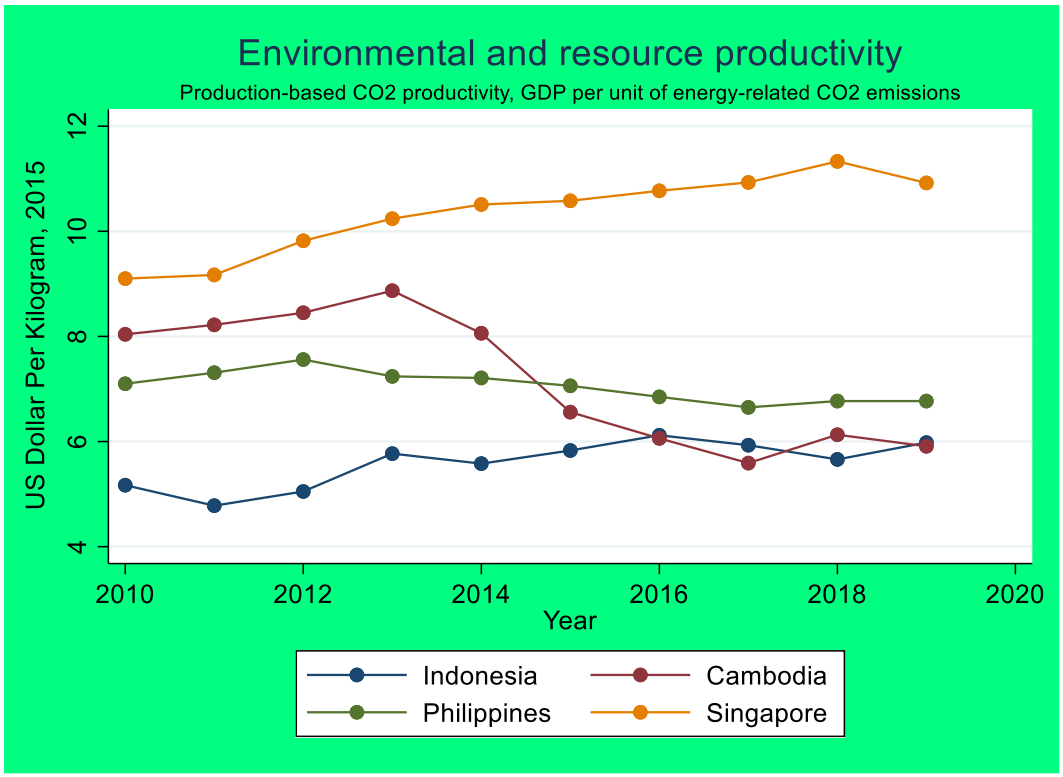

Figure 3. Environmental and resource productivity

Source: Organization for Economic Co-operation and Development (OECD), Graphed/Illustrated by E. Onsay, 2021

The Environmental and Resource productivity in the study utilized the Production-based CO2 Productivity, GDP per unit of energy-related CO2 emissions. These are used in sustainability measurement as it attempts to decouple the direct connection between resources and environmental depreciation. The growth rates can be used as a metric for both economic and environmental cost. It formed part of environmentally adjusted multi-factor productivity which gives a complete picture of an economic productivity by accounting for inputs from natural resources and for the generation of pollution (OECD, 2021).

Based on statistical analysis, the Singapore is the most productive, which can be justified by its innovation in technology (Quah, 2018). This is being followed by Cambodia and Philippines, while the Indonesia has the lowest Environmental Productivity among four countries. It concurs with the findings of Hidayat, et al 2019, that the Indonesia is a developing country that must deal with technical innovation to enhance productivity in economic capacity. The country has a huge room for improvement since that the country contains undeveloped and undiscovered resources for productivity (Musa, 2012).

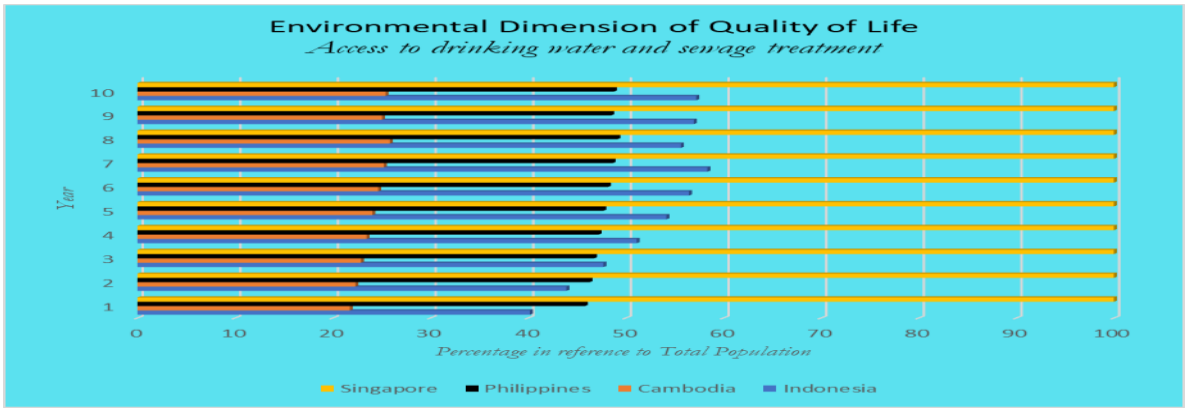

Figure 4. Environmental dimension of quality life

Source: Organization for Economic Co-operation and Development (OECD), Graphed/Illustrated by E. Onsay, 2021

Concerning the environmental dimension of Quality of life, the researcher employed the percentage of access to drinking water and sewage treatment. The main aim of sustainable development is the improvement in quality of life and is being evaluated by various factors that enhance the welfare of people (Streimikiene, 2015).

Based on the results, the total population in Singapore has access to drinking water and sewage treatment. This is being followed by Indonesia and the Philippines. While, in Cambodia, the majority of people have no access to drinking water and sewage treatment. This is justified by the results of the study conducted by Nguyen (2010) and Hipsher (2016) that Cambodia is one of the least developed economies, facing various poverty problems, but the creation of new job and livelihood opportunities also opened progress.

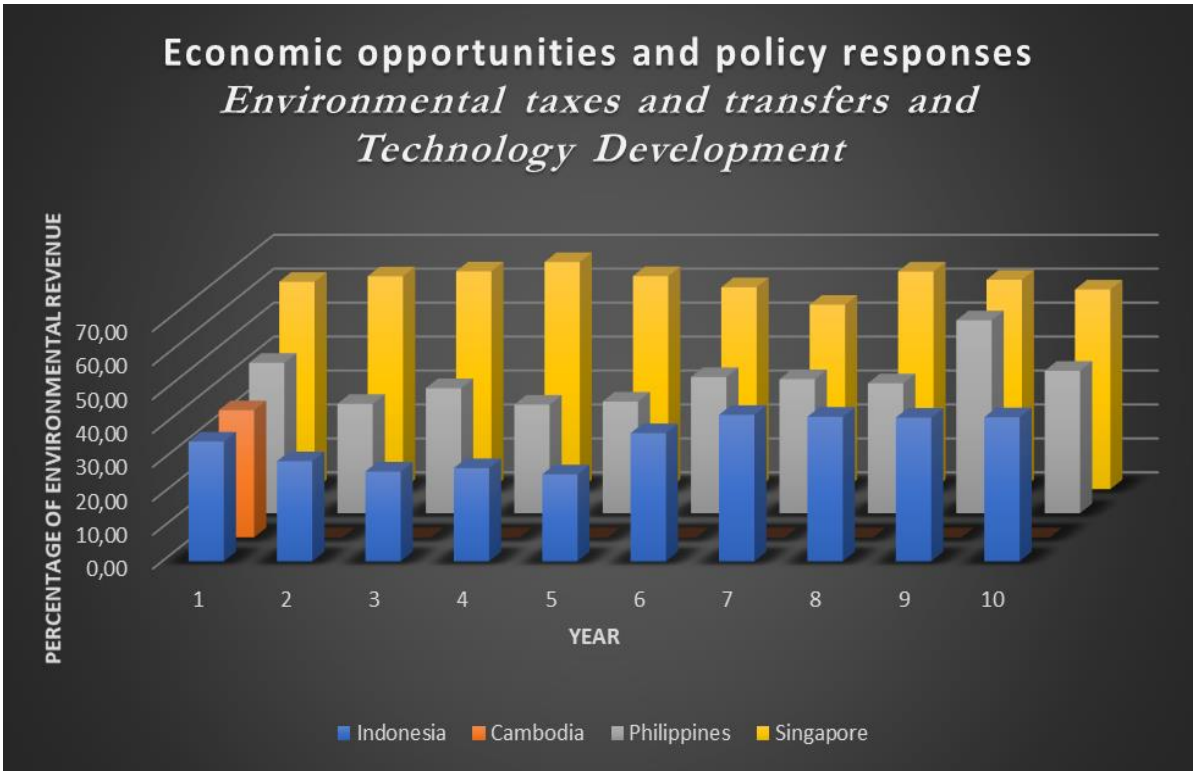

Figure 5. Economic opportunities and policy responses

Source: Organization for Economic Co-operation and Development (OECD), Graphed/Illustrated by E. Onsay, 2021

While businesses are established primarily to earn profit in particular, they must also promote the welfare of people and health of the planet in general. The Environmental Taxes and transfers and technology development in the Philippines is increasing and above Cambodia and Indonesia because the SEC Memorandum Circular on Sustainability Reporting Guidelines for Publicly-Listed Companies took effect in 2019. The revenue being generated by the government in Singapore from environmental taxes are substantial and above the aforementioned three countries.

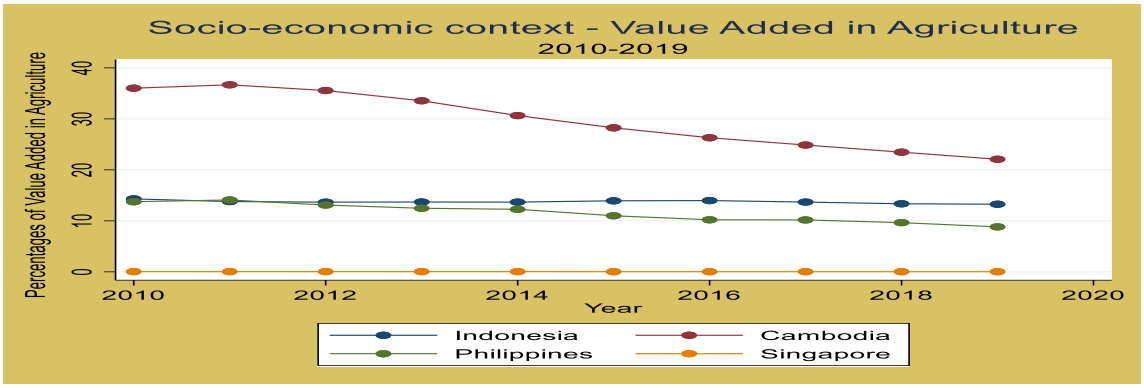

Figure 6. Socio-economic context

Source: Organization for Economic Co-operation and Development (OECD), Graphed/Illustrated by E. Onsay, 2021

Agricultural Value-Added productivity is shown by the table above. Singapore has the least value-added on Agriculture due to their land area constraints and most of their population are employed in the industrial sector (Ong, 2019 and Han et. al, 2002). The Indonesia and Philippines are agricultural lands, but there is a slight downward shift lately in agricultural value-added due to industrial improvement and projects. Some agricultural lands are being traded for housing projects and commercial establishment leading to the decline of crop production in the Region. It conforms to the study of Lakitan, (2019) and Tada (2009) that agricultural areas are affected by industrial improvement and projects. The number of farms and agricultural area in the Philippines decreased by 11.6 percent and 16.3 percent, respectively over the 1991 estimates, and the average farm size likewise decreased from 2.20 hectares per farm in 1991 to 2.08 hectares per farm in 2002 (PSA, 2021).

Furthermore, Cambodia has the highest agricultural value-added since most of its people are engaged in agricultural production and agricultural-related industry. There is twenty-two percent of agriculture accounts for Cambodia's GDP and employs about 3 million people. They have agricultural exports of 4.2 million tons of various commodities in 2018, and lots of potential agricultural growth (USECambodia, 2018).

3.3 Profile of four countries in Southeast Asia

Table 3. Characteristics of green growth indicators and economic development variables of the four ASEAN countries

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Country	40	2.5	1.132277	1	4
Growth rate of gross domestic product per capita	40	6.757257	7.577573	-4.580379	38.08144
Growth rate of gross national income per capita	40	6.502448	5.933537	-5.715972	20.40271
Environmental and resource productivity	40	.4070128	5.835479	-18.53393	14.23286
Environmental dimension of quality of life	40	1.71204	2.761662	-4.671349	9.305797
Economic opportunities and policy responses	40	-1.288731	21.54913	-100	48.36588
Socio-economic context	40	-2.888932	3.755314	-10.39126	4.270668

Source: World Bank and Organization for Economic Co-operation and Development (OECD), Analyzed and Presented by E. Onsay, 2021.

Table 3 presents the characteristics of the variables used. There are 40 observations used in the study. These 40 were formed from 10 year representations of 4 ASEAN Countries with corresponding green growth indicators and economic development variables.

All inputs were growth rates which were manipulated to achieve reliability and comparability clauses. First, the mean GDP per capita growth rate is 6.76% with a standard deviation of 7.58. The minimum and maximum values are -4.58, and 38.08, respectively. Moreover, the mean GNI per capita growth rate is 6.50% with a standard deviation of 5.93. The minimum and maximum values are -5.71 and 20.40, respectively. The measures of the central tendency of dependent variables are also shown in table 3.

3.4 Examining the relationship of green growth indicators and economic development variables of the four ASEAN countries

Table 4. Relationship of green growth indicators to GDP per capita and GNI per capita of the four ASEAN countries

Variables	Growth rate of gross domestic product per capita	Growth rate of gross national income per capita	Environmental and resource productivity	Environmental dimension of quality of life	Economic opportunities and policy responses	Socio-economic context
Growth rate of gross domestic product per capita	1.0000					
Growth rate of gross national income per capita		1.0000				
Environmental and resource productivity	0.0417	0.0179	1.0000			
Environmental dimension of quality of life	0.1124	0.3063	0.0060	1.0000		
Economic opportunities and policy responses	-0.2238	-0.2993	0.0670	-0.1189	1.0000	
Socio-economic context	-0.0170	-0.0504	0.3824	0.1945	-0.1830	1.0000

Source: World Bank and Organization for Economic Co-operation and Development (OECD), Analyzed and Presented by E. Onsay, 2021.

The results show that the relationship between dependent and independent variables is not significant. They have negligible to moderate positive and negative associations. It implies that the chosen Green growth indicators have no significant relationship with the chosen economic development variables of selected ASEAN Countries. It argues with the contexts of EaP GREEN (2016), that green growth indicators are significant drivers of economic growth while balancing and preserving the exchange of environmental and economic resources and natural capital. It also differs from the study of Koçak (2020) claiming that environment-related technology and emissions of carbon dioxide are the most essential indicators in achieving green growth globally for economic growth. The result of this study may affirm with Koh (2016) in counter context his findings reveal a discrepancy between social development and resource efficiency in many successful production economies worldwide. The index of productivity and efficiency is a robust macro-level methodology that requires deeper analysis and treatment of data.

The researcher here believes that in ASEAN Countries, Green growth indicators are not highly considered. None of the four countries are members of the OECD. In recent years, they have started supporting OECD in data provision and compilation, but statutory policies concerning these indicators are not fully established in macro-perspectives. Moreover, no concrete framework as to the measurement of information involved and some indicators have lacking inputs which might affect the statistical treatment of the data. Some records of these four ASEAN countries are incomplete and cannot be generated, moreover, some values are estimated and disclosed by OECD Databases.

3.5 Evaluating the influence of green growth indicators to the economic development of the four ASEAN countries

Table 5. Panel regression results (GDPPCGR) for the green growth indicators and economic development variables of four ASEAN members

Growth rate of gross domestic product per capita	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Environmental and resource productivity	0.134434	0.231927	0.58	0.562	-0.32013	0.589004
Environmental dimension of quality of life	0.293147	0.45808	0.64	0.522	-0.60467	1.190968
Economic opportunities and policy responses	-0.08446	0.059082	-1.43	0.153	-0.20026	0.031335
Socio-economic context	-0.24489	0.371594	-0.66	0.51	-0.9732	0.483418
_cons	5.384329	1.923556	2.8	0.005	1.614229	9.154429

Source: World Bank and Organization for Economic Co-operation and Development (OECD), Analyzed and Presented by E. Onsay, 2021.

Table 5 presents the panel regression result of the variables used in the study for the Growth Rate of GDP per capita. Based on the results, the Environmental dimension of quality of life and Environmental and resource productivity indicators are positive but insignificant to the Growth Rate of GDP per capita (GRGDPPC).

The Economic opportunities and policy responses and Socio-economic context indicators are negative but insignificant also to the Growth Rate of GDP per capita (GRGDPPC). It means that the higher the access to drinking water and sewage treatment, the greater the growth rates of GDP per capita are, but at an insignificant level. The higher the Production-based CO2 productivity, GDP per unit of energy-related CO2 emissions, the higher the GDP per capita is, but an insignificant level. Furthermore, the higher the Environmental taxes and transfers and value-added to agriculture, the growth rates of GDP per capita tend to decline but an insignificant level.

Table 6. Panel regression results (GNIPCGR) for the green growth indicators and economic development variables of four ASEAN members

Growth rate of gross national income per capita	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Environmental and resource productivity	0.119947	0.168594	0.71	0.477	-0.21049	0.450384
Environmental dimension of quality of life	0.66646	0.33299	2	0.045	0.013813	1.319107
Economic opportunities and policy responses	-0.08513	0.042948	-1.98	0.047	-0.16931	-0.00095
Socio-economic context	-0.33557	0.270121	-1.24	0.214	-0.865	0.193855
_cons	4.23347	1.398279	3.03	0.002	1.492894	6.974046

Source: World Bank and Organization for Economic Co-operation and Development (OECD), Analyzed and Presented by E. Onsay, 2021.

Table 6 presents the panel regression result of the variables used in the study for the Growth Rate of GNI per capita. Based on the results, the Environmental dimension of quality of life and Environmental and resource productivity indicators are positive but the former is the only significant to the Growth Rate of GNI per capita (GRGNIPC). The Economic opportunities and policy responses and Socio-economic context indicators are negative but only the former is significant to the Growth Rate of GNI per capita (GRGNIPC). It means that the better the access to drinking water and sewage treatment yields better growth rates of GNI per capita and insignificant level. The higher the Production-based CO2 productivity, GNI per unit of energy-related CO2 emissions, the higher the GNI per capita is, but in insignificant level. Furthermore, the higher the Environmental taxes and transfers, the growth rates of GNI per capita tend to increase and are significant. While as the value-added of agriculture increases, the GNI per capita tends to decrease at an insignificant level. The results of table 6 argue and oppose some results in table 5.

Table 7. Analysis On Variance of green growth indicators and economic development of ASEAN countries

Groups	**Count**	**Sum**	**Average**	**Variance**
GRGDPC	4	27.02902789	6.757256973	1.408895447
GRGNIPC	4	26.00979239	6.502448098	1.866178354
EnResProd	4	1.628051126	0.407012781	5.437742008
EnviDiQLi	4	6.848158276	1.712039569	3.496922126
EconOppPolRes	4	-5.154924458	-1.288731114	28.04965531
SocEconCon	4	-11.55572849	-2.888932122	3.156825694

Source of Variation	**SS**	**df**	**MS**	**F**	**P-value**	**F crit**
Between Groups	320.5403873	5	64.10807746	8.85956	0.00022	2.772853
Within Groups	130.2486568	18	7.23603649			
Total	450.7890441	23				

Source: World Bank and Organization for Economic Co-operation and Development (OECD), Analyzed and Presented by E. Onsay, 2021.

Table 7 reveals that there is a significant difference between the means of green growth indicators and economic development variables of four ASEAN countries. The P-value is 0.00022 which is lower than the critical value, thus the null hypothesis should be rejected. The green growth indicators of the four countries and their economic development are statistically different.

4. Conclusion

This study aims to examine the influence of green growth indicators on the condition of economic development of four countries in Southeast Asia. Based on the findings, it is concluded that the green growth indicators have no significant relationship and influence on the growth rates of GDP and GNI per capita. The first two indicators of green growth have a positive effect on GDP per capita growth rates, while the last two indicators of green growth have a negative effect on GDP per capita growth rates, but both are insignificant. The Economic opportunities and policy responses have a significant influence but are negative on the Growth Rate of GNI per capita. Moreover, the Environmental and resource productivity indicator is also significant to the growth rate of GNI per capita and is positive. The GDP per capita growth rates were derived from GDP and total population. Scrutinizing GDP as the total market value of all finished goods and services produced within a country in a set period, the green growth indicators do not significantly influence the aforementioned measures. The Environmental dimension of quality of life and Environmental and resource productivity indicators are positive because as the environmental welfare and productivity increases, cost decreases, waste decreases, inputs become cheaper, efficiency heightens, leading to optimal production while maximizing wealth.

The Economic opportunities and policy responses and Socio-economic context indicators are negative because as the environmental taxes and value-added increases, the cost and expenses on the part of firms and businesses tend to increase. Regular corporate and business taxes lessen the revenue and earnings of companies. By adding additional taxes for environmental concerns, production and working capital may be affected.

On the other hand, the Value-added is the difference between the price of a product or service and the cost of producing it. As agricultural products undergo new processes and stages of conversions, or as the agricultural sector chooses innovative practices, the cost is primarily affected, and working capital is lowered. Unless, higher yield returns, the production declined thus affecting output negatively. These conclusions were drawn based on the business theory of production by Dorfman, and working capital theories by Pass, 1984. The OECD framework was also analyzed by the researcher and these conclusions were inferred.

Furthermore, the Environmental and resource productivity which is positive, and the Economic opportunities and policy responses that are negative, influence significantly the GNI per capita growth rates. The GNI per capita growth rates were derived from Gross National Income and total population. This measure refers to the total income received by the country from its residents and businesses regardless of whether they are located in the country or abroad. The researcher concludes that the GNI growth rate is significantly affected because most countries tested in the study have large income receipts or outlays from abroad. Those income items include profits, employee compensation, and taxes. If green growth indicators in other countries are effectively utilized, and the CO2 and Energy Productivity are achieved, then maximizing profits will turn in, thus accounting for higher GNI. Moreover, if the incremental or newly environmental cost will be lumped with expenses on business operations, and be charged by the government, then it may result in a decrease in GNI.

The green growth indicators are not yet emphasized holistically in the economic settings of ASEAN. The green growth indicators as of the moment cannot be supposed as a useful predictor of economic development. Moreover, the four countries have significantly different growth indicators and economic development variable measures. The variables involved that were used in the study have no significant relationship to economic growth. Their coefficients had no significant effect on predicting economic development. Therefore, the results fail to reject the null hypothesis.

Recommendation

Drawing from the findings of the study, economists in ASEAN Region should devote time to model the green growth and how it would be more useful in economic setting. For policy makers and government, concrete policies should be crafted and well-defined objectives must be laid out to promote greener society while maximizing productivity and profitability of the country. The results are expected to provide feedback on the current status of green growth indicators in the Southeast Asia particularly in the four countries. For firms and businesses, this research would serve as evidence that organization should emphasize good governance and corporate social responsibility through environmental stewardship and initiatives for better financial position. For researchers, the results of this study can be replicated to validate the findings in micro or macro perspectives. Alternative variables beyond the scope of the study concerning green growth and economic development could be evaluated to test the validity of this research's claims.

Better steps may be laid out towards promoting green economic concerns. Well-crafted policies may be categorized per country and should be implemented according to the demographic and economic profile of a country. Compliances for large multi-national firms and publicly-listed companies including MSMEs, non-profit entities, and government institutions, should be proposed. Concerning measurements, proper economic valuation procedures, techniques, and guidelines on relevant costing, environmental cost, economic cost, and opportunity cost should be developed (concrete steps must be established for reliability clauses). Well-defined penalties and sanctions for those entity which may not depart from environmental guidelines. Provision of awards, incentives, or recognition for those economic players that religiously follow the guidelines towards green growth. Incorporating sustainability accounting and reporting to GDP and GNI measurement. Collaboration of accountants and economists may be done. Recognizing and hiring sustainability accountants and environmental economist could also be defined in every country. Providing regular positions across industries/services of economist should be done. It will open for job opportunity. Incorporating Green Growth topics and environmental economics should also be infused and introduced to students in high school and specialization in tertiary education concerning such aspect may be developed.

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African development puzzle: Scaling up NGOs contribution in West Africa

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Abstract

Community development is seen as a fundamental responsibility of every individual in a society to help in the development of his/her community. Sometimes this development is brought upon by a voluntary individual or group of individuals through Non-Governmental Organizations (NGOs). The NGOs are broadly known for their positive influence on community development. In spite of this, there are diverging views on whether NGOs are for community development or personal development. It is in this context that this paper attempts to discuss and critically evaluate the activities of NGO in West Africa sub-region: their services and contribution in solving developmental challenges of West Africa, the key sectors of the subregion with NGO participation, NGOs success rate in tackling the developmental issues and the state of the sector of intervention. The study also presents the challenges faced by NGOs, the various criticisms made against NGOs and appropriate recommendations on how to scale up NGO impact in achieving sustainable development of West Africa.

1. Introduction

The rise of NGO in the past few decades has been driven by an often implicit assumption that private agents, including private-not-for profit, are effective tool in solving the development puzzle of developing countries, expanding freedom via a robust civil engagement, providing services when national government lack sufficient resources and political will in addressing societal issues through participatory and market-based methods (Brass, Longhofer, Robinson, & Schnable, 2018). These are the reasons why African and Latin American countries see large growth in NGO activities. The question of whether NGO has the specific capacity to solve the African development puzzle skirts the mind of researchers and policymakers (see, e.g., Anderson, 2017; Hearn, 2007; Manjur Morshed & Asami, 2015; United States Agency for International Development Bureau for Africa, 2002). This question cannot be answered outrightly. Let us define development according to Amatya Sen (1999) who stated that "Development is an expansion in freedom, not only political freedom but also social opportunities, protective securities, economic opportunities and transparency guarantees." The outcomes associated with these freedoms include improvement in health, education, justice, sanitation and democratic governance. For this research, we define NGO broadly in tandem with the CSO nomenclature according to Brass, Longhofer, Robinson, & Schnable (2018) who see NGO as any non-profit, non-governmental organization that works in development, humanitarian, advocacy, or civil society sector. Included in this definition are civil society organizations, community-based organization (CBO), grassroots organizations, private voluntary organizations, or faith-based organization (FBOs). They can be international regional, national or local.

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There has been a long debate across disciplines on the positives and negatives impacts of NGOs (Fisher, 1997). In comparison with their public counterparts- states, NGOs are often given credits in community developments. They are acknowledged to be more order-oriented and ideologically committed to democracy and partners in development (World Bank,1989, Bratton, 1989; Fowler & Farrington, 1991). The NGOs are believed to have a positive effect on its society. However, it is believed that NGO can also cause harm if derailed from their mission in pursuance of the fund. For instance, NGOs are considered to be threat to undermining government legitimacy (Fowler & Farrington, 1991) which could exacerbate unrest in the community. That is, in encouraging participatory development, they pressurize existing political leadership, which can result to a counterblast (Bratton, 1989). There has a radical change in the way non-governmental organisations (NGOs) present themselves before their constituency and funding agencies in the last few decades. One significant change, which although is intricately woven with many other simultaneous changes, falls within the realm of nomenclature: NGOs now call themselves CSOs or civil society organisations (Mohanty, 2002). In this view, John Hopkins International Fellows defines Non-Governmental Organizations as

"broadly as any organizations, whether formal or informal, that are not part of the apparatus of government, that do not distribute profits to their directors or operators, that are self-governing, and in which participation is a matter of free choice. Both member-serving and public-serving organizations are included. Embraced within this definition, therefore, are private, not-for-profit health providers, schools, advocacy groups, social service agencies, anti-poverty groups, development agencies, professional associations, community-based organizations, unions, religious bodies, recreation organizations, cultural institutions, and many more."

Civic Society Organisation (CSO) is mostly likened to NGO in terminology. The Advisory Group on CSOs and Aid Effectiveness (2008) defines CSO as

"*non-market and nonstate organizations outside of the family in which people organize themselves to pursue shared interests in the public domain. Examples include community-based organizations and village associations, environmental groups, women's rights groups, farmers' associations, faith-based organizations, labour unions, co-operatives, professional associations, chambers of commerce, independent research institutes and the not-for-profit media.*"

Given that NGOs in most less developed countries are misconstrued in terminology as CSO, they get squashed by the national government which sees their duties as that of antagonism rather than complementarity. This study has chosen to use the two terminologies interchangeably since one is a subset of the other. The government in developing countries refer to NGOs and their role in international development to be subsumed within the broader category of CSO. This forms the main cause of conflict between NGOs and the host government. For example, NGOs in West Africa do not thrive and function effectively, therefore posing a challenge to their success. They face some backlashes ranging from financial, legal to social barriers. NGOs activities proliferate with favourable government policies and where the noise about poverty seems loudest (Agbola, 1992). Looking back to 1945 when the United Nations was formed, this period sees the creation of some international non-state organizations which were labelled as "non-governmental organization". These organizations were labelled such because of their non-affiliation with the then UN member states. During this period, these organizations were granted consultative status in UN activities (Lewis, 2010). The description of the term **"**non-governmental organization" had changed with respect to its source of income, where and how it operates, inter alia. For instance, in the USA, "nonprofit organization" is used to refer to awarded citizen organizations that prove to be profit free and not engaged in any commercial but rather working for the public good. As a result of the Christian value of rendering a voluntary work and the establishment of charity law in the UK, the term **"**voluntary organization" or "charity" is commonly used by the British. But an organization has to be "non-political" to have the status of being charitable (Lewis, 2010). The United Nations also defines an NGO to be an organization where citizens voluntarily tackle issues which are beneficial to the public good without the aim of making a profit. The World Bank as well defines NGOs as "private organizations that pursue activities to relieve suffering, promote the interests of the poor, protect the environment, provide basic social services or undertake community development".

The present article attempts to open a discussion about the activities of non-governmental development organizations, with special reference to West Africa. The article is divided into four parts. In the first section, general/historical background of NGOs in West Africa is discussed. We also identify their activities in some sectors of the subregion with a view to critically evaluate their role in West African Development in the second section. We subsequently highlight the challenges of NGOs in the region and discuss the public opinion for and against NGOs. This is supported by data on the state of NGOs and their barriers in some purposively selected countries.

2. The Role of NGO in State Development

The role of NGOs in state development cannot be overemphasized. Although it has received some backlashes in different forms. The NGOs' role in development is inexhaustible due to their enormity. The list of the roles highlighted in this paper is not exhaustive.

2.1. Good Governance Drivers

NGOs that see themselves as civil society organizations perform the function of watchdog to the government which literarily countervails the power of the state. These NGOs help in keeping the state under proper checks since they belong to a social realm and reflect the power of solidarity (White, 2000). Besides the role of NGO as a CSO to correct the state, they work tirelessly in making the state accountable through different forms of monitoring and ensuring transparency (Mohanty, 2002). They help in promoting democracy through free and fair elections, enlightening voters before and during an election, promotion of the rule of law, and protection of human rights and social justice. For example, the Goree Institute, an NGO and a pan-African organization located in Senegal works for the public interest to promotes openness, transparency and accountability in governance (United Nations Development Program, 2005). Also, in Ghana, The Institute for Democratic Government in support from other NGOs contribute to running an e-government initiative for proper state democratization**.** (PIWA & UNDP, 2011)**.**

2.2. Engagement of Citizens with the State

NGOs as civil society organizations promote citizen participation in state governance. NGOs serving as CSOs aim to promote greater engagement between the citizen and the state. NGOs help in resonating the marginalized voices and serves as intermediaries in articulating the interest of the people (White, 2000). Some NGOs in Ghana, Senegal and other West Africa countries have collaborated with their respective government to engage citizens in governmental activities with the use of technology. For instance, the Penplusbyte and the OSIWA Foundation (Open Society Institute West Africa) partnered to coach journalists on how to use ICT tools such as SMS, mobile phone and blogs to update voters on information regarding districts and national elections in Ghana (PIWA & UNDP, 2011)**.**

2.3. Empowering People and Developing the Community

NGOs through various measures are subsumed under the broad rubric of capacity building of the people in the state. This has had a lot of impact on the entrepreneurial skills of people contributing to jobs creation. Empowerment help in human resources development to find a niche for themselves in society. For almost all countries within the scope of this research, NGOs have been actively responsive to humanitarian aids, supplying basic needs such as food and water, medication, shelter, and tuition to needy and marginalized groups for years (USAID, 2019). For example, MTN foundation promotes good health, youth empowerment, girls' education, HIV/AIDS and environmental conservation. Another example is the Association of African Women for Research and development that empowers citizens, especially African women to contribute to the sustainable development of Africa (United Nations Development Program, 2005).

2.4. Enhancing Corporate Social Responsibility and Social Provisioning

As CSOs, NGOs promotes the social responsibilities of corporate organizations in various countries, they make the corporate organization aware and sensitive to the needs of developing countries. For example, NGOs as part of their responsibilities make corporate firms invest in education (i.e. schools for poor children), housing for the homeless people, health care system etc. on the other hand, given NGOs characteristics of supposedly being transparent, non-bureaucratic, professional, efficient, and closer to the people than the state, they can take up the task of undertaking social provisioning in a state through assessment of people's needs (Mohanty, 2002).

3. Argument for and against NGOs

During the years of 1980s and 1990s, the work of the bilateral aid organization initiated by most European countries to improve lives and eradicate poverty began to be more intense than usual. This was due to the enforcement of the Structural Programs on Africa by the World Bank and IMF. African government were strongly encouraged to reduce public expenditure and turn to international NGOs to alleviate the socioeconomic damages caused by the low public expenditure on key sectors such as the health sector and the educational sector (Anderson, 2017).

NGOs' reputation has been threatened after undergoing some declining public trust (Ebrahim, 2003; & Risse, 2010;). Indeed, their legitimacy and transparency are questioned, not least because of the considerable funding of NGOs by official donors (Hulme & Edwards, 1996; Risse, 2010) but by dependence on external environment, notably the resource environment, for legitimacy and survival (Moulton & Eckerd, 2012). NGO appear to place more importance to financial ratings than their mission which reveals the fact that NGO survival depends not on

the effectiveness of impacts but efficiency in financial terms with the sponsors. Therefore, finance dependency can be expected to influence NGO activities and strategies in this context (Moulton & Eckerd, 2012). Studies by the World Bank indicated that NGOs largely depends on external donors for their financial needs. Hearn (2007) is also in support of the conclusion that many African NGOs have become 'local managers of foreign aids, not managers of local African development process'. The West African region is characterised by the lack of strong local donor base to support the NGO sector in the sub-region (USAID, 2010). Moreover, NGOs face the syndrome of personal enrichment above service to humanity. This is an instance where individual or groups of individuals set up an NGO devoid of clear mission but the desire for individual monetary purpose to finance their perquisite. This makes NGO funds exposed to misuse and installing sound financial systems is usually not in the interests of the key leadership. The African Report reveals that however, citizens in most African countries are dependent on NGOs rather than the government they voted in power.

Some critics have argued that the activities of the national state are threatened by international forces through its neo-liberal policies giving NGOs an avenue for benefit. This is an approach that limits the influence of the state by assuming a smaller role for the state in the economic arena. On the other hand, it holds the belief that private and other non-governmental actors have the capacity to provide better services to people than governments. This move by the International Monetary Fund and World Bank have placed African countries on the mercy of donors which gives local and international NGOs more benefits to thrive at the expense of undermining the state sovereignty. The criticisms received by NGOs on various grounds comes from the fact that they appeal more to their funders than their target audience. Because of the problem of funding, their projects are crafted in line with donor preferences to win a grant instead of those they supposedly represent. Besides, communal problems are myriad and no individual or organization can substantially assume solutions for them. Dallape (1998) observed, "What success can service clubs claim where government with all their resources seem overwhelmed and sometimes incapacitated?" However, NGOs are recording magnificent accomplishments, mostly where governments effort is not sufficient and inefficient. This is in line with the saying that one man can the world, but everybody should try. A combination of small changes could amount to remarkable aggregate change. Thus, because of the development challenges in Africa, no NGO activity will be undertaken that will not be to the benefit of many. Although the magnitude of impact varies from NGO to NGO and from country to country. NGOs are mission-oriented organizations with different mission. NGO activities cover dimensions as distinct as the facilitation of increasing public understanding, offering education, healthcare and training services, securing credits, providing water and sanitation and reducing unemployment (Aldashev & Verdier, 2009).

4. History of NGO's: The African Perspective

The involvement of international bodies in African development can be traced back to the period of struggle for independence, where colonial powers had no intentions of protecting the social welfare of Africans. Less concentration was given to local people on issues of public services. Provisions made for Africans were primarily for the interest of the colonies. For example, the teaching of basic educational skills to aid in their colonial administration and exploitation of the African colonies. Proper health services were only rendered in emergency cases where infections could easily spread to the white communities. All these actions by colonial powers and missionaries gave rise to evolving volunteerism and anti-colonial movements pioneered by a group of Africans to rebel against the mischief they were suffering from (Manji & O'Coill, 2002). This led to the sense of self-governance triggered by the Kwame Nkrumah's pearls of wisdom that "We should seek first the political kingdom by capturing government (power and all other things shall be added into it)". The west African region sees the birth of numerous NGO sectors in the past few decades. The creation of these NGOs are inspired by unique historical, geographical, economical, and cultural factors (USAID, 2010). Based on the United Nations' report, countries like Nigeria and Ghana have enormous populations due to their diversified ethnic beliefs. Different historical backgrounds gave an entirely different outlook of NGO sectors in different countries. For instance, NGOs in Burkina Faso and Niger began to significantly emerge during the country's catastrophe. For instance, the famines ravaged by a food crisis which makes the countries threatened by exceeding poverty and food scarcity**.** Also, another major factor that led to the emergence of NGOs in several West African nations was the Structural Adjustment Programs (SAPs), imposed by international financial institutions and executed by governments in the 1980s. For countries on the verge of collapsing as a result of massive corruption and mismanagement, SAPs has created with the enforcement of governments withdrawal from providing public services (e.g., education, health etc.). This paved way for new, local and secular Non-government actors like NGOs to flourish in their activities to address social and economic problems.

NGO's today form a significant unit in Africa's community development as more and more crises bedevil the region. As a consequence, local citizens make an effort to establish an NGOs or provide an environment for international NGOs to act in resolving societal problems collectively. This has attracted several international NGOs on the African continent to also play a major role in boosting the living standard of people in the name of

aid. In the course of high rate of poverty and inequality in West African countries, the existing NGO approach is currently facing several backlashes. The key challenges include, less coverage of programmes, application of only a lean set of instruments, ineffective service delivery, and the segmentation of methods and projects throughout the country (United States Agency for International Development, 2018).

5. Activities and Challenges of NGOs in West Africa

The primary aim of most NGOs in Africa is to alleviate poverty through, food security, capacity building, rendering financial services via microfinance, promote justice, uphold human rights, relief services during emergency cases and the likes. Other NGOs are also involved in advocating the implementation of a democratic system of governance in Africa while contributing to its social-economic development. A popular example is the United States Agency for International Development (USAID). The long-established microfinance in some West African countries like Ghana, Sierra Leone and Nigeria has lifted a large number of people from poverty. These microfinance companies faced a declined in their operation after the local governments initiated its financial establishments. The mechanism used by local and International NGOs was to provide micro-credit loans to small scale farmers, co-operative groups, women organizations, etc. In response to local issues in Africa such as education, health, environmental, violation of human rights, hunger, poverty etc, many NGO both local and international are intervening with the chief objective of solving the problem that attracts their intervention. For instance, some NGOs attempt to alleviate financial barriers to health care access, reduce out-of-school rate among children etc. One might argue that the local NGOs which originated in the West African region were basically established in the image of their foreign counterparts that had at one time or the other being attracted by an emergency. In some countries, NGOs are accepted in providing social services, promoting human rights issues or advocating sensitive issues like corruption, while in others they are linked with companies' Corporate Social Responsibility strategies which are more inclined to establishing a foundation for empowerment (USAID, 2010). For instance, Mali's Network of People living with HIV/AIDS, Sierra Leone's Campaign for Good Governance, and MTN Foundation with focus on girls' education, HIV/AIDS, and environmental conservation.

5.1. NGOs in the Educational Sector

As a way of eradicating poverty in Africa, NGOs working in the educational sector in Africa put in efforts to enhance the educational system in the respective communities they work in (Harber, 2002). Some of the problem faced by African's educational system is the problem of lack of schooling facility, denying the schoolgirl access to education and the lack of equal educational opportunity. In the early 1960s, new governments in Africa prioritized the expansion of the educational sector on the African continent. With the help of foreign donors, there was an immense increase in educational expenditure, which went into the procurement of teaching materials, establishment of new classrooms, hiring and training of teachers. (Gakusi, 2008).

The local NGOs in Africa, with the support of International NGOs, assists in sponsoring existing community schools with the acquisition of educational materials such as; desk, board, textbook and the likes. Others, step in to establish community schools from scratch (Miller-Grandvaux et al., 2002). Some of this assistance comes from religious groups collaborating with international NGOs, an example is the building of over 500 schools in Africa by the Ahmadiyya Muslim Community and Humanity First, an international charity organization (Akano, Akano, & Ravibabu, 2018). Other aids come in the form of a long-term career development scheme or granting of scholarships to young African researchers. The Volkswagen Foundation has since 2003 been known to offer such opportunity for Sub-Sahara Africans (Czapek, Hanne, & Ziegenbalg, 2013). A similar organization can be found on the African continent.

5.2. NGOs in Health

According to Obiechefu (2012), 25% of health care expenditure is being incurred by donors in one-third of African nations. This data remains true for many West African Countries. Most West African nations rely heavily on donors and International Non-Governmental Organizations (INGOs) for support due to the lack of funds for sufficient health care delivery. Besides the unavailability of health infrastructure such as medical and non-medical equipment, buildings, ambulatory systems, most West African governments are not able to fund for the employment of medical graduates due to insufficient funds. Those already employed in the medical sectors turn to be underemployed because of the absence of some needed medical instrument. (Obiechefu, 2012)NGOs are widely known for their full commitments in a mass epidemic outbreak of diseases like yellow fever, malaria, AIDS, cholera with many cases in developing countries**.** (Ah Shin, Yeo, & Jung, 2018)

The emergence of the Ebola in Africa saw a huge contribution of NGOs in the prevention of its spread. In the case of Sierra Leon, NGOs played a significant role in the implementation of policies to prevent the widespread of this deadly disease, they also provided more sick beds and expanded health care infrastructure for patients. They do this by engaging local NGOs and other members of the community. As a way of reducing the death

rate, International NGOs (INGOs) employed the services of professional doctors from abroad and also import the needed medical and non-medical equipment. As malaria remains one of the deadliest diseases in Africa, the case in most African countries often seems to be the highest as compared to countries from other regions. In reference to the research conducted by the World Health Organization in the year 2018, it reports that Africa has the highest Malaria cases of about 200 million cases (92%) out of 219 million (WHO, 2018).

5.3. NGOs in Political and Social Advocacy

The role of NGOs includes but not limited to humanitarian service, capacity building, empowerment, environmental and other social activities. NGOs engage in political, social and human right advocacy. The rapid increase in the number of NGOs has brought about an improvement in the political environment and public policy procedures in Africa. This has led to both local and international NGOs being permitted to partake in policymaking that would improve the quality of life for the people of Africa. A number of these NGOs uses the bottom-up approaching in their democratization. They do this by empowering local communities to stand up for their fundamental rights (Ewoh, 2004). They become the spokesperson for the underprivileged ones whose rights are being violated. NGOs embodied as civil society plays a very big role in Africa through its political and social advocacies.

"New energies, new experiences, a burst of creativity, an act of courage defying explanation are being manifested by millions of people [in Africa]. In the villages, especially, a silent revolution is underway that is completely changing the continent's development landscape.... In many areas, village self-help groups are joining together to create powerful organizations, which for the first time can speak out in their own interest (Pradervand 1990, xiii)."

NGOs in West Africa campaigns, lobbies and creates awareness through public education. Most of which are related to the protesting for a change in public policy or taking part in the formulation and development of policies to better the lives of the less privileged ones. An example is the Centre for Democracy and Development that assist in the adjustment of west Africa countries' economy and political system. It does this through advocacy, training, and researching areas such as human rights, governance, social and economic development. (United Nations Development Program, 2005).

6. Challenges of NGOs in West Africa

Using data from USAID (2018) survey, we show the state of NGOs or CSOs activities and challenges in the West African region. We define the index according to the definition of USAID sustainability index definition. The USAID Civil Society Organization Sustainable index (CSOSI) gauges the sustainability of each country's CSO or previously defined as NGO sector in their 2010 report based on some dimensions. They make use of seven dimensions or indicators such as legal environment, organizational capacity, financial viability, advocacy, service provision, sectoral infrastructure, and public image with a seven-point scoring scale (i.e., 1.0 to 7.0) lower numbers indicating more robust levels of NGO drawn from empirical observations of USAID agents in the various community. They divided the NGOs sectors into three clusters showing how robust a country's NGO sector is. If a country's NGO sector has a value ranging from 1-3, the country is in the Sustainability Enhanced category which is the highest level of sustainability; a country in the Sustainability Evolving region has a value from 3.1 to 5 and Sustainability Impeded countries have a value from 5.1 to 7. This region is considered the lowest level of sustainability. They measure sustainability across seven dimensions by assessing some indicators related to each dimension. For the legal environment, they assessed indicators relating to registrations, operation, taxation and local legal capacity. For the organisational capacity, questions relating to constituency building, strategic planning etc were assessed. The NGOs financial viability and their ability to influence public policy were also assessed. Responsiveness to local community and range of goods and services was assessed under the social provision index. And lastly, support services and society's perception of NGO was analysed under social infrastructure and public image was analysed respectively (see, USAID, 2018). The result of the empirical observation for the period 2009 to 2018 for West African countries is presented graphically thus. This shows the challenges the west African region faces in its NGO activities to solve the societal issues.

Inconducive Legal Environment

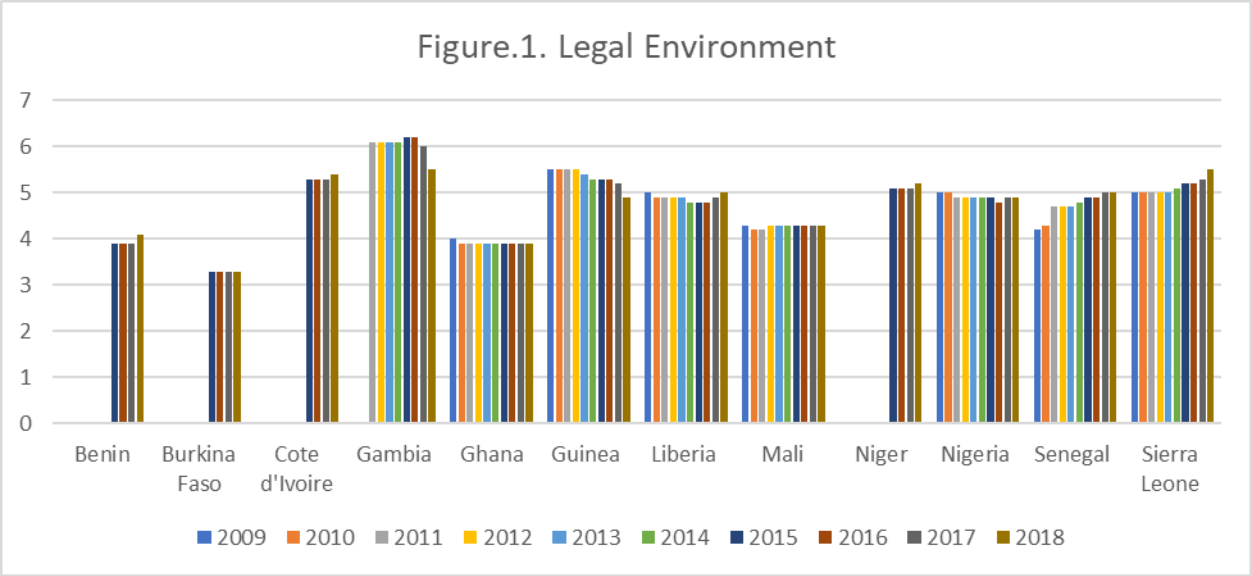

Figure 1. Legal Environment

Source: Authors' presentation using data from USAID

NGOs working in West Africa has been reported to be impeded by the legal environments existing in this subregion. They experienced gruelling and bureaucratic registration processes, severe screening by the registration agencies, and harassment when serving to counterbalance the state. Although, these limitations as reported by USAID 2018 was revealed to have dropped which resulted in the increased number of registered NGOs to address their set objectives.

Lack of Organisational Capacity

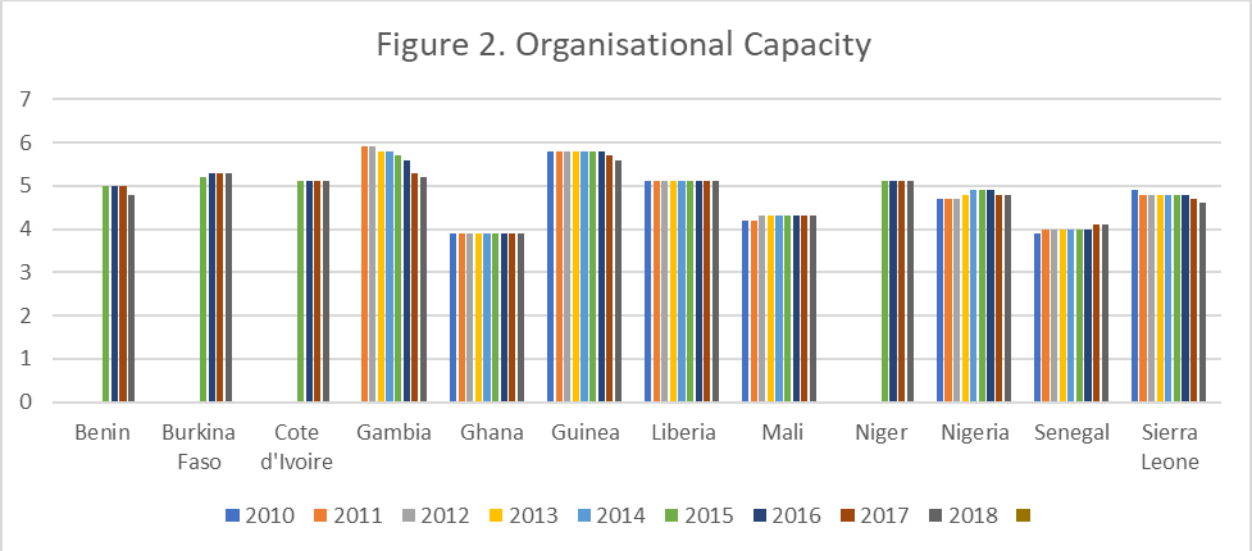

Figure 2. Organisational Capacity

Source: Authors' presentation using data from USAID

USAID (2018) reported that NGOs throughout the west African region have troubles in developing their internal capacity. In their pursuit of funding, they struggle with effective strategic planning, nurturing effective management processes and staff. These internal challenges lead NGOs to inconsistently be adrift from their core missions of the establishment. Moreover, in most African countries, it is no longer new for NGOs to move away from their missions and strategies in pursuit of funding opportunities. Due to unemployment in the region, graduates see establishing NGOs as a haven to guard themselves against unemployment. This leads to the

creation of NGOs devoid of community development value. The state of the West African countries in NGOs are presented below.

Lack of Financial Viability

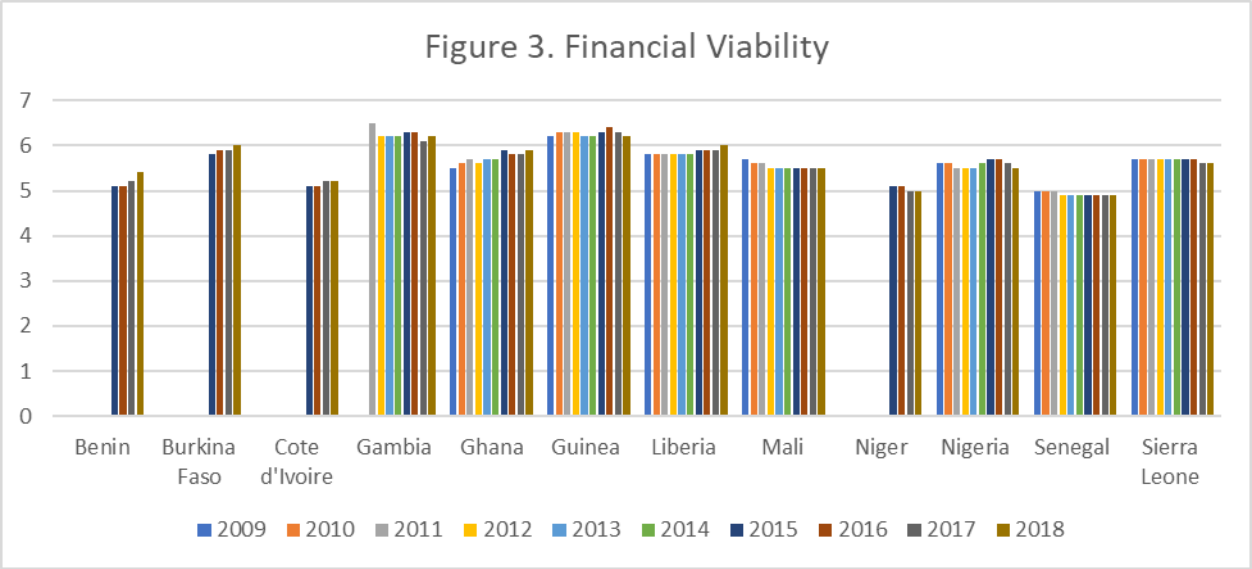

Figure 3. Financial Viability

Source: Authors' presentation using data from USAID

Financial viability has remained one of the greatest challenges of NGOs in Africa. This has led them to consistently move away from their mission to the agenda of the funding agencies. They highly attach their activities to foreign support. On the other hand, these donors prefer to work with or through international organizations, which crushes other smaller NGOs working towards the development of the community. Unfortunately, NGOs have not recorded success in diversifying their funding sources. Domestic funding support is still a problem in the subregion making up only a portion of NGOs' fund. Some NGOs conduct traditional or social media fundraising campaigns as a means to get support from the public recording success in some countries. The corporate firms also through their ethical domain provide some support in some countries like Ghana. Some NGOs in Benin and Guinea, Sierra Leone and Nigeria engage in some commercial activities and crowdfunding to generate fund for their operations.

Lack of Public Support

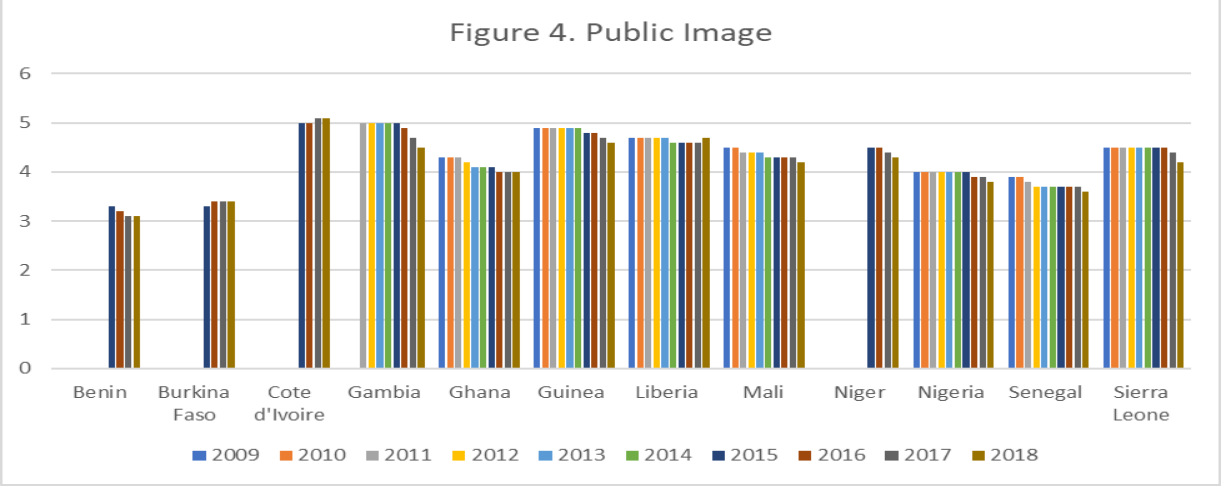

Figure 4. Public image

Source: Authors' presentation using data from USAID

The community are indifferent in supporting NGOs in Africa. However, whatever the motivation of these NGOs is in developing the community when they get no support from the public and have their contribution appreciated, they are likely to give up on their mission and quit NGOs. The public appears to have an ambiguous and often incorrect understanding of the nature and role of NGOs. Everyone talks about change and development, but few are willing to make the sacrifice for the development to come. In fact, the regions NGOs experienced a flowering of public support would record better performance. In many cases, NGOs become meaningful partners in policy or legislative development when given the required support.

Lack of Sectoral Infrastructure

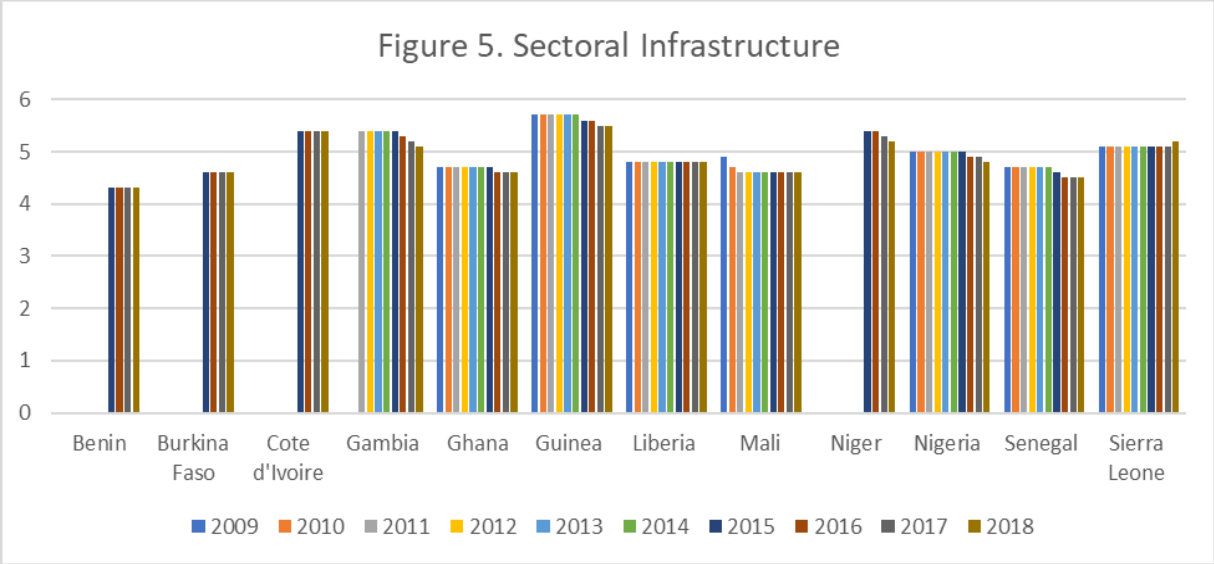

Figure 5. Sectoral infrastructure

Source: Authors' presentation using data from USAID

The provision of infrastructures supporting NGO sectors leads to significant service delivery, collaborations and training opportunities. In countries with stronger infrastructures provide effective services to their community. NGOs having difficulty with infrastructure have difficulty in achieving their objectives. For example, in countries with weaker infrastructures, such as Ivory Coast, Guinea, Sierra Leone generally tend to be far from achieving their missions.

7. Conclusion

To achieve a sustainable NGO, the public, legal and regulatory environment should assist NGOs in the community with their needs. The legal and regulatory environment should facilitate the creation of new NGOs, prevent government interference, and give them the necessary legal basis to engage in appropriate fundraising activities and legitimate income-producing ventures. An NGO with a long-term strategic plan would help them achieve their defined missions. NGOs' plans should be characterized by the following objectives under different dimensions depending on the area of service i.e., education, health, environment etc. That is their visions should be tied to ensuring that there is a social justice that would provide access for all; is impartial and independent; portrayed by equal economic, social and political rights and a chance to understand social inclusion; support citizens right in engagement; provide protection and assistance for the isolated and disadvantage class; provide peace and inclusiveness for sustainable development. The visions should also ensure contribution in health that would be incorporated, accessible, high excellence and comprehensive; offers early involvement and precautionary treatment and ensure healthy lives and promote wellbeing for all at all ages. An education system that is available to all without favoritism; an effective, fair, sustainable and responsive established system, enhance the capacity of students and trainees to think innovatively; participate in the growth of a proud, productive, answerable and competitive citizens who accepts diversity and differences. Lastly, an environment capable of Preserving of national resources and efficient use and investment to preserve resources for prosperity; integrating climate change measures into natural policies, strategies and planning; and improving education, awareness-raising & human & institutional capacity on climate change mitigation, adaptation, impact reduction and early warning. To execute these wide-spreading objectives, there is a need to acknowledge the need for

general participation of all stakeholders in the community and sectors. NGOs require a large amount of financing and support from natural government & donors.

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Oil rent and the quality of institutions in Sub-Saharan African countries: Evidence using the dynamic panel threshold model

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Abstract

This paper aims to determine the optimal level of oil rent having a positive effect on the quality of institutions in Sub-Saharan Africa. The study covers the period 1995 to 2016, for a sample of 12 countries. To achieve this objective, we used the threshold effect model of the DF-GMM estimator inspired by Seo and Shin (2016), put into practice by Seo et al. (2019) in stata. To do this, we used three (03) measures of the quality of institutions namely balance of power, control of corruption and government efficiency. The results of the study show that: i) *The direct effect of oil rents on the quality of institutions is negative, supporting the political resource curse hypothesis*. ii) *The relationship between oil rent and the quality of institutions is positive for a high level of oil rent. In particular, above the threshold of 29.935, 22.526 and 18.263*. For the robustness analysis, we conduct a sensitivity analysis using the fixed-effect dynamic threshold model of Couttenier (2012). The results of the analysis confirm those found by the DF-GMM model of Séo and Shin (2016).

1. Introduction

The World Bank in its classification of countries taken as its clientele specified that more than 50 countries are dependent on natural resources (Barma et al., 2011). In addition, natural resources occupy a central place in the economy of most of these countries and play an important role in governance and the quality level of institutions. To do this, the presence of the natural resource curse influences the need for a real quality of institutions in its relation to the richness of these resources (Wiens, 2014).

Moreover, with regard to the oil-exporting countries of Sub-Saharan Africa (SSA), they most often have very poor quality institutions and poor government practice (Ross, 2001; 2015). According to World Bank data (2020), relating to Sub-Saharan African countries with the best quality institutions and policies, all oil exporting countries except South Africa have poor quality institutions. In addition, according to data from Central African countries, oil represents 70% of exports (Moudjaré & Nourou, 2020). As for other countries, like Nigeria and Angola, oil accounts for more than 80% of exports. While South Africa, Niger, Ivory Coast and DRC each have less than 50% of petroleum products in their total export. It is therefore easy to see that an endowment in petroleum resources can lead to poor quality institutions. This situation may be accelerated by the existence of already poor quality political institutions and questionable governance mechanisms (James, 2019). However, countries like Norway and South Africa have better quality institutions and a significant amount of oil.

Regarding the economic literature, there is still a debate on the effects of natural resources on the quality of institutions (Mehlum et al., 2006; Brunnschweiler, 2008; Avom and Carmignani, 2010; Chang, 2020; Shadabi and Adkisson, 2021; Ertimi et al.,2021). It is in this perspective that a current of research will be born focusing on the effects of so-called "peak" resources like oil and minerals on the quality of institutions (Barro, 1999;

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Deason, 2005; Masi et al. Ricciuti 2019). Oil being a resource with different characteristics than other natural resources (cocoa, coffee, etc.), it plays an important role in the world economy and in the quality of institutions in particular (Isham et al., 2005). It is with this in mind that one of the very first researchers to examine the effects of oil rents on the quality of institutions was Michael Ross (2001, 2015). The latter will show a negative effect of the oil rent on the quality of institutions. This is how he will support the "political resource curse theory." However, other studies like Herb (2005), Dunning (2008), Menaldo (2016), O'Connor et al. (2018), will question these results. They find a positive effect of the oil rent on the quality of institutions. In addition, other studies go even further and support a conditional effect of oil resources on the quality of institutions (Caselli and Tesei, 2015; Brooks and Kurtz, 2016; Houle, 2018). Among these authors, some have been interested in the non-linear relationship between petroleum resources and the quality of institutions. Leite and Weidman (1999) argue that the effects of oil rents on the quality of institutions are based on the level of dependence on oil rents. It is in the spectrum of the non-linearity approach that Couttenier (2012) studies the threshold above which natural resources have an effect on the quality of institutions. The latter finds a positive effect of the resource rent on the quality of institutions at a certain threshold. Thus, the "political resource curse" may be limited to a certain level of oil rent. However, *what is the level of the oil rent that ensures a positive effect on the quality of institutions in Sub-Saharan Africa?*

In order to answer the question below, the study revisits the relationship between oil rent and the quality of institutions in Sub-Saharan Africa. This question is of crucial importance and rests on several aspects. The first interest of this study rests on the empirical level. To our knowledge, it is one of the first studies[1] to contribute to the enrichment of the literature on the non-linear relationship between oil rent and the quality of institutions. Indeed, by determining the optimal level of oil rent, it allows the renewal of studies on the relationship between oil rent and the quality of institutions. In addition, it provides a response to the divergence of approaches and the non-convergence of conclusions.

The second contribution is on the methodological level. The majority of studies use oil rent in terms of oil dependence, leading to endogeneity problems (Tsui, 2011). Similarly, Lall (2016) argues that the absence of data has led to spurious results both for the oil variable and for the quality of institutions. In addition, these studies focus on the linear relationship between oil rent and the quality of institutions (Bjorvatn et al., 2012; Caselli & Tesei, 2015; Hendrix, 2018), while setting aside the idea of non-linearity. In order to overcome these limitations and taking into account the fact that economic phenomena are not always linear, we use the estimation of the FG-GMM threshold model by Seo and Shin (2016), put into practice by Seo et al. (2019). In addition, the choice made on this model is based on the fact that it limits the change in value of the model variables as the threshold is changed. What is criticized for other models with threshold effects like the PTR model of Hansen (1999) and the PSTR model of Gonzales et al. (2005). As a result, it overcomes the problem of endogeneity of variables by using the estimation of the Generalized Moments Method (GMM) in difference. Thus, we use a sample of 12 oil-exporting countries from Sub-Saharan Africa. The study covers the period 1995 to 2016, taking a three-year average. For the robustness of our results, we conduct a sensitive analysis using the fixed-effect dynamic threshold model of Couttenier (2012). Our empirical analysis argues that the direct effect of oil rent on the quality of institutions is negative. In addition, we find that the oil rent acts positively on the quality of institutions at a certain threshold.

The structure of this article is as follows. Section (2) presents the literature review. In section (3), we present the data and the methodological framework. Section (4) is devoted to results and discussion. Section (5) is based on the conclusion and recommendations of economic policies.

2. Literature review

The analysis of the effects of oil rents on the quality of institutions continues to generate much ink and saliva. Theoretical and empirical analyzes are still inconclusive and fall within the scope of the "natural resource curse" (Badeeb et al., 2017; Frankel, 2010; Murshed, 2018; Ross, 2015). The debate fits more specifically into that of the curse of "political resources" (Ross, 2001; 2009). Nonetheless, long before Ross's (2001) studies of the "political resource curse", Tornell and Lane (1999) and Torvik (2002) developed a theory that fits within the "resource curse" theory. policies "which has been called "rent-seeking theory". However, apart from the study by Couttenier (2012), there are few studies that have assessed the threshold effects of oil rents on the quality of institutions by taking into account several measures of the quality of institutions. This is how Bergougui and Murshed (2020) classify the effects of oil rents on the quality of institutions into three main branches. However,

[1] Couttenier (2012) is interested in the non-linear relationship between natural resources and the quality of institutions. However, the analysis of the oil rent in particular has not been done.

for the purposes of this study, we will categorize them into two broad groups. Indeed, the second (that of the conditionalists) and the third group complement each other.

The first group are the skeptics. They support the idea of a negative effect of the oil rent on the quality of institutions. Indeed, Tornell and Lane (1999) will set up a theoretical model, presenting the rent-seeking behaviors, characteristic of an economy with weak political and judicial institutions and several powerful interest groups. They will highlight the "greediness effect" which manifests itself in an allocation of resources, favoring production towards the less productive and untaxed sector, while balancing the increase in gains from external effects. Thus, it has a negative effect on the whole economy. In addition, Torvik (2002) examines the relationship between natural resources (possibly oil) and the poor performance of countries holding these resources. He presents in a model rent-seeking theory, the political competition of entrepreneurs and / or the frenzied race in search of rent leads to an increase in corruption and a bad practice of democracy. However, the first to explicitly express the "political resource curse" is Ross (2001). He sets up a theoretical model in which he shows the negative effects of petroleum resources on the quality of institutions. It presents three (03) mechanisms from which oil resources act on the quality of institutions. First, states rich in oil rents tend to rush towards oil resources to finance public spending by setting aside taxation: this is the "rentier effect". Then, the "repression" effect supports the limitation of elementary rights relating to democracy and the establishment of repression of the population. Finally, the "modernization" effect highlights the idea that the presence of oil hinders social evolution (the absence of enthusiasm for studies, the unnecessary need for a great democracy). In the same vein, Smith (2004) examines the lifespan in power of the leaders of oil-producing countries during the period 1960 to 1999. He seeks to assess the controversies relating to oil wealth which improves or reduces the lifespan. of a diet. The results of his study show that oil wealth improves the stability of the regime. In addition, Cuaresma et al. (2011) in the same idea, evaluate the effects of the oil rent on the duration of autocratic leaders. Their research results show that dictators in countries that are relatively better endowed with oil tend to stay in office longer. Cotet and Tsui (2013) support the idea that an increase in oil resources leads to political violence. Anyanwu and Erhijakpor (2014) carry out a study on the effects of oil wealth on democracy in Africa over a period from 1995 to 2008 and find that the oil rent has a negative effect on the quality of institutions. Blanco et al. (2015) argue that the oil rent has a negative effect on the quality of institutions and on socio-economic conditions. Cassidy (2019) assesses the long-term effects of oil rents on development. He uses the instrumental variables of 172 countries over a period between 1966 and 2008. The results of his study show that oil production has a negative effect on democracy.

The second wave of literature is defended by the so-called "conditionalists". According to these authors, the effects of oil rents on the quality of institutions are based on several factor conditionalities. Couttenier (2008) establishes a theory putting forward the idea of a conditional effect of natural resources on the quality of institutions based on the idea of Mehlum et al. (2006). It demonstrates both theoretically and empirically that natural resources have a negative impact on the quality of institutions. However, this negative effect turns into a positive one, once there is a considerable abundance of resources. On the other hand, Caselli and Cunningham (2009) theoretically highlight the hypothesis of the presence of an existing non-linear relationship between natural resources and the quality of institutions in a country with a presidential system. Avom and Carmignani (2010) argue that natural resources improve economic inequalities in a context of weak institutions. In addition, the description of the transmission channels of the negative effects of natural resources was put forward. Couttenier (2012) studies the threshold above which natural resources have a positive effect on the quality of institutions. It shows that natural resources have a negative effect on the quality of institutions, but above a certain threshold, this negative effect turns into a positive one. Caselli and Tesei (2015) show that the resource rent arising from an increase in commodity prices is at the root of the presence of an authoritarian state. Omgba (2015) focuses on a sample of oil-exporting countries. They find in his study a positive effect between the start of oil production and the period of independence of these countries. Brooks and Kurtz (2016) use data from 183 countries over a period from 1964 to 2004 to study the effects of oil wealth on political regimes. They find that oil resources are not necessarily a curse. That in the long run the latter can improve the quality of institutions. In addition, Houle (2018) defends the conditionality of the failure of the authoritarian regime which is at the origin of the negative effect of oil on the quality of institutions. At the end of this literature review, it emerges that there is no taxic agreement on the effects of oil rents on the quality of institutions. In addition, to our knowledge, there is no study that has looked at the non-linear relationship between oil rent and the quality of institutions. Hence the need to dwell on the evaluation of this relationship, in order to fill this void in the literature.

3. Data and research methodology

It is a question of presenting the methodological approach of the research (3.2). However, well before this phase, the need to go through the presentation of the studied variables and the data source is important (3.1).

3.1. Study data

Our study is based on determining the optimal level of oil rent having a positive effect on the quality of institutions. To do this, we are interested in the exporting countries of Sub-Saharan Africa. Due to the unavailability of data, we limited ourselves to 12 countries[2] over a period from 1995 to 2016, a three-year average. The choice based on an average of three years is relative to the condition imposed by our dynamic threshold model[3]. Thus, the number of individuals must be greater than the number of times (N> T). In addition, the choice of the study period is based on the harmonization of data and time. In addition, relating to our data, the majority of our data come from the database of the World Bank (WDI, 2020; WGI, 2020) and from Cruz et al. (2018). The choice made for the World Bank database is based on the fact that the latter does not suffer from any bias that is criticized by other databases (Couttenier, 2012). For the database of Cruz et al. (2018) is a credible database as it comes from Inter-American Development Bank. It is a credible American institution with international notoriety.

3.1.1. Dependent variable

Quality of institutions: This is a variable that takes into account the institutional arrangement and environment. As part of this research, we will focus on the institutional arrangement. Chekouri et al. (2017) are interested in the relationship between the oil rent and the quality of institutions in Algeria. To do this, within the framework of this study, by approaching in the same sense as these authors, we use three (03) institutional indicators which are used: *the balance of power (BP), the control of corruption (CC) and government efficiency (GE)*. However, we do not measure the linear relationship between rent and the quality of institutions, but we are interested in a non-linear relationship. Thus, the power balance variable is a variable established by Kaufman et al. (2004). The latter was taken over by Inter-American Development Bank (Cruz et al. 2018). This variable explains the probability that two (02) deputies chosen at random from the government or parliament belong to different parties. The choice made on this variable is based on the idea that it better reflects the role of political fractionation. Bjorvatn et al (2012) in his study on the resource curse in oil-rich countries. The corruption control (CC) variable is one of the variables of good governance. It determines the corruption and abuse of public powers for the purpose of profit. Thus, the choice made on this variable is due to the fact that it highlights the misappropriation of state property by the elites. The importance of this variable was made by Shadabi and Adkisson (2021). In addition, petty corruption and grand corruption are taken into consideration. In addition, the government efficiency variable takes into account the performance of the bureaucracy in the quality of the provision of public services.

3.1.2. Threshold variable

Oil rent (Oilrev): This variable represents the difference between the international price of oil and the average unit of extraction cost (Mohammed et al. 2015). Tan and Isa (2011) support a positive relationship between the price of oil and the stock performance of the energy industry in Malaysia. Thanks to an increase in the price of oil, this induces an increase in profits from the latter. In the same vein, Chekouri et al. (2017) put in relation the oil rent and the quality of institutions in Algeria. They showed the important place of the oil rent and its influence on the quality of institutions.

3.1.3. Control variables

Income inequality (Gini/head): It reflects the income disparities existing in a country during the period as a percentage of GDP. This measurement is made using the Gini index. The choice made on this indicator is based on the fact that it allows a better description of the income disparities existing in the countries of Sub-Saharan Africa, more specifically the countries rich in oil resources.

Education (EDU): This variable measures the education rate of individuals in secondary school. The effects of the latter on the quality of institutions must be positive. However, it is noticed that the countries rich in natural resources and particularly oil are less inclined to a weak school attraction.

[2] L'Angola, le Cameroun, le Congo, le Gabon, la Guinée Equatoriale, le Nigéria, le Tchad, le soudan, la Côte d'ivoire, la République Démocratique du Congo, le Ghana, le Niger et l'Afrique du Sud.
[3] For more information, please consult Seo et al. (2019).

3.2. Justification of the econometric choice and choice of the research method

This subsection is based on the one hand on the justification for the choice of the econometric model and on the other hand on the methodological presentation.

3.2.1. Justification and specification of the econometric model

This research aims to determine the optimal level at which the oil rent positively affects the quality of institutions in SSA countries. We use the dynamic threshold effect model unlike Seo and Shin (2016). Indeed, having a particularity to take into account the heterogeneity in the relationship between oil rent and the quality of institutions, it considers endogenous covariances and lagged variables. In addition, the model of Séo and Shin (2016) allows countries to make gradual changes over time. Finally, as the support Abdulahi et al. (2019), it takes into account the endogenous non-linearity highlighting the thresholds.

Moreover, Couttenier's (2012) model, although it takes into account the fixed country effect, suffers from the problem that it is not a real threshold model. The models of Hansen (2000) called the PTR model and the PSTR model of Gonzalez et al. (2005) suffer from an endogeneity problem. Thus, the choice made on the model of Séo and Shin (2019) remains the best suited. Therefore, Séo et al. (2019) put the stata model into practice and it can be specified as follows:

$$institution_{it} = \beta_0 + \beta_1 x_{it} + \beta_2 q_{it} + \delta (q_{it} - \gamma) 1\{q_{it} > \gamma\} + \alpha_{it} + \varepsilon_{it} \qquad (1)$$

With t representing the study period and i representing the country. Thus, we have two periods of panel data (t = 1.2). The latter take in first difference on the suppression of α_{it}, the individual characteristics of time-invariant in such a way that they are associated with the measurement of the oil rent. We then have the following second equation:

$$\Delta institutions_{i2} = \Delta\beta_1 x_{i2} + \Delta\beta_2 q_{i2} + (\delta_0 + x_{i2}\delta_1 + q_{i2}\delta_2) 1\{q_{i2} > \gamma\} - (\delta_0 + x_{i1}\ \delta_1 + q_{i1}\ \delta_2) 1\{q_{i2} > \gamma\} + \Delta\varepsilon_{i2} \qquad (2)$$

In addition, the variable $institutions_{it}$ represents the quality level of institutions in country i at period t. It is measured by three (03) variables: balance of power (BP), Control of corruption (CC) and government efficiency (GE). q_{it} represents the oil rent threshold variable (Oilrev), x_{it} : represents my different control variables like: education (Edu) and Income inequality (Gini/head).

3.2.2. Methodology for producing the econometrics model of Seo and Shin (2016)

The choice made on the dynamic panel threshold of Seo and Shin (2016) led us to adopt the procedure put into practice by Séo et al. (2019). Based on the principles of GMM, we proceed to four stages for the realization of the model:

The first step is to determine the non-linear relationship between oil rent and the quality of institutions using the Boostrap method. To do this, we validate the presence of nonlinearity, when the probability is zero (Seo et al. 2019).

The second step relies on using the high lags of the dependent variable to regress the instrumental variables. To do this, the endogenous variable is regressed on a set of instrument variables.

The third step insists on determining the threshold, after estimating the regression of the instrumental variables. To do this, we use the method of Hansen (1999).

The fourth step estimates the coefficients of the slope and the asymptotic variance using the generalized method of moments. The result of the estimate leads us to a curve with a slope whose coefficient is denoted K.

3.2.3 Presentation of Couttenier's threshold model (2012) to test the robustness of our results

To assess the robustness of the results, use the dynamic threshold model of Seo and Shin (2016), put into practice by Seo et al. (2019), we use the fixed-effect estimator of the dynamic threshold model of Couttenier (2012). Thus, Couttenier in order to take into account the fixed country effect, he uses the Within estimator and decides to shift the threshold variable by one period in order to solve the endogeneity problem. To do this, it squares the threshold variable, while leaving the control variables unchanged. By adapting his model to our study, the specification of his model looks like this:

$$institution_{it} = \partial_0 + \partial_1 oilrev_{it-1} + \partial_2 (Oilrev_{it-1})^2 + \sum Z_i + \varepsilon_i \quad (3)$$

Where $institution_{it}$ represents the dependent variable of country i at period t. $Oilrev_{it-1}$ is the oil rent of country i at period t shifted by one period. $\sum Z_i$ represents the sum of the control variables. $(Oilrev_{it-1})^2$ represents the oil rent threshold of country i shifted by one period. This expression represents the non-linearity between the oil rent and the quality of institutions.

4. Results and discussions of the estimates

This section deals with presenting the results (4-2) and discussing them (4-3). Long before that, it is a question of determining the stationarity of our variables (4.1).

4.1. Unit root test results

The objective of our research is based on estimating the optimal threshold of oil rent having a positive effect on the quality of institutions. These estimates are made on a sample of 13 SSA countries rich in petroleum resources. Well before proceeding to any estimates, it is necessary to proceed to the stationarity of our variables. The study of the stationarity of is done using the tests of Im, Pesaran and Shin (IPS) (2003) and the test of Levin, Lin and Chu (LLC) (2002). The results of the IPS and LLC tests led to significant results (see table [1] in the appendix). At the first result, with the IPS test, all the variables are stationary in level. Indeed, the test values are greater than the threshold of 1% and 5%. The second result, with the LLC test, shows us that all the variables are stationary in level, except the corruption and government efficiency variables which remain non-stationary despite the differentiation. We retain the results of the IPS test insofar as it considers both heterogeneity and autoregression of a unit root. In addition, this test corrects the limitation of the LLC test which suffers from the presence of unit root homogeneity.

4.2. Results of the estimation of the dynamic threshold model of Seo and Shin (2016)

The objective of our research is to determine the level of oil rent having a positive effect on the quality of institutions in the countries of Sub-Saharan Africa. Thus, we use the FG-GMM dynamic panel data threshold model of Séo and Shin (2016), put into practice by Séo et al. (2019).

The summary of these results can be found in Table [1] and the estimates made support the presence of an oil rent threshold. To do this, the hypothesis of the non-linearity between the oil rent and the quality of institutions at the threshold of 1%, 5% and 10%, is confirmed by the P_value of Boostrap (P_value = 0.000). In addition, the asymptotic formula for the GMM estimator of the dynamic threshold model is good and is supported by the value of the cutoff point denoted Γ, with a P_value <1%. Finally, the presence of an inverted U-shape is supported by the tilt angle, confirming the asymptotic shape of the model.

In addition, models (1), (2), (3), each having one of the three (03) indicators of the quality of institutions, namely: the balance of power (BP), Government efficiency (GE) and Corruption Control (CC), present several results. Thus, from these results, we can draw several lessons:

First, the direct relationship between the oil rent and the quality of institutions is materialized by the coefficient of the parameter β_1. To do this, our variable of interest which is the oil rent acts negatively and not significantly on the balance of power and the control of corruption with the respective values -0.0035 and -0.0420. But in a negative and significant way on the effectiveness of government with the respective value -0.0423. On the other hand, the inequalities of income and education variables improve the quality of institutions. However, income inequalities have a positive and significant effect on the balance of power with a value of 0.019. While education plays a positive and significant role on corruption with a value of 0.007.

Second, the relationship of non-linearity between the oil rent and the quality of institutions is presented by the parameter K. Being the parameter of the angle of inclination, materializing the asymptotic form, it allows to highlight an inverted U shape. It is observed that a relationship between the oil rent and the quality of institutions is positive. This positive relationship is significant with the variables of good governance (Government efficiency and control of corruption). On the other hand, not significant with the power balance variable. The values of the parameters of K, measuring the angle of inclination, are respectively 0.03405 (model 1), 0.023 (model 2) and 0.0389 model (3).

Table 1. Results of the dynamic threshold effect model with the quality of institutions as dependent variable

Dependent variable: BP Model (1)		**Dependent variable**: CC Model (2)		**Dependent variable**: EG Model (3)	
Estimated Threshold (γ)	29.93563 (0.000)	Estimated Threshold (γ)	22.526 (0.005)	Estimated Threshold (γ)	18.263 (0.000)
95% confidence interval	[18.564 ; 41.306]	95% confidence interval	[6.800 ; 37.279]	95% confidence interval	[8.234 ; 28.2929]
oil rent effect		**oil rent effect**		**oil rent effect**	
β_1	-0.0035 (0.608)	β_1	-0.0420 (0.852)	β_1	-0.0423 (0.000)
K	0.03405 (0.116)	K	0.023 (0.001)	K	0.0389 (0.000)
control variables		**control variables**		**control variables**	
BP_{t-1}	0.495 (0.318)	CC_{t-1}	0.4566 (0.000)	EG_{t-1}	-0.540 (0.000)
Education	0.000 (0.933)	Education	0.007 (0.000)	Education	0. 001 (0.212)
Gini/head	0.019 (0.001)	Gini/head	0.002 (0.852)	Gini/head	0.005 (0.197)
Number of current conditions	50	Number of current conditions	50	Number of current conditions	50
P_value of Boostrat	0	P_value of Boostrat	0	P_value of Boostrat	0
Number of countries	12	Number of countries	12	Number of countries	12

Note: β_1 represents the upper speed parameter, while K represents the bank angle parameter. The values in parentheses represent the probabilities associated with the parameters.

Source: Author, from stata.

4.3. Discussion and robustness test using Couttenier's dynamic fixed-effect threshold model (2012)

It is easy in this subsection to discuss our results in the light of another estimation technique, in order to confirm the solidity of the latter. This is how we use the dynamic fixed-effect threshold model of Couttenier (2012). The choice made on this model is based on the fact that it captures the fixed country effect. Thus, country fixed effects make it possible to capture all the factors during a period (Couttenier, 2012). To do this, it is then a question of comparing our results obtained in table [1] with those obtained in table [4]. In addition, it is also important in this subsection, a justification of the non-significance of our variables and the results obtained, in the light of the literature.

Regarding the results obtained in Table [1], we can safely say that we find substantially the same results in Table [2]. This confirms us on the strength of our results. Thus, the negative and insignificant effect of the oil rent on the balance of power and the control of corruption on the one hand and the positive and significant effect of the oil rent on the other hand. Government efficiency is part of the political resource curse theory (Ross, 2001). According to Ross (2001), countries with an oil presence tend to devote themselves to this windfall. Thus, Arezki and Brükner (2011) argue that in the presence of oil manna, the authorities, in order to escape redistribution and conflict, increase civil liberties and reduce political freedoms. The results of the negative linear effect of oil rent on the quality of institutions are in line with those found by Chekouri et al. (2017). Moreover, the negative effect of the oil rent turns into a positive effect on the indicators of the quality of institutions at a certain threshold. These results are in line with those found by Couttenier (2012).

The education variable is insignificant due to the absence of a real education policy in these countries as shown in models (1), (3) and (4). But, despite this lack of educational policy, it manifests itself in a positive effect on the balance of power and government effectiveness. These results are in line with those found by Asongu and Nwachukwu (2015). However, the non-significance present in models (5) and (6) is accompanied by a negative effect of the education variable on corruption and on government efficiency using Couttenier's model (2012).

The insignificance and positivity of the income inequality variable in models (2), (3) and (4) can be explained by development theory. Indeed, the distribution of income in these countries, although unequal, it improves government efficiency and corruption control. These results go in line with those found by Khan (2021) and Policardo et al. (2020). In contrast to models (5) and (6), in addition to having a negative effect on government variables, income inequality significantly on these variables.

Table 2. Robustness test using the dynamic fixed-effect threshold model of Couttenier (2012)

Dependent variable: BP Model (4)		**Dependent variable**: CC Model (5)		**Dependent variable**: EG Model (6)	
oil rent effect		**oil rent effect**		**oil rent effect**	
$Oilrev_{t-1}$	-0.009 (0.188)	$Oilrev_{t-1}$	-0.0186 (0.123)	$Oilrev_{t-1}$	-0.028 (0.028)
$Oilrev_{t-1}^2$	0.0002 (0.077)	$Oilrev_{t-1}^2$	0.0002 (0.344)	$Oilrev_{t-1}^2$	0.0002 (0.267)
control variables		**control variables**		**control variables**	
Education	0.00021 (0.869)	Education	-0.001 (0.625)	Education	-0. 001 (0.472)
Gini/head	0.008 (0.112)	Gini/head	-0.018 (0.041)	Gini/head	-0.019(0.038)
Constant	0.1598 (0.013)	Constant	-0.547 (0.000)	Constant	-0.360 (0.02)
R^2 (Within)	0.0725	R^2(Within)	0.120	R^2(Within)	0.189
Number of Observations	84	Number of Observations	84	Number of Observations	84
Number of Countries	12	Number of Countries	12	Number of Countries	12

Note: The values in parentheses represent the probabilities associated with the parameters.

Source: Author, from stata.

5. Conclusion

The object of this research rested on the optimal determination of the oil rent from which, the quality of the institutions has a good performance. Our sample focused on 12 oil-rich Sub-Saharan African countries. The study period was between 1995 and 2016. In order to take into account, the conditions of our dynamic threshold model, we took a three-year average. Thus, the dynamic threshold model of Séo and Shin (2016), put into

practice by Séo et al. (2019) supports three (03) thresholds respectively of 29.935, 22.526 and 18.263. In addition, the three (03) indicators for measuring the quality of institutions (balance of power, control of corruption and government efficiency) better describe the theory of the political curse of natural resources put forward by Ross. (2001). Moreover, in terms of economic policy recommendations, the presence of monitoring of government action in these countries must be accentuated. Thus, the parliament must set up a commission which evaluates the achievements made by the government. In addition, the independence of the legislative, executive and judicial power is very important. This is how, to fight corruption, these three (03) powers must be evaluated in full transparency.

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Appendix

Table 1. Results of unit root tests

Variables	Level		First difference		Observation
	IPS	LLC	IPS	LLC	
Corruption Control (CC)	-8.701*** (0.000)	2.170 (0.985)	-12.229*** (0.000)	8.324 (1.000)	I(0)
Balance of Power (BP)	-1.289** (0.098)	-2.349** (0.009)	-7.565*** (0.000)	-6.562*** (0.000)	I(0)
Government Effectiveness (GE)	-7.620*** (0.000)	0.642 (0.739)	-11.870*** (0.000)	5.539 (1.000)	I(0)
Education (EDU)	-1.802** (0.035)	2.384 (0.991)	-9.312*** (0.000)	-3.686*** (0.001)	I(0)
Income inequality (Gini/head)	-6.486*** (0.000)	-2.872*** (0.002)	-10.107*** (0.000)	-7.728** (0.000)	I(0)
Oil rent (Oilrev)	-1.981** (0.023)	-3.010*** (0.001)	-6.940*** (0.000)	-6.471*** (0.000)	I(0)

Notes: (***), (**) significance at 1%, 5%. Values in parentheses are probabilities.

Source: Author, from stata.

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A critical study of Covid-19 pandemics on crime rates in India

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Abstract

Covid - 19 pandemic has wide ranging repercussions including the direct and massive impact on the employment sector. The sudden outbreak of this virus affected the labor market in immeasurable ways and in order to curb this menace, the need of the hour was a nationwide lockdown. As a result, people ran out of jobs and unemployment rates escalated. People were bogged down into situations of poverty, starvation, and misery. Sadly, many of them indulged in activities like robbery, dacoity, etc. in order to sustain and support their families. Thus, covid aftermath wasn't restricted to rise in unemployment rates, but also led to spike in crime rates in India. Through this paper, we have studied the impact of the pandemic on crime rates. Our paper treats literacy rate, infant mortality rate, per capita income and unemployment rate as factors affecting crime rates, with unemployment rate being a major determinant. Multiple regression model is used to test the hypothesis that the pandemic scaled up unemployment rates, thereby leading to a surge in crime rates.

1. Introduction

Crime has always been a miserable cloud surrounding a country and hampering its growth. Complete freedom from crimes is a fictitious, fabricated goal with special reference to India. India is home to a large population, with people having different opinions and viewpoints. Differences seem to be a prominent reason for arguments, quarrels, fights and ultimate crimes like murders, rape etc. However, discord is just a part of a whole. Surge in crimes have wide-ranging reasons, but what we have underscored through this paper is the fact that unemployment escalates crime rates much significantly when compared with other factors.

Unemployment refers to a situation where all those who are willing to work, and are looking for work are unable to find jobs. Employment sector is considered to be the backbone of a country. Being unemployed is nothing but a situation of complete misery and despondency because more than just earning a livelihood, people have to look after their families and fulfill their daily needs. In order to escape this grimness people often opt for hard labor which further shoots up disguised unemployment. Thus, an unemployed person is no less than a liability for the country.

The year 2020 brought with itself numerous casualties. With manifold increase in covid-19 cases, the entire world was shaken up to the core. In India, this unprecedented pandemic started spreading so hastily that the govt. adopted nationwide lockdown in order to restrain the spread. But instead of a positive outcome, lockdown was followed by repercussions and a massive unbalance everywhere. Due to lockdown, all activities and jobs were shut down, with the new labor market enterers not being able to find jobs for themselves. Also, the existing ones were laid off from their work. Thus, the result was unemployment rates surging up. People could not work, could not earn money, and hence were highly stressed out. This stress, anxiety and misery further forced a large chunk

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of this population to head towards crimes like robbery, dacoity, loot, murders etc. Henceforth, through unemployment rates, covid finally led to a spike in crime rates.

Lockdown exacerbated pandemic driven downturn by enhancing economically-motivated crimes. Covid - 19 pandemic upraised unemployment rates in India thereby snatching away disposable income from its citizens. Lower levels of income paved the way for money driven crimes in India. Covid - 19 pandemic made people switch to the virtual / online work mode. Online dependency and digital divide inflated victimization from online scams, fraudulent transactions, and cyber-bullying too.

Thus, in this paper, we have studied how different factors affect crime rates (in terms of no. of FIRs registered) with unemployment rate playing a significant role and have tried to unfold the effect of covid - 19 pandemic on unemployment rates and ultimately on crime rates by deriving their relation through regression model. The urgent need at this point is to improve the employment rate in India. The downturn was uncontrollable and unfortunate, but now we should buck up so that India can get back to normalcy. It is very important that freshers find new jobs and the ones laid off get their jobs back so that they are motivated to not involve themselves into criminal activities.

2. Literature review

COVID-19 has impacted the world in ways which no one predicted. The whole world went into lockdowns which changed the daily routine of people. The UNODC research in March 2020 aimed at providing observations on 4 different types of crimes- robbery, burglary, theft & homicide. This research showed that unprecedented changes related to pandemic differ by type of crime, country, region and time. The research paper titled : 'Has COVID-19 Changed Crime? Crime Rates in the United States during the Pandemic' indicated the extent to which governmental responses to COVID-19 have impacted crime rates in the USA. A poll conducted in March showed that 90% of Americans including essential workers are staying at home (Washington Post, 2020) describing the employment and labour market status in the USA. But similar polls were not conducted in other countries. Another paper titled 'Is poverty the mother of crime' by Atlantic Review shows how education & income affect crime. Other variables like number of FIRs, Infant Mortality Rate, and Unemployment Rate are used in this paper after extensive research as research articles like Pridemore (2008) have attempted to resolve a striking incongruence between two bodies of literature on social structure and homicide.

3. Objectives of the study

In the light of the above review, this study aims to understand the significance of various factors that determine crime rate and its relative significance in the wake of the pandemic.

The objectives of the study are:

1) To compare the role of unemployment on the determination of crime rate in pre and post Covid period in India.
2) To understand the impact of Covid-19 on crime rates.
3) To analyze the role of dropout rate in increasing crime rates.
4) To assess the role of police deployment on crime rate in the period pre and post Covid.

Based on the review of literature and objectives, we frame the hypothesis with respect to the following variables of study: unemployment rate across various states of India, the police deployments per sq.km across states, secondary school dropout rates and per capita income while controlling for other factors such as infant mortality rate (an indicator of development status of the state) and rural population.

We hypothesize that the relative significance of aforementioned variables would increase in the period post Covid since these metrics have undergone significant changes owing to increase in unemployment, dropout rates, police deployment and reduction in per capita incomes. All of these variables result in an increase in crime rates. The statement of null hypothesis towards the objectives of the study is detailed below:

H_{0a}: There is no role of unemployment in the determination of crime rate in pre and post Covid period in India.

H_{0b}: There is no change in overall crime rate in pre and post Covid period in India.

H_{0c}: There is no role of dropout rates on crime rates in pre and post Covid period in India.

H_{0d}: There is no change in relative significance of police deployment on the determination of crime rate in pre and post Covid period in India.

H_{0e}: There is no change in relative significance of income on the determination of crime rate in pre and post Covid period in India.

4. Data & Methodology

To show a comparison between the crime rates of Year 2019 & 2020 we collect secondary data for variables like Unemployment Rate, secondary school dropout rate, Infant Mortality Rate, Per Capita Income and Crime rates for all states of India. Factors such as IMR, rural population provide evidence of the socio-economic development in a state. We sourced the secondary data from government websites.

Table 1. The variables, their definitions and sources

Variable	**Definition**	**Source**
Crime rate	Number of crimes reported per 1,00,000 population	NCRB(National crime bureau records)
Unemployment Rate Growth in %	Monthly (Y/Y) % Change in Unemployment rate	CMIE(centre for monitoring Indian economy)
Secondary school dropout rates	Proportion of pupils from a cohort of grade 9^{th} -12^{th} standard enrolled in a given grade at a given school year who are no longer enrolled in the following school year.	UDISE (Unified District Information System for Education)
Police deployed per sq km area	No. Of actual police force deployed per sq. km area	BPRD(Bureau of Police Research & Development)
Per capita Income (annual in Rs.)	Per capita income or average income measures the average income earned per person in a given area in a specified year	RBI (Reserve Bank of India)
Infant Mortality Rate	The infant mortality rate is the number of infant deaths for every 1,000 live births.	Census India 2011
Rural Population	No. of persons living in rural areas	Census 2011

Source: Authors' Compilation

Table 2. Descriptive statistics for the variables used in the model

Variable	Mean	Minimum	Maximum
No. of FIRs Registered	26277.20	0.89	316380
Unemployment Rate Growth in %	1.102003	-.898(Assam)	58.6(Karnataka)
Literacy Rate- %	79.235	66.4(Andhra Pradesh)	96.2(Kerala)
Per capita Income (annual in Rs.)	116268.4	31827 (Bihar)	283636(Delhi)
Infant Mortality Rate	29.5	10(Kerala)	47(Madhya Pradesh)

Source: Authors' Calculations

5. Methodology

The choice of variables was made considering factors of inclusivity coupled with foundations of existing literature such as (Insert citations of studies that have used these variables). We collected data for the year 2020 for all the variables but to show some comparison between pre & post Covid we collected data for unemployment both in 2019 & 2020 for employment to find the change in unemployment rates.

We construct two cross section data sets for all states and union territories of India for a period pre Covid (2019) and post Covid (2020). Subsequently, we run an OLS multiple regression test to derive the T statistics of variables impacting the crime rate.

a) Equation 1 for 2020

$\text{Crime rate}_i = \beta0 + \beta1\text{Police deployed/sq.km} + \beta2\ \text{Unemployment Rate} + \beta3\text{Infant Mortality Rate} + \beta4\text{Per Capita Income} + \beta5\ \text{rural population} + \beta6\ \text{secondary school dropout rate} + u_i$

b) Equation 1 for 2019

$\text{Crime rate}_i = \alpha0 + \alpha1\text{Police deployed/sq.km} + \alpha2\ \text{Unemployment Rate} + \alpha3\text{Infant Mortality Rate} + \alpha4\text{Per Capita Income} + \alpha5\ \text{rural population} + \alpha6\ \text{secondary school dropout rate} + v_i$

We used STATA software for the test.

Descriptive Statistics:

Regression Results and Analysis:

Table 3. OLS estimates for 2020

CrimeRate2020	***Coef.***	***Std. Err.***	***t***	***P>|t|***	***[95% Conf.***	***Interval]***
policeperkm2020	2980.49	2377.595	1.25	0.245	-2502.254	8463.234
secondarydropout2020	-2361.07	5843.64	-0.4	0.697	-15836.53	11114.39
percapitaincomefy21inrs	0.317199	0.418071	0.76	0.47	-0.6468735	1.281272
ruralpopin1000	4.00235	0.964804	4.15	0.003	1.777509	6.227191
Unemployment rate 2020	4715.606	3858.246	1.22	0.235	3285.907	5753.039
IMR	3010.525	4738.216	0.64	0.543	-7915.82	13936.87
Constant	85948.81	186800.6	0.46	0.658	-344814.10	516711.8

Table 4. OLS estimates for 2019

CrimeRate2019	***Coef.***	***Std. Err.***	***t***	***P>t***	***[95% Conf.***	***Interval]***
Police per km2019	2870.129	2290.531	1.25	0.223	-1880.142	7620.4
Secondary droput 2019	-1311.15	3469.395	-0.38	0.709	-8506.233	5883.937
Percapita income fy20inrs	0.254502	0.29071	0.88	0.391	-0.3483943	0.857399
Rural pop in 1000	3.531838	0.713574	4.95	0	2.051976	5.011699
Unemployment rate 2019	1953.54	4702.165	0.42	0.689	-8889.672	12796.75
IMR	922.3535	2847.129	0.32	0.749	-4982.23	6826.937
Constant	28599.89	122426.9	0.23	0.817	-225297.90	282497.7

The relative significance of the factors can be indicated through the change in the t value for each of the independent variables. As can be seen, the impact of unemployment rate both in terms of coefficient value and significance in determining crime rate increased in the period of Covid (2020) as compared to pre Covid (2019). This leads us to reject our null hypothesis. Further to assess the impact of Covid on crime rate overall can be indicated by the significance of constant term which too has increased in terms of coefficient value and significance in 2020 as compared to 2019. We reject our null hypothesis that Covid has no impact on crime rate overall. The significance of secondary school dropout rate in determining crime rate reduces in 2020 as compared to 2019. The dropouts are incidental to the lockdowns and access to digital modes of education coupled with finances to fund education. Compared to 2019, the dropouts determining crime rates reduce. Further, deployment of police force/sq.km's significance on crime rate also decreased in 2020 compared to 2019. Lastly, per capita income's impact on determining crime rate increased in terms of coefficient value and significance in 2020 as compared to 2019, leading us to reject the null hypothesis.

6. Conclusion

This paper uses a panel data of 20 Indian states for the months Jan-Nov 2020 to assess the incidence of crime due to Covid -19. FIRs registered were used as the dependent variable (a good proxy for incidence of crime) while controlling for factors like unemployment rate, literacy rate, per capita income and infant mortality rate. This paper aims at testing the hypothesis that the ongoing Covid - 19 pandemic has an impact on crime rate in the country. The GLS estimates (using the software STATA) provide two main conclusions. Firstly, change in unemployment rate is one of the most statistically significant factors that influences the crime rate as it can be observed that when unemployment changes by one unit the number of FIRs registered increases on an average by 2185 cases. This relationship can be explained logically as due to the ongoing pandemic a lot of people have lost their jobs and thus people have started to get into criminal activities to make ends meet. Secondly, another statistically significant variable is crime rate itself, as it can be observed that due to the pandemic the number of FIRs registered increased by 11,422 cases on average in the country. Thus, it is extremely important to control the increasing number of crimes in the country to be able to avoid the socio-economic consequences. Conscious lifting of lockdown and restrictions will help us avoid such unwanted consequences.

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