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Highlights

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Discovering Thoughts, Inventing Future

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Impact of Public and Private Investment on GDP Growth in Bangladesh: Crowding-in or Out?

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Abstract- The study investigates into the impact of public and private investment on GDP growth in Bangladesh over the period 1980-2016 within ARDL framework. It also enquires into the causal relationship between investment (public and private) and GDP growth using Block Exogeneity Wald Test. The study primarily finds that there exists a significant impact of both public and private investment on GDP growth in the long run. In the short run, public investment does not affect, but private investment has a positive impact on GDP growth. The study also uncovers a bidirectional association between public investment and GDP growth whereas unidirectional relationships from private investment to GDP growth and from public investment to private investment. Consequently, public investment crowds-in private investment. Therefore, increase in public investment is critical to moving to the next level of the country's growth.

Keywords: public investment, private investment, GDP growth, crowding-in and -out effects, ARDL bounds te.st.

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Impact of Public and Private Investment on GDP Growth in Bangladesh: Crowding-in or Out?

Md. Monirul Islam [α], Asif Hossain [σ] & Mohammad Tareque, PhD [ρ]

Abstract- The study investigates into the impact of public and private investment on GDP growth in Bangladesh over the period 1980-2016 within ARDL framework. It also enquires into the causal relationship between investment (public and private) and GDP growth using Block Exogeneity Wald Test. The study primarily finds that there exists a significant impact of both public and private investment on GDP growth in the long run. In the short run, public investment does not affect, but private investment has a positive impact on GDP growth. The study also uncovers a bidirectional association between public investment and GDP growth whereas unidirectional relationships from private investment to GDP growth and from public investment to private investment. Consequently, public investment crowds-in private investment. Therefore, increase in public investment is critical to moving to the next level of the country's growth.

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I. Introduction

GDP growth as well as the development of a country bank on its capability to invest and utilize its resources efficiently for aggregate production. Even, growth cannot be achieved with the lack of investment in adequate quantity and quality. Thus, GDP growth is the cause and outcome of investment (Bayraktar, 2003). The general assumption of economic theory reveals that both public and private investments have a pivotal role in boosting up GDP growth. Many studies strived to show that public and private investments have a dual impact on GDP growth, which may be positive or negative through crowding-in and crowding-out effects respectively (Saidjada and Jahan, 2016). Besides, in the short and long run, both public and private investment cause increase in production of a country to create employment opportunity, stimulate trade and finally, GDP growth to reach its optimality (Nwakoby and Bernard, 2016).

There are two distinct opinions prevailed in the analysis of economic theory, Keynesians and Neo-classical with rival views concerning the impact of public and private investment on GDP growth of a country. Keynesians opined that public investment is the tool of government that increases production of a country, which is included in aggregate demand resulting in increasing employment opportunities for the people. This aggregate demand has multiplier effects on output (Blinder, 2008). Keynesians also stated that private investment has a significant effect in the short and long run and it happens as public investment accelerates it through building infrastructure, providing energy and other capacity enhancing human resource development projects and initiatives (Mohsin and Manmohan, 1997). Neo-classical views stated that, as the public investment increases at the cost of private spending, it helps transform the private sector into the public sector. This sort of transfer of private investment impacts negatively on GDP growth and brings about crowding-out effect on private sector and the shift of public investment vice versa, which eventually makes the growth of economy sluggish (Sandler and Hartley, 1995). The modern views differ with that of Keynesian and Neo-classical views, pointing out that public investment as a government instrument has no multiplier effect to boost up growth, but actually, it has this kind of effect on GDP growth in a negative sense (Smaldone, 2006; Dunne, 2012; Musayev, 2013).

As a developing country of South Asia, Bangladesh witnessed several socio-economic and political perils, and natural calamities from its inception to present, which sometimes brought about quasi-stagnant situation in all sectors of the country in particular economic sector. Despite these all sorts of predicament, the country is still going forward maintaining its average GDP growth at more than 6 percent for almost a decade. Having this average growth continuance, Bangladesh has settled its dreams to reach the status of middle-income country by 2021 as set by the World Bank. The trajectory of development the country has achieved through the attention and initiative employed by both government and private entrepreneurs going through expenditures and investments in their variance of volumes and qualities. The series of schemes and projects taken by both the government and private sector have helped reach the trade at its apex thereby, achieving the rank of the 44th country regarding GDP growth across the world (World Bank, 2015).

The study is distinctive in myriad of ways as it has incorporated the ratio of the lagged value of GDP as the dependent variable, the lagged value of both the

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public and private investment as independent variables, and the terms of trade (TOT) as a control variable. To analyze the variables of the study, the ARDL Bounds Testing technique is used for regression. The study has used time series data collected from World Bank Development Indicators (WDI) and the globale-conomy.com over the year from 1980 to 2016—the period crucially marks out the more changing but stable economic situation the country witnesses regarding the degree of freedom in the policy-making domain. Previous studies barely covered this time and study technique along with the combination of relevant variables as used in the current study to investigate into the impact of public and private investment on GDP growth in Bangladesh. Also, Block Exogeneity Wald Test is employed to detect the existence of causal relationship from both the public and private investment to GDP growth.

The study is of five sections. Section I points out the introduction to the study. Section II underscores the literature review and the core findings of related studies. Section III outlines the methodology of the study including the data and model specification. Section IV represents the results attained, and lastly, section V makes the findings of the study concise, and it comes to an end with policy recommendations.

II. Review of Literature

A good number of relevant literature elucidating the case of developing countries have been studied.

Empirical studies on the impact of public and private investment on GDP growth are quite widespread. Despite this, some researches followed by the empirical evidence of Aschauer (1989a, 1989b) and Munnell (1990) on the relationship between public investment and economic infrastructural development, and GDP growth are very noteworthy. All these studies found a statistically significant relationship of public investment with GDP growth. Studies conducted by Barro (1991); Barro and Sala-i-Martin (1992); Mankiw, Romer and Weil (1992) discovered that the aggregate investment (public and private) has a significant role on the long run growth and the convergence in real per capita incomes. Mohsin and Manmohan (1997) unmasked that public investment in infrastructure and the human capital formation may enhance the efficiency of private capital and be useful for GDP growth. They also found that some instruments of public investment may be complementary to private investment to spur GDP growth. The complementary may take place regarding public investment in infrastructure that increases the marginal productivity of private capital.

Karim, Rahaman, and Ali (2005) found that there exists significant impact of public and private investment on the GDP growth in Bangladesh. In another word, the marginal productivity of both public and private investments is differentiated in the context of Bangladesh. Further, the study showed that private investment plays a significant role in the growth process of the country. Rabnawas and Jafar (2015) conducted an empirical study that showed there is a positive relationship between GDP and public investment in the short run and increase in GDP causes a rapid increase in public investment in Pakistan. The study applied the Granger causality test that found the bi-causal relationship existed between public investment and GDP growth. The causality ran from GDP to public investment and equally, from public investment to GDP.

Mustafa, Kivilcim, and Aysit (2002) uncovered some evidence of the crowding-out effect of total government investment on private investment. Their study showed that there was no significant impact of public infrastructural investment on private investment in the long run. But the study found several complimentary between public and private investment over the short and medium run. The result of the study suggested that for the public investment, the chronic macroeconomic instability appears as an acute problem and has stopped, or even reversed, in the long run comple-mentaries. Majumder (2007), and Hasan and Salim (2011) investigated the crowding-out hypothesis in the case of Bangladesh. Employing the Johansen co-integration approach, Majumder (2007) found out the presence of a crowding-in effect in the long run for the period 1976-2006. On the other hand, Hasan and Salim (2011) showed a crowding-out impact of public investment in the short and long run for the period of 1981-2003 in Bangladesh. Saidjada and Jahan (2016) found that public investment negatively affects private investment both in the long run and short run. It also suggested that public investment crowded out the private investment. The study estimated a model with three different specifications in the ARDL bounds testing framework using real private investment, real public investment, real GDP, the real interest rate, and a dummy variable for liberalization.

It appears that very few studies have keenly covered the impact of public and private investment simultaneously on GDP growth and no study found has taken the terms of trade (TOT) as a control variable particularly in the context of Bangladesh. The inclusion of TOT as a control variable has significantly valued the study as Bangladesh penetrated into the spectrum of open market economy predominantly via trade liberalization in 1990. The existing study thus corresponds to a broad picture relating to the effect of public and private investment on GDP growth of Bangladesh regarding trade. Besides, there is the absence of such relevant as well as exclusive technique and variable specification in the previous studies. Instead, comprehensive and rigorous researches on this issue are essential to immaculately recognize the effect

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of public and private investment on GDP growth in Bangladesh.

III. Methodology

a) Variable and Model Specification

In this study, Auto-Regressive Distributive Lag (ARDL) technique is used by choosing the best possible lag for all the variables. The dependent variable is GDP growth, and the independent variables are public investment and private investment, and the terms of trade (TOT) has taken as a control variable in the study.

The aggregate production function of Bangladesh economy may be defined as follows:

$$Y = \alpha f(k, l) \quad \text{(i)}$$

Where α = Technological Shift Parameter
k = Capital
l = Labor
f = Potential Aggregate Output

Bangladesh as a labor surplus country, it is also reasonable to assume that at the margin, the growth of labor force does not affect the aggregate output. In this regard, aggregate potential production function has been assumed as follows:

$$Y = \alpha f(k^g, k^p) \quad \text{(ii)}$$

k^g = Public or Government's Capital Formation
k^p = Private Capital Formation

Then, to test whether the public and private sectors' investment have differential impacts on growth, expressing equation (ii) in growth terms, we can have:

$$\frac{\Delta Y}{Y} = \left[\alpha \frac{\delta f}{\delta k^g}\right] \frac{\Delta k^g}{Y} + \left[\alpha \frac{\delta f}{\delta k^p}\right] \frac{\Delta k^p}{Y} + \frac{\Delta \alpha}{\alpha} \quad \text{(iii)}$$

It can be written for estimation purposes as follows:

$$\frac{\Delta Y}{Y(-1)} = \alpha_0 + \alpha_1 \frac{IG}{Y(-1)} + \alpha_2 \frac{IP}{Y(-1)} \quad \text{(iv)}$$

Where $\alpha_0 = \frac{\Delta \alpha}{\alpha}$

$$\alpha_1 = \alpha \frac{\delta f}{k^g}$$

$$\alpha_2 = \alpha \frac{\delta f}{k_p}$$

From the estimation, we can draw the growth model in the following way:

$$\Delta Y = \alpha_0 + \alpha_1 IG + \alpha_2 IP + \alpha_3 TOT + \mu_\tau \quad \text{(v)}$$

The constant term α_0 is assumed to capture the growth in productivity as well as other left-out exogenous variables. α_1 is the marginal productivity of public or government capital (k^g) and α_2 is the marginal productivity of private capital (k^p). α_3 is the coefficient of the terms of trade (TOT).

b) Apriori Issues

If the impacts of public and private investment are equal to GDP growth, this will imply that the relevant marginal productivity is the same, where $\alpha_1 = \alpha_2$. Besides, the higher impact of public investment than private investment on GDP growth leads us to expect that $\alpha_1 > \alpha_2$; contrarily, the higher impact of private investment makes us expect that $\alpha_2 > \alpha_1$.

Broadly, public investment causes crowding-out effect if the government utilizes scarce physical and financial resources that would shrink the private investment. Moreover, the financing of public sector investment through taxes, issuance of debt, or inflation would lower resources available to the private sector.

In contrast, public investment in infrastructure, energy and other capacity enhancing projects of human resources development are complementary to private investment, a situation popularly known as the crowding-in effect. Public goods/investment of this type can help increase the productivity of capital, demand for private output and savings. Therefore, α_2 subsumes the effects of public investment and vice versa.

c) Regression Technique and the Other Tests

A. Augmented Dickey-Fuller (ADF) and Philips Perron (PP) unit root tests have been carried out to make sure the integration of variables, which are within their level and first difference form.[1] ADF test shows the following equation:

$$\Delta Y_t = \mu + \beta_t + \delta Y_{t-1} + \sum_{j=1}^{k} \alpha_j \ \Delta Y_{t-j} + \varepsilon_t \quad \text{(vi)}$$

Here, Δ is the difference operator; t represents time trend; ε is the error term; Y_t is the series, and k indicates the lag. Same null hypothesis and asymptotic distribution with ADF test are shared in PP test.

B. To check the presence of long run co-integration among the variables, Ordinary Least Squares (OLS) based Autoregressive Distributive Lag (ARDL Bounds Testing using Akaike Information Criteria has been used. The basis of ARDL regression model is shown below:

$$Y_t = \mu + \alpha_0 X_t + \alpha_1 X_{t-1} + \cdots + \alpha_p X_{t-q} + \beta_1 Y_{t-1} \cdots + \beta_k Y_{t-k} + \varepsilon_t \quad \text{(vii)}$$

The form of ARDL Regression model employed in this study is given below:

$$Y_t = \mu + \sum_{i=1}^{n=3} DY_t + \sum_{i=0}^{n=3} DIG_{t-i} + \sum_{i=0}^{n=3} DIP_{t-i} + \sum_{i=0}^{n=3} DTOT_{t-i} + Y_t + IG_{t-1} + IP_{t-1} + TOT_{t-1} + \varepsilon_t \quad \text{(viii)}$$

Here μ shows the intercept term, n and i represent the maximum and the minimum number of

[1] The null hypotheses of both the tests are the same that discloses that the concerned time series have a unit root or possesses a stochastic trend.

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lags respectively. And, the remaining variables are shown in the preceding interpretation section.

C. VAR Granger Causality/Block Exogeneity Wald Tests are done following the procedure introduced by Granger (1969, 1986) to know about the direction of causality between the dependent variable and the independent variables.

$$E_t = \alpha + \sum_{i=1}^{M} \beta_i Y_{t-i} + \sum_{j=1}^{N} \gamma_j E_{t-j} + \mu_t \quad \text{(ix)}$$

$$Y_t = \delta + \sum_{i=1}^{R} \mu_i E_{t-i} + \sum_{j=1}^{S} P_j Y_{t-j} + v_t \quad \text{(x)}$$

Here M, N, R, and S are usually determined based on lag selection criterion such as Akaike Information Criterion (AIC) where μ_t and v_t are white noise error processes. Besides, residual variables and signs are described in the previous interpreting section.

D. To make sure the residuals free from error, Normality Test, Serial Correlation LM Test and Heteroskedasticity Test (Breusch-Pagan-Godfrey) are used. Besides, Recursive Estimations (CUSUM and CUSUM of Squares) are employed to understand whether the model is stable.

IV. Results and Interpretations

a) Unit Root Tests

Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit-root tests are utilized in the study avoiding the non-stationary issue.

Table 4.1: Unit Root Test Results*

Variables	ADF test Statistics				PP test Statistics				Order of Integration
	I(0)		I(I)		I(0)		I(I)		
	Constant	Constant & Trend	Constant	Constant & Trend	Constant	Constant & Trend	Constant	Constant & Trend	
LGDP	-5.17 (0.00)	-8.86 (0.00)	-14.89 (0.00)	-14.74 (0.00)	-5.40 (0.00)	-8.54 (0.00)	-21.91 (0.00)	-23.21 (0.00)	I(0)
LIGR	-3.57 (0.01)	-3.40 (0.06)	-8.31 (0.00)	-8.11 (0.00)	-3.62 (0.01)	-3.50 (0.05)	-8.08 (0.00)	-7.90 (0.00)	I(0)
LIPR	0.2330 (0.9710)	-1.7338 (0.7152)	-5.1365 (0.0002)	-5.2933 (0.0007)	-0.04 (0.94)	-1.86 (0.65)	-5.29 (0.00)	-5.41 (0.00)	I(I)
TOT	-0.86 (0.78)	-3.09 (0.12)	-7.48 (0.00)	-7.37 (0.00)	-0.75 (0.81)	-2.97 (0.15)	-7.48 (0.00)	-7.37 (0.00)	I(I)

**Results show adjusted t-stats with associated probabilities in parentheses.*

Results above (Table 4.1) show that all the variables have been integrated within their level and first difference form.

b) ARDL Bound Testing Regression

The ARDL model used in the study has taken one lagged value for GDP and private investment. No lagged value is considered for the public investment, and the lagged value of the terms of trade (TOT) is 3. Here in the regression, both the R-squared and adjusted R-squared values are 79% and 72% respectively, meaning that 72% change in GDP can be explained by using this model. As the F-statistic value is 0.00 and Durbin Watson stat is 2.24, indicating that this model is free from autocorrelation.

c) ARDL Regression Output for the Long Run with Bounds Test

Table 4.2: ARDL Long Run Form and Bounds Test

Level Equation

Variables		Std. Error	t-statistic	Prob.
IG	0.982209	0.388092	2.530864	0.0183
IP	0.433821	0.176959	2.451533	0.0219
TOT	-0.000496	0.000192	-2.590132	0.0161
@TREND	-0.003644	0.001551	-2.350388	0.0273
EC = GDP - (0.9822*LAG_IGR + 0.4338*LAG_IPR -0.0005*TOT -0.0036 *@TREND)				
F-statistic	9.65	Level of Significance	I(0)	I(I)
		10%	2.97	3.74
		5%	3.38	4.23
		2.5%	3.8	4.68
		1%	4.3	5.23

The 'Level Equation' output demonstrates the long run relationship between the dependent and independent variables. In this equation, public investment has a higher impact than private investment on GDP growth in the long run at 1% significance level as the coefficient of public investment is higher (0.982209). This long-run association of public and private investment with GDP growth is proven in economic theory in a way that these two types of

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investment have a differential impact on GDP growth (Mohsin and Manmohan, 1997). Here it is also traced that in the long run, the terms of trade (TOT) in Bangladesh is also highly associated with GDP growth at 1% significance level; but the coefficient is negative, indicating that the TOT of Bangladesh is in falling line following Prebisch-Singer Hypothesis.[2] The relevant F-statistic of 9.65 is higher than the upper bound value at 1% level of 5.23, leading to a co-integrating equation in the ARDL Error Correction (ECM) regression showing the short run coefficients and speed of adjustment in the long run.

d) ARDL Regression Output for the Short Run with Coint Eq(-1)

Table 4.3: ARDL Error Correction (ECM) Regression

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	0.053223	0.007046	7.553230	0.0000
IP	0.623884	0.152005	4.104370	0.0004
D(TOT)	-0.000213	7.85E-05	-2.715521	0.0121
D(TOT(-1))	0.000195	8.00E-05	2.434167	0.0227
D(TOT(-2))	0.000219	8.04E-05	2.720601	0.0119
CointEq(-1)*	-0.811840	0.108189	-7.503922	0.0000
R-squared		0.739226		
Adjusted R-squared		0.692659		
Prob (F-statistic)		0.000000		
Durbin-Watson stat		2.248306		

The 'ARDL Error Correction (ECM) Regression' output demonstrates the coefficients of the regressors in the short run. It shows that public investment has no impact on GDP growth in the short run.[3] The coefficient of private investment is (0.623884), indicating the significant impact of this variable on GDP growth in the short run. TOT is statistically significant, and it has an impact on the GDP growth in the short run. The current year's coefficient value of TOT is negative; but the 1st and 2nd lagged year's values are shown as positive, meaning that their added value will be positive. It indicates that TOT has a positive impact on GDP growth in the short run.

Beside this, ECM regression output narrates the speed of adjustment from the error correction term drawn from the Levels Equation (Table 4.2) with the combination of the regressors named CointEq (-1). In this model, this particular regressor shows the speed of adjustment to equilibrium in each period of the study. The coefficient of this variable needs to be negative with a probability value at or below 5% level while the original regressors are co-integrated. In this model, the value of the CointEq (-1) is -0.811840. So, it indicates that there exists co-integration between the dependent variable and the concern regressors in the model. The result of the model also shows that 81% disequilibrium is adjusted in the current period and it takes almost one year and four months for the economy to return equilibrium after any shock. As being the adjusted R-squared value (0.69) adequately high with the value of F-statistic probability at 0, it can be safely said that this model satisfies the goodness of fit.

e) VAR Granger Causality Test Results

This sub-section elucidates the result of VAR Granger Causality/Block Exogeneity Wald Tests of the different variables of the study. The summary of the results is shown in the following table:

Table 4.4: Relative Impact of Public and Private Investment on GDP growth regarding VAR Granger Causality/Block Exogeneity Wald Tests

From	To	Chi-sq	Prob.	Result
IG ⟷	Y ⟷	6.507 ⟷	0.038 ⟹	Bidirectional
Y ⟷	IG ⟷	6.256 ⟷	0.043	
IP ⟶	Y ⟶	16.777 ⟶	0.000 ⟶	Unidirectional
IG ⟶	IP ⟶	12.517 ⟶	0.001 ⟶	Unidirectional

[2] The Prebisch-Singer hypothesis coined by Raul Prebisch and Hans Singer is usually considered to be the proposition that the net barter terms of trade between primary products and manufacturing goods are subject to a long-run downward trend (Toye, 2003). It is eligible for Bangladesh as the coefficient of TOT is negative as per the Long Run Bounds test of the current study.

[3] Following the Neo-classical prediction, if public investment impacts significantly on GDP growth in the short run, there might be a crowding-out effect on the economy (Hasan and Salim, 2011). The public investment financed by domestic borrowing reduces the availability of funds for private investment. This situation leads to the higher interest rate, which, one at a time, shrinks private investment under the crowding-out effect. In the existing study, in the short run, public investment does not affect the GDP growth. It does not mean that public investment causes GDP growth. Regarding consumption, public/government expenditure has a higher impact in the short run on different public-oriented programs like social safety net program, wages and salaries and other consumption-related sectors in Bangladesh. The current study contrasts with that of Neo-classical prediction as found in the study of Hasan and Salim (2011); but espouses the crowding-in effect of public investment that accelerates the private investment as government investment is employed in public-concern schemes like infrastructures, energy, education, human resource development programs for achieving long-run output as prevailed within Keynesian framework (Saidjada and Jahan, 2016).

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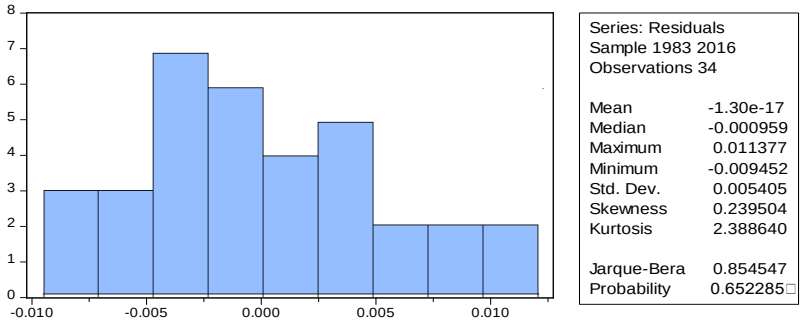
To analyze the causal relationship among the variables, the VAR Granger Causality/ Block Exogeneity Wald Tests is applied in the study shown in Table 4.4. The result reported shows that the relationship between public investment and GDP growth is bidirectional at 5% significant level. On the other hand, there exists unidirectional association from private investment to GDP growth and from public investment to private investment respectively at 1% significant level in which private investment causes GDP growth, and public investment causes the private investment. The existence of the effect of public investment thus brings about the crowding-in effect on private investment. The causality test of the study resembles the observations ordained in the study of Mohsin and Manmohan (1997).

f) Residual Diagnostic Results

Table 4.5: Summary of the Results of Residual Diagnostic Tests

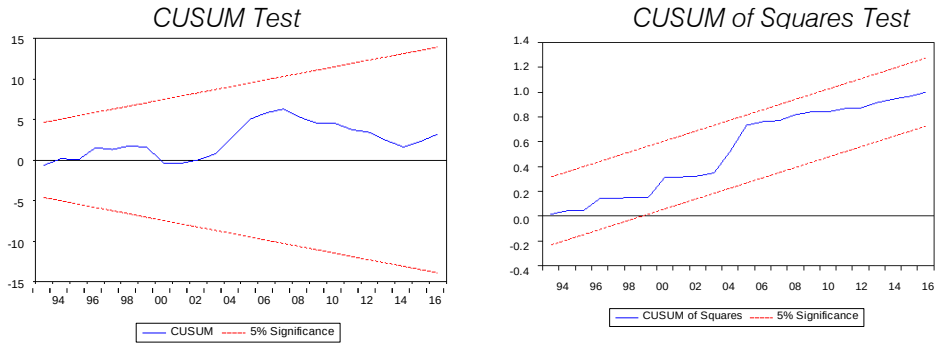
Breusch-Godfrey Serial Correlation LM Test	
Prob. F (2,22)	0.4285
Prob. Chi-Square (2)	0.2835
Heteroskedasticity Test: Breusch-Pagan-Godfrey	
Prob. F (9,24)	0.2749
Prob. Chi-Square (9)	0.2559
Prob. Chi-Square (9)	0.9173
Normality Test	
Jarque-Bera	0.854547
Prob	0.652285



The result shown above clarifies that there exists no serial correlation and heteroskedasticity, indicating that this model's residuals are normally distributed.

g) Stability Diagnostic Results

Recursive Estimations



Graph 4.3: Summary of the Stability Diagnostic Results

These two graphs (CUSUM and CUSUM of Squares) visualize that the drawn lines lie within the 5% critical line, making sure the stability of the model.

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V. Findings, Conclusion and Policy Recommendations

a) Findings

The objective of this study is to investigate into the impact of public and private investment on GDP growth and identify the causal relationship between investment (public and private) and GDP growth of Bangladesh. To this end, the study analyzes the impact of public and private investment on GDP growth adopting the growth model of Production Function. The findings of the study conclude that there exists a significant impact of both the public and private investment on the GDP growth of Bangladesh in the long run (Table-4.2). Public investment has no effect on GDP growth in the short run, but the private investment has (Table-4.3). According to VAR Granger Causality/ Block Exogeneity Wald Tests, there exists a bidirectional relationship between public investment and GDP growth of Bangladesh and unidirectional association from private investment to GDP growth and public investment to private investment (Table-4.4). The impact of public investment on private investment shows that public investment crowds-in the private investment.

b) Conclusion

The study result shows that public investment has a significant impact on the GDP growth in the long run while private investment also has significant effect both in the short and long run. Apart from this, public investment has a significant impact on GDP growth of Bangladesh with their bidirectional association and private investment has a unidirectional relationship with GDP growth. Notably, public investment causes the private investment with unidirectional relation, meaning public investment crowds-in private investment. The study result is akin to that of Mohsin and Manmohan (1997) and contrasts with the study results found by Rabnawas and Jafar (2015) and Saidjada and Jahan (2016). It is caused due to the use of unique variables and the variance of times of the existing study. In recent years, the government of Bangladesh has been emphasizing public investment to attain higher GDP growth in the years to come. The current study findings may have significant implications in exploiting the potentials of private investment by way of public investment as it (public investment) crowds-in the private investment to be more effective in the growth process of Bangladesh.

c) Policy Recommendations

The policy recommendation is straightforward that may be associated with the facilitation of private investment. In this regard, the government may keep on increasing public investment. As public investment in Bangladesh crowds-in the private investment, increase in public investment is critical to moving to the next level of the country's growth.

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Effet De La Gouvernance Sur L'efficacité De L'aide Publique Au Développement Dans La CEMAC

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Resume- L'objet de ce travail est de vérifier l'impact de la gouvernance (indicateurs tels que la démocratie et la corruption) dans le lien existant entre l'aide publique au développement et la croissance économique dans les pays de la zone CEMAC. Ainsi, à partir de notre modèle de données de panel dynamique mettant en relation la croissance économique et les variables explicatives notamment l'aide publique au développement et nos deux indicateurs de gouvernance retenus, nous utilisons la méthode des Moments Généralisés (GMM) pour estimer notre modèle ; notre échantillon étant constitué des six pays de la zone CEMAC (Cameroun, Congo, Gabon, Guinée Équatoriale, République de Centrafrique et Tchad) et notre période d'étude s'étend de 1996-2013. Les résultats obtenus indiquent la gouvernance n'a d'effet sur l'efficacité de l'aide publique au développement qu'à long terme.

Motscles: *aide publique au développement, gouvernance, croissance économique, cemac.*

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Effet De La Gouvernance Sur L'efficacité De L'aide Publique Au Développement Dans La CEMAC

Dsangue Tchana Christianne Laure [α], vangvaidi Albert[σ], Dazoue Dongue Guy Paulin[ρ] & Nembot Ndeffo Luc [ω]

Resume- **L'objet de ce travail est de vérifier l'impact de la gouvernance (indicateurs tels que la démocratie et la corruption) dans le lien existant entre l'aide publique au développement et la croissance économique dans les pays de la zone CEMAC. Ainsi, à partir de notre modèle de données de panel dynamique mettant en relation la croissance économique et les variables explicatives notamment l'aide publique au développement et nos deux indicateurs de gouvernance retenus, nous utilisons la méthode des Moments Généralisés (GMM) pour estimer notre modèle ; notre échantillon étant constitué des six pays de la zone CEMAC (Cameroun, Congo, Gabon, Guinée Équatoriale, République de Centrafrique et Tchad) et notre période d'étude s'étend de 1996-2013. Les résultats obtenus indiquent la gouvernance n'a d'effet sur l'efficacité de l'aide publique au développement qu'à long terme. Il apparait donc urgent pour les dirigeants des pays receveurs de s'atteler à reformer la qualité de leur situation démocratique tout améliorant les mesures de lutte contre la corruption pour une utilisation efficiente de l'aide notamment l'investissement dans les domaines qui pourraient propulser les pays de la zone CEMAC vers un accroissement de leur croissance.**

Motsclés: aide publique au développement, gouvernance, croissance économique, cemac.

I. Contexte de L'etude

La relation APD – croissance économique dans les pays en développement a suffisamment alimenté de nombreux débats houleux chez les politiques, les économistes et même les spécialistes du développement. L'aide publique au développement est-elle source de croissance économique ? Pour les uns comme susmentionnés, les flux d'APD n'ont pas d'effets sur la croissance et peuvent même parfois l'endommager dans les pays bénéficiaires. Pour d'autres, les flux d'APD stimulent la croissance économique dans les pays bénéficiaires. Pour une dernière catégorie, les flux d'APD ont un impact positif sur la croissance économique mais cet impact positif est conditionné par l'existence de bonnes institutions, un bon environnement politique ainsi que bien d'autres éléments (Burnside et Dollar, 2000 ; Banque Mondiale, 1998 ; Easterly et al. 2004). Dans les pays pauvres bénéficiaires, la baisse de l'aide s'explique par le fait que son octroi est de plus en plus soumis à un nombre impressionnant de contraintes et d'exigences des bailleurs qui poussent les pays concernés à en réduire la demande. Il s'agit, notamment, des conditions de bonne gouvernance. L'aide n'est utile et efficace que dans les pays à faibles revenus qui pratiquent de bonnes politiques économiques et disposent d'institutions de qualité (Burnside et Dollar, 2000).

On voit donc les indicateurs de « gouvernance » apparaitre dans la nouvelle littérature des APD comme éléments conditionnant l'impact des flux d'APD sur la croissance économique. En effet, l'étude de Burnside et Dollar (1997) qui a constitué une réponse aux détracteurs de l'aide publique au développement démontre que l'efficacité de l'aide est conditionnée par l'amélioration de la gouvernance dans les pays bénéficiaires.

Pour certains, une bonne gouvernance démocratique permet une meilleure utilisation de l'APD qui permettra de maximiser sa productivité ; par ailleurs, la démocratie constitue chez les donateurs un critère de décision d'octroi de l'APD ; les donateurs seront susceptibles de donner plus d'APD aux pays avec de meilleures qualités démocratiques (Akramov, 2012). Pour Burnside et Dollar (2000), de bonnes politiques macroéconomiques constituent une condition fondamentale pour que l'APD booste la croissance ; ils ont trouvé que l'APD booste la croissance dans les pays avec de bonnes politiques et ont un impact négatif dans les pays avec de mauvaises politiques. L'une des caractéristiques de la bonne gouvernance (qui conditionne l'efficacité de l'aide) est que les institutions et les procédures mises en place combattent la corruption et les comportements déviants. En effet, la gouvernance est d'une importance cruciale pour la création d'un environnement commercial attractif et propice à l'investissement. Elle est, dès lors, vitale pour assurer le développement économique et, par conséquent, pour s'attaquer à la pauvreté. Par contre, la mauvaise gouvernance notamment la corruption est une réalité largement répandue dans l'ensemble des économies en développement tant au niveau du secteur public que du secteur privé (Akpo et Somakpo, 2006).

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En outre, depuis 1994, le climat politique en zone CEMAC se caractérise par des coups d'Etats ou des tentatives, des conflits internes et transfrontaliers, des mutineries à répétition, des élections sources de violences et de contestations, la situation des droits de l'homme sujette à controverses. Ce contexte ne favorise pas l'essor de la sous-région mais contribue à alimenter les craintes des investisseurs et de la communauté internationale.

L'objectif de ce travail est de déterminer l'incidence de la gouvernance sur la relation aide publique au développement et croissance économique en zone CEMAC.

II. Etats des Lieux de la Gouvernance en Zone CEMAC

a) Situation politique

De manière générale, la région Afrique centrale est caractérisée par une certaine fragilité politique qui se retrouve à différents niveaux. Au niveau national, la situation pour un certain nombre de pays de l'Afrique centrale nécessite encore des progrès en termes de stabilité et de bonne gouvernance. Cependant, une amélioration sensible peut être observée en termes de mise en place des structures démocratiques nationales, et certains progrès observés dans le domaine de la gouvernance politique (notamment au niveau électoral) sont encourageants. Les tensions politiques persistent néanmoins dans la région et trouvent généralement leur origine dans l'absence d'alternance politique, les faiblesses dans la protection des droits de l'homme, le manque de transparence dans la gestion des ressources, et la faiblesse et marginalisation de la société civile. La consolidation du système juridique dans le cadre de l'État de droit est un enjeu permanent dans la région. La faiblesse des médias, le peu dediffusion de la presse écrite et la liberté d'expression limitée des journalistes dans certains pays, nuisent aussi au développement de la démocratie dans la région. L'idée générale étant que, en détruisant les actifs physiques et humains et en détournant les dépenses publiques d'activités productives, l'instabilité politique déprime la croissance économique. Collier (1999) trouve qu'en moyenne une guerre civile fait perdre habituellement à un pays plus de 2% par an de son PIB par habitant par rapport à ce qu'il aurait réalisé sans la guerre. Pour la Banque Mondiale (2001), l'instabilité politique est l'un des facteurs internes qui explique le déclin de la croissance économique des pays africains depuis le début des années 1970.

Dans la plupart des tensions et conflits dans la région, il existe des interactions entre dimensions intérieures et extérieures au pays. L'impact des conflits aux portes de la région, surtout dans la zone des Grands Lacs et au Darfour, constitue un facteur d'instabilité. Si la situation s'est améliorée depuis la fin des années 1990, certaines crises persistent. La situation sécuritaire diffère selon les pays: le Tchad subit une crise intérieure et extérieure, alors que la RCA, en situation post-conflit, peine à éliminer les éléments perturbateurs issus des crises récentes. Le Congo est quant à lui dans une phase finale d'apaisement. Ce contexte.

Depuis la création de la CEMAC, le 16 mars 1994, les pays de l'institution ont connu chacun des fortunes diverses. Cela s'est traduit par des périodes de relative stabilité politique et/ou de croissance économique soutenue et un environnement social acceptable. Seulement la majeure partie du temps, les pays de la CEMAC se sont confrontés à des crises politiques et socioéconomiques conduisant à des conflits importants. Ce contexte a contribué à pérenniser la pauvreté au sein d'une frange considérable de la population de façon à la rendre vulnérable. Aujourd'hui encore, des poches de tensions existent un peu partout au sein de la zone CEMAC et les indicateurs socioéconomiques ne sont pas toujours rassurants. Plusieurs paramètres, aussi bien internes qu'externes, expliquent ce contexte. De même, pris séparément, les situations se traduisent différemment au Cameroun, au Congo, au Gabon, en Guinée équatoriale, en RCA et au Tchad. Les pays de la sous-région Afrique centrale sont réputés pour leurs climats politiques plutôt instables. Les membres de la CEMAC n'échappent pas à cette caractéristique et ce d'autant plus que la création de l'institution n'a pas véritablement modifié cette tare, à quelques rares exceptions près. Ce contexte ne favorise pas l'essor de la sous-région mais contribue à alimenter les craintes des investisseurs et de la communauté internationale.

De manière générale, depuis 1994, le climat politique en zone CEMAC se caractérise par des coups d'Etats ou des tentatives, des conflits internes et transfrontaliers, des élections sources de violences et de contestations, la situation des droits de l'homme sujette à controverses. Bien que n'ayant pas atteint la moyenne, la stabilité politique s'est améliorée passant de -1,5 en 2002 à environ -0,5 en 2013.

b) La démocratie

Dans la zone CEMAC, la démocratie devient de plus en plus une réalité affichée, même si sa pratique laisse parfois à désirer. La démocratisation a favorisé la liberté d'opinion, malgré l'inégale répartition du pouvoir entre le législatif, le judiciaire et l'exécutif qui détient généralement la réalité du pouvoir. Les politiques de libéralisation favorables à la privatisation, particulièrement dans les satellites de l'ancienne Union Soviétique (Congo) et dans certains pays conservateurs (Cameroun) sont de plus en plus prônées par les gouvernants. La politique économique est débattue actuellement au Parlement des pays de la CEMAC, ce qui n'était pas le cas il y a quelques années. La démocratie crée un cadre légal qui protège le droit des

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investisseurs qu'ils soient nationaux ou étrangers. Mais la démocratie n'est pas signe de la réussite si les institutions viables ne sont pas introduites et si les pays manquent des capitaux pour construire des infrastructures nécessaires, ce qui est le cas de plusieurs pays africains, aux dires d'Addison (2003). De plus, la démocratisation n'est pas synonyme de la stabilité macro-économique. Nous relevons que de façon générale la situation démocratique de la zone CEMAC n'a cessé de se détériorer durant notre période d'étude.

c) La corruption

La corruption est l'un des phénomènes socioculturels observés dans la plupart des administrations publiques (police, impôts, santé, douane, transport, etc.), mais aussi privées des pays du continent. Aucun indicateur de gouvernance n'attire sans doute plus l'attention des médias que l'indice de perception de la corruption (IPC) publié tous les ans depuis 1995 par « Transparence internationale » (TI). Les investisseurs, les bailleurs de fonds, les analystes et les universitaires s'en servent également abondamment. L'indice de perception de la corruption (IPC) de TI définit la corruption comme l'abus d'une charge publique à des fins d'enrichissement personnel. Établi à partir de données recueillies par 13 institutions internationales – parmi lesquelles la Banque mondiale, les banques asiatique et africaine de développement ou encore le Forum économique mondial – cet indice est compris entre zéro pour un pays perçu comme «hautement corrompu» et 100 pour un pays considéré comme «très vertueux». La Banque mondiale produit deux séries d'indicateurs de gouvernance. La première est publiée tous les deux ans depuis 1996 par Daniel Kaufmann et ses collègues du WBI. La seconde est composée des évaluations des performances des politiques et des institutions des pays (Country Policy and Institutional Assessments, CPIA), réalisées tous les ans par le personnel de la Banque mondiale (ses équipes pays) pour évaluer la qualité des politiques et cadres institutionnels des pays emprunteurs afin de lutter contre la pauvreté, promouvoir une croissance durable et utiliser judicieusement l'aide au développement. La corruption a pris de l'ampleur dans la sous-région CEMAC avec la montée de la pauvreté et la clochardisation du personnel administratif à la suite de l'implémentation des Programmes d'Ajustement Structurels (PAS) et la dévaluation économique au milieu des années 1990. La corruption a eu pour conséquences, de réduire les ressources des Etats, d'amoindrir les revenus des populations et surtout, de nuire aux climats des affaires et donc, de la libre circulation des facteurs de production de richesses.

L'aide publique au développement est concernée de deux manières par la corruption. La première est que les modalités d'aide au développement sont souvent « vulnérables » à la corruption. La deuxième est liée à l'éventualité que le flux d'aide contribue à des niveaux élevés de corruption dans les pays bénéficiaires.

Ces dernières années, les chercheurs ont essayé de déterminer quelles étaient les modalités de l'aide les moins susceptibles de générer de la corruption. Les preuves ont manqué pour différencier les avantages de l'appui au budget par rapport à l'appui au projet en matière de lutte contre la corruption. En revanche, il a été démontré qu'il est préférable d'utiliser d'autres modalités que l'appui budgétaire dans les pays qui reçoivent le plus d'aide internationale alors qu'il existe déjà un niveau élevé de corruption. L'aide publique au développement peut également générer de la corruption dans les pays bénéficiaires en apportant des ressources susceptibles d'être accaparées. Pourtant, l'efficacité de l'aide dépend en grande partie de la qualité des politiques publiques et de la gouvernance autant du côté des agences bilatérales de développement que des pays bénéficiaires. En l'absence de bonne gouvernance, l'effectivité de l'aide décline en raison des déperditions de fonds au niveau des projets de développement ou des budgets nationaux et ce en raison des problèmes de corruption. La corruption peut intervenir à toutes les étapes de l'aide internationale, de la définition du projet jusqu'au processus d'appel d'offre, de la mise en œuvre jusqu'à l'audit du projet. La corruption peut être créée en passant contrat avec des entreprises inefficaces et incompétentes pour livraison de services à des coûts trop élevés et dans une mise en œuvre d'aide aux projets inappropriée et parcellaire. Le danger de la corruption dans l'aide publique au développement est évident : l'assistance est détournée de ses objectifs de départ par des politiciens corrompus et des agents publics et elle est dépensée pour fournir des plus grandes opportunités d'enrichissement personnel. Ce sont les populations pauvres, les plus vulnérables et les personnes privées du droit de vote qui souffrent.

Ce phénomène qui gangrène pratiquement toute l'Afrique, a plus d'ampleur en zone CEMAC, dont les pays membres partagent les dernières places du classement. L'Indice de Perception de la Corruption avec les pays en perpétuel conflictualité Comme en témoigne le Baromètre mondial de la corruption 2009 publié par Transparency International. Il ressort de l'analyse de la corruption qu'elle n'est pas le fait le plus souvent du secteur privé, quand il fonctionne librement, mais d'abord du secteur public, livré à toutes les tentations des hommes de l'Etat. Les fonds d'aide publique venus des pays riches sont systématiquement détournés. La lutte contre la corruption passerait donc en priorité par l'introduction de la bonne gouvernance (Sommo Pende, 2010).

« L'Indice de perception de la corruption 2014 montre que les abus de pouvoir des responsables

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politiques et des hauts fonctionnaires entravent la croissance économique et les efforts de lutte contre la corruption », affirme José Ugaz, président de Transparency International.

En général sur la période d'étude, la situation s'est dégradée avec un regain à partir de 2005 en raison des pressions internationales pour le contrôle et l'assainissement des finances publiques afin de pouvoir bénéficier de l'initiative PPTE.

De manière globale, il ressort de notre analyse que la période de 1996 à 2013 a été marquée par un variation considérable du PIB de la zone et des flux d'aide reçus dus entre autre à la mise sur pieds des OMD, l'atteinte du point d'achèvement, la crise des subprimes, la reprise de l'activité par la suite.

Du fait de la montée en puissance de la notion de gouvernance, on assiste à une multiplication des bases de données internationales censées fournir des indicateurs de mesures de ses différentes dimensions.

Nous livrons ci-dessous quelques indicateurs les plus utilisés de nos jours sur la gouvernance au niveau international (d'après Sudders et Nahem, 2004 cités par Razafindrakoto M. et Roubaud F., 2007 et repris par Feulefack, 2011).

- L'OCDE, à travers l'initiative "Metegora" relève 144 approches différentes de mesures de la gouvernance parmi lesquels, il s'appuit sur des indicateurs tels que l'Indice de Perception de la Corruption (IPC) de Transparency international, le Mécanisme Africain d'Evaluation par les Pairs (MAEP) existant dans le cadre du Nouveau Partenariat pour le Développement de l'Afrique (NEPAD), et le "Worldwide GovernanceIndicator" (WGI) de la Banque Mondiale.
- La Commission Européenne élabore des "profils de gouvernance" depuis 2008, qu'elle utilise pour évaluer la qualité de la gouvernance des pays auxquels elle apporte un appui au développement.
- Au sein du NEPAD, l'évaluation de la gouvernance se fait par le Mécanisme Africain d'Evaluation par les Pairs (MAEP).
- CPIA (Country Policy and InstitutionalAssessment) de la Banque mondiale a recours à une fiche d'évaluation "passe-partout" Controversée. L'Evaluation politique et des institutions nationales pour noter les gouvernements emprunteurs. Les notations de la CPIA sont préparées tous les ans et consistent en 20 critères (rassemblés en quatre groupes) liés à la performance de la politique et des institutions d'un gouvernement.
- ICRG (International Country Risk Guide) de PoliticalRisk Services Group depuis 1980 et connu sous la rubrique de risques politiques. Ces indicateurs représentent quatre mesures de qualité institutionnelle : l'efficacité gouvernementale ou la qualité de la bureaucratie, le niveau de la corruption, le rôle de la loi et la démocratie.
- IPC (Indice de Perception de la Corruption) de Transparency International qui, lancé pour la première fois en 1995, couvrait 102 pays et aujourd'hui, couvre 177 pays.

III. Revue de la Littérature

Afin d'estimer l'efficacité de l'aide en termes decroissance, Burnside et Dollar (1997) estiment une équationde croissance qui met en relation une variable d'aide et unterme d'aide en interaction avec un indicateur de politique économique. La qualité des politiques macro-économiques est déterminée par la maîtrise de l'inflation, l'équilibre budgétaire et la mise en œuvre d'une politique d'ouverture commerciale. L'interaction de l'aide publique au développement avec l'indice de politique économique permet d'étudier l'impact des politiques économiques sur l'efficacité de l'aide au développement en termes de croissance. Leurs résultats économétriques montrent un coefficient positif et statistiquement significatif au seuil de 1% du terme croisé de l'aide avec l'indicateur de politique économique. Burnside et Dollar (1997,2000) concluent que l'aide n'est efficace en termes de croissance que dans un environnement macroéconomique de bonne qualité. Dans ce cas, l'aide n'est efficace en termes de croissance uniquement dans les pays en développement qui présentent de bonnes politiques économiques. On peut alors dégager le principe de sélectivité des pays bénéficiaires et le principe de conditionnalité basée sur la qualité des politiques économiques.

Burnside et Dollar (2000) concluent que l'aide au développement favorise la croissance économique seulement dans les pays qui adoptent de bonnes politiques macroéconomiques.

Easterly, Levine et Roodman (2004) ont constaté que les résultats obtenus par Burnside et Dollar (2000) ne font pas l'objet des tests de robustesse. Ils reprennent le modèle de Burnside et Dollar (2000) pour un échantillon plus large. Leurs résultats d'estimation montrent que le terme d'interaction entre l'aide reçu et l'indice de politique économique est statistiquement non significatif au seuil de 1%. Ils concluent que l'efficacité de l'aide au développement en termes de croissance ne dépend pas de politiques économiques menées par les pays récipiendaires.

Selon Bauer (2000), l'aide constitue une ressource discrétionnaire qui peut être utilisée par l'exécutif à des fins de manipulation du processus électoral et d'accroissement des dépenses militaires. Une analyse récente de Djankov et al (2008), confirme cette hypothèse. Par ailleurs, les travaux de Rajan et Subramanian (2007) soutiennent que l'aide a un effet

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corrosif sur les institutions politiques de pays récipiendaires.

IV. Methodologie de L'etude

Nous travaillons sur un panel des six (6) pays de la CEMAC sur la période 1996-2013 (18 années) pour mesurer l'influence des deux indicateurs de la gouvernance sur la relation aide publique au développement–croissance économique. Empiriquement, il s'agit pour nous d'étudier deux relations économétriques suivant les deux indicateurs de gouvernance retenus. On s'appuie sur la revue de la littérature qui a trouvé plusieurs variables qui seraient des déterminants de la croissance économique. Dans ce chapitre, il sera donc question pour nous de présenter les modèles économétriques en panel dynamique étudié, les variables dudit modèle, la source des données, les tests appliqués (pré et post-estimation) et les méthodes d'estimations.

V. Spécification des Modèles Econométriques

Les données que nous utilisons sont de source secondaire et proviennent des bases officielles de la Banque Mondiale en ligne notamment les World DevelopmentsIndicators 2014 (WDI, 2014) ainsi que la base de Kaufmann pour la gouvernance.

a) Expression du modèle

A partir du modèle théorique de croissance endogène, le modèle empirique inspiré des des travaux de Burnside et Dollar (2000) sera formulé ainsi qu'il suit:

$$Croiss_{i,t} = \alpha_{i,t} + \alpha_1 Croiss_{i,t-1} + \alpha_2 APD_{i,t} + \alpha_3 Gov_{i,t} + \alpha_4 \left(APD*Gov\right)_{i,t} + \alpha_5 \left(APD^2*Gov\right)_{i,t} + \beta' X_{i,t} + \varepsilon_{i,t}$$

Où :

- $Croiss_{i,t}$ est le taux de croissance du PIB réel par tête du pays i à l'année t.
- $Croiss_{i,t-1}$ est le taux de croissance du PIB réel par tête du pays i à l'année t décalé d'une période
- $Gov_{i,t}$ est l'indicateur de gouvernance retenu pour le pays i en t
- $APD_{i,t}$ est le rapport entre les flux entrants d'aide publique au développement et le PIB
- $\left(APD*Gov\right)_{i,t}$ est la variable d'interaction entre l'APD en pourcentage du PIB et l'indicateur de gouvernance retenu à court terme ;
- (APD^2Gov) i,t est la variable d'interaction entre l'APD en pourcentage du PIB et l'indicateur de gouvernance retenu à long terme ;
- X est le vecteur constitué des autres variables identifiées par la littérature comme étant des déterminants de la croissance ; il s'agit notamment de l'investissement domestique, du taux d'ouverture, du capital humain du taux de croissance de la population, …

Les différentes variantes du modèle ci-dessus seront obtenues en remplaçant la variable gouvernance par l'indicateur retenu.

Lorsque l'indicateur de la gouvernance est le niveau de démocratie, on a :

$$Croiss_{i,t} = \alpha_{i,t} + \alpha_1 Croiss_{i,t-1} + \alpha_2 APD_{i,t} + \alpha_3 Demo_{i,t} + \alpha_4 \left(APD*Demo\right)_{i,t} + \alpha_5 \left(APD^2*Demo\right)_{i,t} + \beta' X_{i,t} + \varepsilon_{i,t}$$

Où $Demo_{i,t}$ est le niveau de démocratie dans le pays i en t.

Lorsque l'indicateur de la gouvernance retenu est le niveau de corruption, on a:

$$Croiss_{i,t} = \rho_0 + \rho_1 Croiss_{i,t-1} + \rho_2 APD_{i,t} + \rho_3 Corrup_{i,t} + \rho_4 \left(APD*Corrup\right)_{i,t} + \rho_5 \left(APD^2*Corrup\right)_{i,t} + \beta' X_{i,t} + \varepsilon_{5i,t}$$

Où

$Corrup_{i,t}$ est niveau de corruption dans le pays i ent

VI. Resultats et Interpretations

Il sera essentiellement question de faire une présentation des résultats des tests et estimations effectuées. Aussi, nous exposerons les méthodes utilisées aux fins d'évaluer la pertinence du modèle retenu, d'estimer les paramètres dudit modèle et d'examiner ceux-ci conformément aux attentes de l'étude (hypothèses de l'étude et signes attendus des variables), à la littérature existante et au contexte ambiant.

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a) Resultats Des Tests De Stationnarite d'Im, Pesaran Et Chin

Tableau 1: Résultat du test de stationnarité d'IPS

Variables	A niveau		En différence		Décision
	stats	Prob	stats	prob	
APD	-4,83***	0 ,000	-	-	I(0)
TX PIB	-3 ,71***	0,001	-	-	I(0)
IDE	-3,34***	0,004	-	-	I(0)
IDO	-2,62***	0,004	-	-	I(0)
DOE	-1,54*	0,062	-	-	I(0)
DVP Fi1	-2,76***	0,003	-	-	I(0)
DVP Fi2	-1,58*	0,057	-	-	I(0)
DEMO	-0,98	0,162	-3,29***	0,005	I(1)
CORR	-0,928	0,176	-4,606***	0,000	I(1)
APD^2	-5,37***	0,000	-	-	I(0)
APD* CORR	-4,92***	0,000	-	-	I(0)
APD* DEMO	-3,424***	0,003	-	-	I(0)
APD^2* CORR	-3,652***	0,000	-	-	I(0)
APD^2* DEMO	-4,374***	0,000	-	-	I(0)

*NB : *, **, *** représentent respectivement la stationnarité à 10%, 5% et 1%*

Il ressort du tableau ci-dessus que toutes nos variables sont stationnaires à niveau à l'exception des variables démocratie et corruption qui sont quant à elles stationnaires en différence première.

b) Analyse Descriptive Des Correlations Entre Les Variables

Tableau 2 : Tableau des corrélations entre les variables

	txpib	apd	ide	ido	doe	dvpfi1	dvpfi2	demo	corr	apdsq	apdcorr	apddemo	apdsqc~r
txpib	1.0000												
apd	-0.0557	1.0000											
ide	0.4372	-0.0363	1.0000										
ido	0.6311	-0.2920	0.7598	1.0000									
doe	0.6176	-0.3232	0.7161	0.9496	1.0000								
dvpfi1	-0.3768	0.1360	-0.1066	-0.3978	-0.3844	1.0000							
dvpfi2	-0.2402	-0.1747	-0.1906	-0.1868	-0.2647	0.5865	1.0000						
demo	-0.2766	0.1109	-0.3208	-0.4844	-0.4934	0.3756	0.3010	1.0000					
corr	-0.2349	0.0441	-0.2175	-0.3877	-0.3928	0.3380	0.4351	0.7681	1.0000				
apdsq	-0.0484	0.9175	-0.0306	-0.2095	-0.1976	0.1289	-0.1267	0.0878	0.0672	1.0000			
apdcorr	0.0358	-0.9772	0.0148	0.2662	0.2902	-0.1193	0.2326	-0.0686	0.0665	-0.8828	1.0000		
apddemo	0.0108	-0.9748	-0.0214	0.2292	0.2637	-0.0796	0.1796	0.0075	0.0120	-0.8865	0.9619	1.0000	
apdsqcorr	0.0467	-0.9123	0.0226	0.2055	0.1878	-0.1377	0.1556	-0.0810	-0.0200	-0.9895	0.9060	0.8828	1.0000
apdsqdemo	0.0355	-0.9137	0.0115	0.1934	0.1856	-0.1124	0.1167	-0.0469	-0.0574	-0.9917	0.8804	0.9094	0.9801

	apdsqd~o
apdsqdemo	1.0000

Il ressort de ce tableau de corrélation que la relation entre l'aide publique au développement et le taux de croissance du PIB est négative. La démocratie, la corruption, l'aide publique à long terme sont négativement corrélés au taux de croissance du PIB. Les variables d'interaction aide publique au développement-démocratie à court terme, aide publique au développement –corruption à court terme , aide publique au développement démocratie à long terme, aide publique au développement –corruption à long terme, sont positives. Ce qui suggère que l'APD en elle même n'a pas d'effet positif sur la croissance mais en fonction du contexte démocratique et institutionnel, cet effet peut être positif. Ceci met en lumière la non linéarité de la relation aide –croissance.

Pour avoir une idée plus précise et plus robuste de cette corrélation, nous avons mené un test de significativité des corrélations dont le résultat est le suivant:

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Tableau 3 : Test de significativité des corrélations

	txpib	apd	ide	ido	doe	dvpfi1	dvpfi2
txpib	1.0000						
apd	-0.0557	1.0000					
ide	0.4372*	-0.0363	1.0000				
ido	0.6311*	-0.2920*	0.7598*	1.0000			
doe	0.6176*	-0.3232*	0.7161*	0.9496*	1.0000		
dvpfi1	-0.3768*	0.1360	-0.1066	-0.3978*	-0.3844*	1.0000	
dvpfi2	-0.2402*	-0.1747*	-0.1906*	-0.1868*	-0.2647*	0.5865*	1.0000
demo	-0.2766*	0.1109	-0.3208*	-0.4844*	-0.4934*	0.3756*	0.3010*
corr	-0.2349*	0.0441	-0.2175*	-0.3877*	-0.3928*	0.3380*	0.4351*
apdsq	-0.0484	0.9175*	-0.0306	-0.2095*	-0.1976*	0.1289	-0.1267
apdcorr	0.0358	-0.9772*	0.0148	0.2662*	0.2902*	-0.1193	0.2326*
apddemo	0.0108	-0.9748*	-0.0214	0.2292*	0.2637*	-0.0796	0.1796*
apdsqcorr	0.0467	-0.9123*	0.0226	0.2055*	0.1878*	-0.1377	0.1556
apdsqdemo	0.0355	-0.9137*	0.0115	0.1934*	0.1856*	-0.1124	0.1167

	demo	corr	apdsq	apdcorr	apddemo	apdsqc~r	apdsqd~o
demo	1.0000						
corr	0.7681*	1.0000					
apdsq	0.0878	0.0672	1.0000				
apdcorr	-0.0686	0.0665	-0.8828*	1.0000			
apddemo	0.0075	0.0120	-0.8865*	0.9619*	1.0000		
apdsqcorr	-0.0810	-0.0200	-0.9895*	0.9060*	0.8828*	1.0000	
apdsqdemo	-0.0469	-0.0574	-0.9917*	0.8804*	0.9094*	0.9801*	1.0000

*NB : * traduit la significativité au seuil de 10%* Ce test de significativité des corrélations suggère qu'il n'y a pas de corrélation significative entre le taux de croissance du PIB et toutes les variables susmentionnées.

Conscients de ce que des corrélations mécaniques peuvent être construites entre les variables, nous avons utilisé une méthodologie économétrique bien plus robuste pour déterminer l'impact de l'APD sur la croissance dans un contexte de démocratie et dans un contexte de corruption.

VII. Resultats des Estimations

Notre premier objectif spécifique consistait à déterminer l'incidence de la démocratie dans la relation Aide Publique au Développement – Croissance économique dans la zone CEMAC. Avant de procéder à l'interprétation de nos variables, il convient d'évaluer la pertinence et la robustesse du modèle tout entier.

Tableau 4: Effet de la démocratie dans la relation APD-croissance

Variable dépendante : txpibpt (gouvernance = démocratie)		
Variables	Coefficients	T
txpib (-1)	-.00223 (.0337)	-0.07
Apd	-3.2472 (6.7955)	-0.48
Demo	5.9965 (4.8361)	1.24
Apdsq	.66306 (.54040)	1.23
Apddemo	-3.553 (5.600)	-0.63
apdsqdemo	.63035 (.28344)	1.37
Ide	.24681 (.16748)	1.47
Ido	.06503 (.1214)	0.54
Doe	.0181 (.0612)	0.30
dvpfi1	.94708*** (.34718)	-2.73
Cons	16.176 ** (7.6638)	2.11
Observations	90	
instruments	24	
Wald (Chi-deux)	2970.73	
Prob (Wald)	0.0000	
Stat Sargan	4.14382	
Prob (Sargan)	0.9896	
AR(2)	0.3554	

Source: estimations de l'auteur à partir de Stata 13

*NB : ** et *** représentent les significativités au seuil de 5% et 1% respectivement*

L'estimation dont les résultats sont contenus dans le tableau ci-dessus a été effectuée à partir d'un échantillon de 90 observations. La probabilité associée à la statistique de Wald (p=0,0000< 0,01) est inférieure au seuil de 1% ce qui suggère que le modèle est globalement significatif ; la statistique de Wald (Wald=2970,73) apporte la même information sur la significativité globale du modèle. Il ressort donc de ces deux indicateurs que le modèle est globalement significatif. Par ailleurs, le nombre d'instruments (24<90) est inférieur au nombre d'observations suggérant que notre régression est robuste. Notre estimation suggère à travers le test d'auto corrélation d'Arellano et Bond une absence d'auto corrélation de second ordre (p=0,35>0,05) et aussi à travers le test de sur-identification des instruments de Sargan que nos instruments sont valides car la probabilité associée à ce test est supérieure au seuil de significativité qui peut être de 1%, 5% ou 10% (p=0.98). Tous ces éléments nous conduisent à valider les résultats que ces estimations nous donnent.

Des dix (10) variables explicatives dont est constituée notre modèle (txpib (-1), apd, demo, apdsq, apddemo, apdsqdemo, ide, ido, doe, dvpfi1), une seule est significative (dvpfi1) alors que les neufs autres (txpib (-1), apd, demo, apdsq, apddemo, apdsqdemo, ide, ido, doe) ne le sont pas. Autrement dit, le taux de croissance en valeur retardé, l'aide publique au

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développement, la démocratie, l'aide publique au développement à long terme, l'aide publique au développement à court terme associée à la démocratie, l'aide publique au développement à long terme associée à la démocratie, l'investissement direct étranger, l'investissement domestique et le degré d'ouverture de l'économie n'ont pas d'effets statistiquement significatif sur la croissance économique dans la CEMAC. En revanche, le développement financier à un effet positif et significatif sur la croissance des pays de la CEMAC. Il ressort globalement de ces estimations que l'aide publique n'a pas d'effet significatif sur la croissance dans la CEMAC et que même le niveau de démocratie n'influence pas la capacité de l'APD à booster la croissance. Ces résultats sont compatibles à ceux des auteurs tels que Boone (1995), Paldam et Doucouliagos (2005) pour qui environ 75% des flux d'APD contribuent à l'augmentation des dépenses gouvernementales et non à l'accumulation du capital pour l'investissement ; il n'y a donc pas baisse d'impôt permise par l'allocation de l'aide et donc pas d'augmentation de la consommation des ménages et plus généralement pas d'augmentation de la production.

Ces résultats sont par ailleurs contradictoires à ceux de la Banque mondiale (1998), Lensink et White (2000) Dalgaard et Hansen (2001), avec des implications politiques. Pour eux, si l'aide est plus efficace dans un bon environnement macroéconomique, elle devrait cibler les pays pauvres ayant adopté une « bonne gouvernance».

Notre deuxième objectif spécifique consistait à déterminer le rôle de la corruption dans la relation Aide Publique au Développement – Croissance économique dans la zone CEMAC. Avant de procéder à l'interprétation de nos variables, il convient d'évaluer la pertinence et la robustesse du modèle tout entier.

Tableau 5: Effet de la corruption dans la relation APD-croissance

Variable dépendante : txpibpt (gouvernance = corruption)		
variables	coefficients	t
txpib (-1)	.1152*** (.0304)	3.79
apd	-6.9307 (4.4927)	-1.54
corr	16.417*** (4.3960)	3.73
apdsq	.6123* (.33053)	1.85
apdcorr	-7.354** (3.6027)	-2.04
apdsqcorr	.60099** (.28344)	2.12
ide	.02049 (.12563)	0.16
ido	.11305 (.09188)	1.23
doe	.0625 (.04116)	1.52
dvpfi1	.91134** (.3917)	-2.33
cons	22.9658** (8.8741)	2.59
Observations	90	
instruments	24	
Wald (Chi-deux)	1140.64	
Prob (Wald)	0.0000	
Stat Sargan	6.292774	
Prob (Sargan)	0.9348	
AR(2)	0.9395	

Source: estimations de l'auteur à partir de Stata 13
*NB : *, ** et *** représentent les significativités au seuil de 10%, 5% et 1% respectivement*

L'estimation dont les résultats sont contenus dans le tableau ci-dessus a été effectuée à partir d'un échantillon de 90 observations. La probabilité associée à la statistique de Wald (p=0,0000< 0,01) est inférieure au seuil de 1% ce qui suggère que le modèle est globalement significatif ; la statistique de Wald (Wald=1140,64) apporte la même information sur la significativité globale du modèle. Il ressort donc de ces deux indicateurs que le modèle est globalement significatif. Par ailleurs, le nombre d'instruments (24<90) est inférieur au nombre d'observations suggérant que notre régression est robuste. Notre estimation suggère à travers le test d'autocorrélation d'Arellano et Bond une absence d'autocorrélation de second ordre (p=0,93>0,05) et aussi à travers le test de sur-identification des instruments de Sargan que nos instruments sont valides car la probabilité associée à ce test est supérieure au seuil de significativité qui peut être de 1%, 5% ou 10% (p=0.93). Tous ces éléments nous conduisent à valider les résultats que ces estimations nous donnent.

Des dix (10) variables explicatives dont est constituée notre modèle (txpib (-1), apd, corr, apdsq, apdcorr, apdsqcorr, ide, ido, doe, dvpfi1), six d'entre elles sont significatives (txpib (-1), corr, apdsq, apdcorr, apdsqcorr, dvpfi1) et quatre d'entre elles sont en revanche non significatives (apd, ide, ido, doe). Autrement dit, le taux de croissance en valeur retardée, l'aide publique au développement à long terme, la corruption, l'aide publique au développement à court terme associée à la corruption, l'aide publique au développement à long terme associée à la corruption, le développement financier ont un effet statistiquement significatif sur la croissance économique dans la CEMAC. En revanche, l'aide publique au développement (apd), l'investissement direct étranger (ide), le degré d'ouverture commerciale de l'économie (doe), l'investissement domestique (ido) n'ont pas d'effet significatif sur la croissance des pays de la CEMAC. L'examen de ces variables significatives prises individuellement suggèrent que : le taux de croissance

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retardé à un effet positif et significatif sur le taux de croissance courant ; en effet, une augmentation du taux de croissance de la période précédente de 1 point va entrainer une augmentation du taux de croissance de la période courante de 0,11 points. Ce coefficient ne vérifie pas l'hypothèse de convergence conditionnelle qui veut que le coefficient de la variable retardée soit négatif et significatif pour assurer l'effet de rattrapage.

La variable d'interaction entre l'APD à court terme et la corruption à un effet négatif et significatif sur la croissance ; en effet, une augmentation de l'aide de 1 point va entrainer une diminution de la croissance de 7,35 point. Ceci implique que dans un contexte de corruption avancé, l'APD sera un frein à la croissance économique car ces flux seront détournés à des fins individuelles et ne serviront pas la cause qu'ils sont supposés servir. La variable d'interaction entre l'APD à long terme et la corruption à un effet positif et significatif sur la croissance ; en effet, une augmentation de l'aide à long terme de 1 point va entrainer une augmentation de la croissance de 0,6 point. Ceci implique qu'à long terme, les stratégies de lutte contre la corruption auront atteints des résultats tels que les flux d'APD aient un impact positif sur la croissance. Ceci confirme les études menées par Lensink et White (2000), Dalgaard et Hansen (2001), ayant abouties à des implications politiques. En effet, pour eux, l'aide est plus efficace dans un bon environnement macroéconomique et institutionnel avec une bonne gouvernance.

Le développement financier a un effet positif et significatif sur la croissance économique dans la CEMAC ; en effet, une augmentation de l'APD de 1 point va entrainer une augmentation de la croissance de 0,9 points.

VIII. Conclusion

Il ressort globalement de ces estimations que l'aide publique n'a pas d'effet significatif sur la croissance dans la CEMAC mais que dans le contexte de corruption qui est le sien, il aurait un effet négatif sur la croissance. En revanche, à long terme, les efforts de lutte contre la corruption engagés par les Etats de la zone permettront que l'APD ait un effet positif et significatif sur la croissance dans ce contexte-là. Ces résultats sont conformes aux études menées par Burnside et Dollar (1997)pour selon lesquelles l'aide publique est efficace dans les économies qui pratiquent des politiques économiques saines.

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New Insights into Financial Sector Development and Economic Growth Nexus in Nigeria

By Oladotun Olaniran

*Abstract-*This paper examined the relationship between financial sector development and economic growth in Nigeria. The paper used the Principal Component Analysis (PCA), Autoregressive Distributed Lag Model (ARDL),Structural Break Test and the Pairwise Granger Causality Test (PGC) to examine the effect of financial development on economic growth in Nigeria and to establish which theory holds for Nigeria between the demand-following and the supply-leading theory. Annual time series data between 1981 and 2016 was used for the study. Data on real gross domestic product, broad money supply/gdp, inflation, credit to the private sector/gdp, total liquid liabilities, total stocks/shares traded and total stock market capitalization were sourced from the Central Bank of Nigeria (CBN) statistical bulletin. The structural break unit root test revealed that all the variables are stationary at their first difference except for inflation that was stationary in its level form; the bound test cointegration analysis established the existence of long run relationship among the variables. The ARDL revealed that financial development negatively and insignificantly affected economic growth in Nigeria during the period of study.

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New Insights into Financial Sector Development and Economic Growth Nexus in Nigeria

Oladotun Olaniran

Abstract- This paper examined the relationship between financial sector development and economic growth in Nigeria. The paper used the Principal Component Analysis (PCA), Autoregressive Distributed Lag Model (ARDL),Structural Break Test and the Pairwise Granger Causality Test (PGC) to examine the effect of financial development on economic growth in Nigeria and to establish which theory holds for Nigeria between the demand-following and the supply-leading theory. Annual time series data between 1981 and 2016 was used for the study. Data on real gross domestic product, broad money supply/gdp, inflation, credit to the private sector/gdp, total liquid liabilities, total stocks/shares traded and total stock market capitalization were sourced from the Central Bank of Nigeria (CBN) statistical bulletin. The structural break unit root test revealed that all the variables are stationary at their first difference except for inflation that was stationary in its level form; the bound test cointegration analysis established the existence of long run relationship among the variables. The ARDL revealed that financial development negatively and insignificantly affected economic growth in Nigeria during the period of study. Furthermore, the pairwise granger causality found evidence in support of the supply-leading theory that says economic growth must be achieved before the financial sector can be stable in Nigeria. Therefore, the paper recommends that more attention should be paid to growth-driven policies because it will bring about financial sector stability in Nigeria.

I. Introduction

Financial sector development and economic growth are two integral parts of an economy that cannot be undermined in any country, be it developed or developing. This is because developing countries are continuously striving to achieve both in their economies while developed countries are faced with the task of maintaining the already attained stability in their financial and growth sectors. Financial development encompasses growth in all finance related sectors of the economy as a whole, including banking institutions, stock market (where short and long term securities are being traded), insurance companies, finance houses and other non-banking financial institutions. The role of these institutions cannot be trivialized in the economy especially foran economy that has not attained the desired level of economic growth.

Authors have made frantic efforts over the years to provide theoretical and empirical explanations on the nexus between financial development and growth under different frameworks (panel studies in developed and developing countries, country-specific studies, Middle East and North African countries and several others). However, the argument on the finance-growth relationship is still ongoing because this dearth of studies found mixed and inconclusive results in their studies. Particularly, what remains distinctly unclear is the issue of whether finance spurs growth in the economy or growth is the necessary pre-requisite for the achievement of a stable financial sector (Adeniyi, Oyinlola, Omisakin and Egwaikhide, 2015).

The literature is filled with several studies that examined the finance-growth relationship, with mixed results produced, regardless of whether the study is country specific or panel. (seeAdeniyi *et al* 2015; Abu-Bader and Abu-Qarn,2008; Nicholas Odhiambo, 2004, 2008; Ghirmay, 2004; Agbetsiafa, 2004; Rousseau and Watchel, 2011; Ahmed, 2016; Benfiglioli, 2008; Arize, Ume and Nkwor, 2017, Dabo, 2012; Enowbi, Mlambo and Asongu (2017), Ibrahim and Alagidede, 2017). Agbetsiafa (2004), and Abu-Bader and Abu-Qarn (2008) in a study for Tunisia Egypt and Morocco found finance to be growth spurring in their studies while the Kenyan economy found growth as the pre-condition for a stable financial sector (see Odhiambo 2004 and 2008).

Theoretical and empirical arguments also exists among scholars as regards the precise nature of the relationship between financial development and economic growth, while some studies found that the direction of causality runs from financial sector development to growth (see Agbetsiafa, 2004; Abu-Bader and Abu-Khan, 2008; to mention a few), some others found the causality to be from growth to financial sector development (see Odhiambo, 2004; and Odhiambo, 2008). Studies such as Akinboade (1998) using Botswana as the focal point, found the existence of a bi-directional causality between finance and growth while Atindehou, Guyeie and Amenounve (2005) found no causal linkage between financial development and growth in Sub-Saharan Africa.

From the theoretical standpoint, as described by one Patrick (1966), the finance-growth relationship is said to be either supply-leading or demand-following. The demand-following relationship asserts that financial sector development drives and induces output in the economy while the supply-leading relationship posits that growth has to be achieved before financial sector development and stability can be attained. However, Lucas (1988) believes the finance-growth argument to

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be overrated and he posited that financial sector performance insignificantly affects growth. Having established some of the key controversies that abound in the literature, this paper will examine the relationship between financial development and economic growth in Nigeria because of the following reasons, Firstly; previous studies have produced mixed and inconclusive results as regards the effect of financial sector development on economic growth and there is the need to investigate the effect of finance on economic growth in a developing country like Nigeria.

Secondly, country specific studies in Nigeria are still quite scanty compared to studies carried out in some other developed and developing countries of the world, thirdly; this paper will investigate which theory holds in Nigeria, whether it's the supply-leading or the demand-following theory, by examining the direction of causality between the variables. Finally, previous studies have used different ways to measure financial development ranging from the ratio of broad money supply to gross domestic product (M2/GDP), ratio of the credit to the private sector to gross domestic product (PSC/GDP), total banking sector assets (TBSA), interest rate spread (IRS), ratio of investment to GDP, stock market capitalization etc. As a departure from previous studies, this paper intends to generate a composite series for financial development using Principal Component Analysis (hereafter, PCA) as a way of generating a more precise series to measure financial development in Nigeria.

The rest of the paper is divided into five sections, section two presents the review of relevant literature on the finance-growth nexus, section three presents the methodology, section four showcases analysis and discussion of results while section five concludes the paper.

a) Brief Overview Of Financial Development And Economic Growth In Nigeria (Trend Analysis)

The financial sector in Nigeria is an integral part of the economy. The introduction of the Structural Adjustment Programme (SAP) in 1986(which championed the liberalization and deregulation of the financial sector among other things) was aimed at improving the performance of the financial sector in Nigeria. This was followed by the consolidation periods of the mid-2000s, the post consolidation era, bank mergers and acquisition and the recent cashless policy introduced by the Central Bank of Nigeria (hereafter, CBN) in recent years. These series of reforms brought about the introduction of Electronic banking (E-banking) that came along with the usage of Automated Teller Machines (ATM) and point of Sales (POS) as alternative sources of withdrawing cash in Nigeria. The introduction of these machines has helped in improving the performance and efficiency of banks and the stock market in Nigeria.

This paper therefore examines briefly the trend of financial development and economic growth in Nigeria using quarterly data between 1981 and 2014, in order to provide a deeper insight into the behavior of both variables in Nigeria. From figure 1, Nigeria witnessed a drag in financial development (proxied by PSC/GDP) between 1981 and 1991 and rose at a steady rate between 1992 and 2006. In 2007, the financial sector experienced a sudden increase with the stock market experiencing a growth of about 74.5%, making Nigeria one of the fastest growing markets around the time despite the occurrence of the global economic meltdown. The subsequent periods experienced slight increases and falls (fluctuations) and these has been the trend in recent years

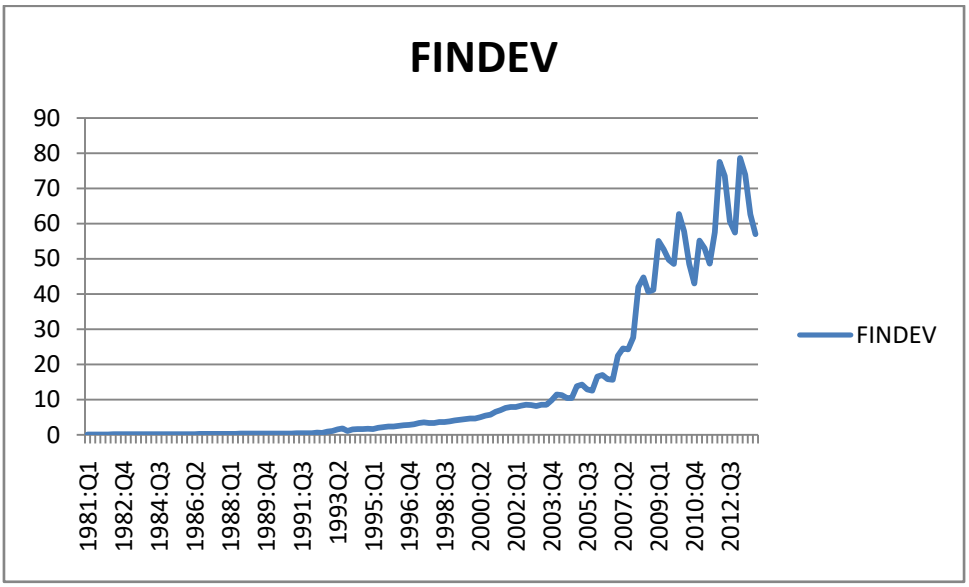

Figure 1: The graph of Financial Development

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On the other hand, GDP increased at a decreasing rate between the first quarter of 1981 and the third quarter of 1991and it was fairly stable between 1992 and 2004. It experienced fluctuations between 2004 and 2007 probably as a result of CBN's commercial banks consolidation policies around the time and the fluctuations in oil price (which is the major source of revenue to the government).Furthermore, GDP experienced sharp fluctuations between 2007 and 2014, probably as a result of the global economic meltdown that affected the performance of macroeconomic variables all over the world around the time and the economic recovery process of the subsequent periods. Specifically, GDP fell in 2009 and rose between 2010 and 2011; it further increased sharply between the first quarter of 2013 and the last quarter of 2014.

The foregoing clearly establishes and further strengthens the need to examine the finance-growth relationship in Nigeria, as both have been fluctuating over the years. This implies that the desired level of growth and financial sector performance have not been achieved despite several reforms and policies introduced over the years in Nigeria.

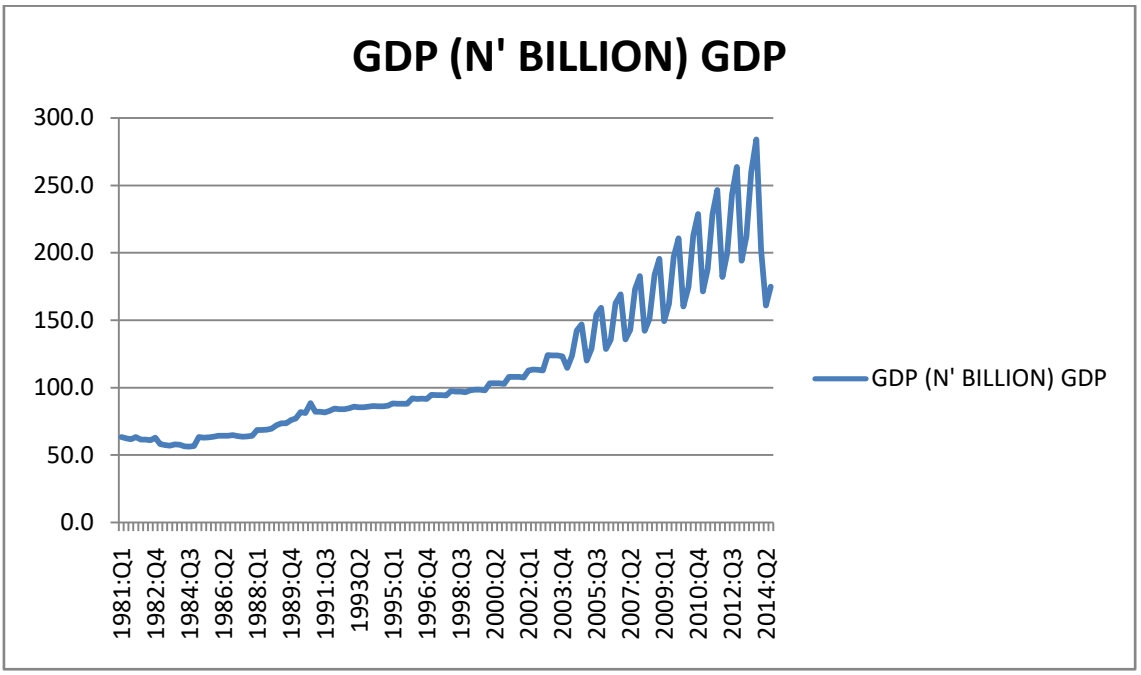

Figure 2: The graph of GDP

II. Review of Relevant Literature

There are different theoretical views and empirical findings on the finance-growth nexus in the literature. The study of Schumpeter (1911) was more or less the earliest study to examine the finance-growth relationship, and his findings supported the demand following hypothesis, which argued that financial sector performance significantly drives the achievement of economic growth in the economy (see Levine, 2005; for clarity on the roles of the financial sector in any economy). Contrastingly, Robinson (1952) posited that economic growth has to be achieved before a stable financial sector can be attained in any economy; this places his view to be in support of the supply-leading hypothesis. This establishes that the demand-following and supply-leading theories are the two (2) major theories in the literature on the finance-growth relationship. Some empirical studies on the strands of literature that supports both are discussed below.

In line with the demand-following theory, Ghirmay (2004) found finance to be the major driver of economic growth in two-thirds of his sample countries in SSA (specifically 8 out of the 13 countries sampled in his study. Similarly, Agbetsiafa (2004) and Abu-Bader and Abu-Khan (2008) who worked on the Middle-East and North African countries (MENA) found that finance causes growth in their study. Also, Adeniyi*et al* (2015) using annual data between 1960 and 2010 and an error correction model incorporated the role of thresholds in their study. They found finance to play a very trivial role in accelerating economic growth in Nigeria. This is because finance had a significantly weak but positive relationship with growth during the period of study. Furthermore, Ahmed (2015) that used seven indicators to measure financial development in forty-five (45) SSA countries between 1976 and 2010 supported the growth-spurring effect of financial development in his study.

Some studies have also established the existence of the supply-leading theory in their findings. Robinson (1952) was one of the pioneers of this view as earlier stated. Recent studies such as Odhiambo (2004), using data for South Africa, found out that growth spurs

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financial development in the economy. This implies that a sustained increase in economic performance in the economy is a necessary pre-requisite for a stable financial system. Also, in an attempt to further strengthen his argument, Odhiambo (2008) used the Kenyan economy as the focus between 1969 and 2005incorporatedsavings into his model as a key explanatory variable, he found the causal link between financial development and economic growth to be uni-directional; albeit, the causality runs from economic growth to financial development in Kenya.

In contrast to the uni-directional relationship stated above, a few other studies found the relationship between financial sector development and economic growth to be bi-directional. For example, Akinboade (1998) found out that private sector credit and bank deposit liabilities (which were used as proxy for financial development) granger caused economic growth and a reverse causation was statistically found to run from economic growth to financial development in Botswana. On a different note, Lucas (1988) posits that there is no relationship whatsoever between finance and growth, asserting that the presumption that finance influences growth is overrated. This view is supported by Atindehou*et al* (2005) who found the effect of finance on growth in SSA countries to be ambiguous and overrated as they found no significant relationship between them.
Based on the studies reviewed above, it is evident that the finance-growth debate is largely inconclusive. This study will therefore investigate the effect of financial development on economic growth in Nigeria, verify which theory (whether demand-following or supply-leading) holds in Nigeria by examining the direction of causality between financial development and economic growth in Nigeria while using PCA to generate a series to measure financial development in Nigeria.

III. Methodology

This study in an attempt to examine the relationship between financial development and economic growth in Nigeria adopts model used by Arize*et al* (2017) and Adeniyi (2015). Theoretically, the demand-following hypothesis presents financial development to be a function of economic growth while the supply-leading hypothesis refutes the assertion. Nonetheless, in line with the objectives and focus of this study, the relationship between financial development and economic growth is specified as follows:

$$RGDP = \beta_0 + \beta_1 FDIN + e_t \quad (1)$$

Where RGDP is real gross domestic product, FDIN is financial development index which will be measured by generating a series from different proxies for financial development in the literature such as the ratio of broad money supply to GDP (M2/GDP), ratio of private sector credit to GDP (CPS/GDP), ratio of total bank deposit to GDP (TBP/GDP), total stock market capitalization (TSMC) and total market turnover (TMT) using PCA. The reason for doing this are in two folds; firstly, modeling various indicators of financial development in the same equation may lead to serious problem of multicollinearity, furthermore, utilizing the aggregate effect of these indicators of financial development is preferably a better approach than modeling each indicator separately. Secondly, there is no general concensus as to which measure of financial development is most appropriate (Alimi, 2018). For the purpose of robustness and model stability, this study introduces two major macroeconomic explanatory variables commonly used in the finance-growth models in the literature. Thus, equation 1 is restated as:

$$RGDP = \beta_0 + \beta_1 FD + M2 + INFL + e_t \quad (2)$$

Where M2 is broad money supply, INFL is inflation which is used as a measure of economic instability in the model and e_t is the stochastic error term.

b) Estimation Technique

This paper employs the autoregressive distributed lag model (hereafter, ARDL)as the technique of analysis. This is because it is effective comparatively in determining the co integration of small and finite samples (Arize*et al*, 2017). The ARDL can be used for variables with different orders of integration, be it I(1) or I(0) or a mix of both (Pesaran and Smith, 1995; Pesaran*et al*., 1999), provided none of the variables are I(2). The augmented form of the ARDL model as specified by Pesaran and Shin (2001) is stated as:

$$\lambda\,(L, p)yt = \Sigma^{k}\,\beta i\,(L, p) + \delta' wt + \mu t \quad (3)$$

Where

$$\lambda\,(L, p) = 1 - \lambda\,1L - \lambda\,2L^2 - \cdots - \lambda\,pLp \text{ and}$$

$$\beta i\,(L, p) = \beta i1 + \beta i1L + \beta i2 + \cdots + {}^{\beta iqi}L^{q}_{i}$$
$$i = 1,2, \ldots, k$$

L is a lag operator such that $LYt = yt-1$, and wt is an $s \times 1$ vector of deterministic variables such as the intercept term, dummy variables, time trends or exogenous I(1) variables with fixed lags.

Before the ARDL model can be estimated, the ordinary least squares (OLS) estimates of equation (3) must be estimated first. All possible values p = 0, 1, 2, . . . , m; qi= 0, 1, 2, . . . , m; and i = 1, 2, . . . , k, that is, for a total of three$(m + 1)^{k+1}$ different ARDL models. The choice of one of the estimated models was made using the SBC information criteria. The error-correction model of the ARDL (, $q1$, $q2 \ldots qk$) model can be obtained by rewriting equation (1) in terms of the lagged levels and the first differences of y_t, x_{1t}, x_{2t}, … ,x_{kt} and wt. Substituting these lagged and differenced terms into equation (3) and rearranging gives:

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$$\Delta y_t = -\lambda(1-\rho)EC_{t-1} + \sum_{i=1}^{k} \beta_{i0}\Delta x_{it} + \sigma\Delta w_t^1 - \sum_{j=1}^{p-1} \lambda^* y_{t-j} - \sum_{t-1}^{k} \sum_{j=1}^{t-1} \beta_{ij}^* \Delta x_{i,t-j} + \mu_t \quad (4)$$

Where the error-correction term, EC_t is defined as:

$$ECj_t = y_t - \sum_{i=1}^{k} \theta_i x_{it} - \hat{\Psi} w_t \quad (5)$$

The response of y_t with respect to x_t for the long-run coefficients are estimated as:

$$\theta_i = \frac{\beta_i(1, q_t)}{\lambda_1(1, p)} = \frac{\hat{\beta}_{io} + \hat{\beta}_{i1} + \ldots\ldots + \hat{\beta}_{tqt}}{1 - \lambda_1 + \lambda_2 - \ldots\ldots - \hat{\lambda}_p} \quad (6)$$

where $\hat{p}$ *and* $\hat{q}i$, i = 1, 2, … , k are the selected estimated values of p *and* qi , i = 1, 2, … , k.

In line with the objectives of this study, the relationship between financial development and economic growth in Nigeria will be examined within the framework of the ARDL (provided the variables exhibits mixed order of integration). However, if all the variables in the model are found to be stationary at first difference and co integrated, the error correction mechanism will be adopted. The general form of the ARDL specification which is flexible with different orders of integration is stated as follows:

$$\Delta Y = \gamma_0 + \gamma_1 Y_{t-1} + \gamma_2 FDIN_{t-1} + \gamma_3 M2_{t-1} + \gamma_4 INFL_{t-1} + \sum_{i=1}^{n} \pi_{1i}\Delta Y_{t-i} + \sum_{i=0}^{m} \pi_{2i}\Delta FDIN_{t-i} + \sum_{i=0}^{p} \pi_{3i}\Delta M2_{t-i} + \sum_{i=0}^{p} \pi_{4i}\Delta INFL_{t-i} + \lambda_1 EC_{t-1} + e_t \quad (7)$$

Where the variables are the same as defined above, γ_i are the long run multipliers and π_i are the short run coefficients. After establishing the order of integration of the variables, the restricted version of the ARDL is stated as follows:

$$\Delta Y = \theta_0 + \sum_{i=1}^{n} \pi_{1i}\Delta Y_{t-i} + \sum_{i=0}^{m} \pi_{2i}\Delta FD_{t-i} + \sum_{i=0}^{p} \pi_{3i}\Delta M2_{t-i} + \sum_{i=0}^{p} \pi_{4i}\Delta INFL_{t-i} + \lambda_1 EC_{t-1} + e_t \quad (9)$$

Where λ_1 is the error correction term which shows the speed of adjustment of the short run towards the long run equilibrium. Put simply, the error correction term shows the speed at which errors committed in the short run are corrected in the long run.

a) Structural Breaks Unit Root Test

For robustness, this study will employ the Zivot and Andrews structural break unit root test.Checking for structural breaks in unit roots has become necessary in the study of time series over the years. This is because it allows us to test and ascertain the order of integration of the variables used in a model i.e. whether the variables are truly non-stationary or not in their level form. For this study, the Zivot-Andrews structural break unit root test will be used toascertain the order of integration of the variables and the structural break dates in the data.

b) Data Sources

The data used in this study were sourced from the Central Bank of Nigeria (CBN) statistical bulletin (2016). Data on real gross domestic product, broad money supply, inflation and financial development (proxied by generating a series from five financial development indicators namely; M2/GDP which is the ratio of broad money supply to gdp, CPS/GDP i.e. the ratio of credit to the private sector to gdp, ratio of total bank deposit i.e. TBD/GDP, total stock market capitalization i.e. TSMC and total stock market turnover i.e.TSMT, using PCA), are used for this study. As a way of avoiding spurious results and in line with standard research practice, this study adopts the Phillip-Perron unit root test and the Zivot and Andrews structural break unit root test to examine the order of integration of the variables after which the bounds test co-integration test will be used to test for long run relationship among the variables

IV. Empirical Results and Discussion

This section starts with the results of the unit root test carried out with intercept and trend.The Phillip-Peron unit root test showed that all the variables are non-stationary at level, but they became stationary at their first difference. However, the Zivot-Andrews unit root test for structural breaks showed that real gross domestic product (RGDP), financial development index(FDIN) and broad money supply (M2) became stationary at their first difference except for inflation (INFL) that was stationary at level.

The identified breakpoint for RGDP was in 2002, this may be as a result of the reforms and policies made as an economic recovery attempt to insulate the country from the aftermath effect of the previous military

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administration in Nigeria. In the case of financial development index, 2007 was its breakpoint; this is probably as a result of the global economic and financial crisis that affected all countries of the world. This crisis affected the performance of the financial sector in Nigeria due to the fall in stock prices and the value of the currency around the time. Money supply recorded its breakpoint in 2006; this may be as a result of the different bank consolidation policies, mergers and the unsatisfactory performance of the stock market around the time. Lastly, inflation has its breakpoint in 1996; this is likely to be as a result of the military administration at the time, which encouraged printing excessive loads of currency for the purpose of embezzlement and capital flight in Nigeria. The result of the Phillip-Peron unit root test and the Zivot-Andrews structural break unit root test are presented in table 1 and 2.

Since this study intends to ascertain the order of integration of the variables and the structural break dates of the variables using the Zivot-Andrews unit root test, the result of the Zivot-Andrews unit root test result will be followed. This implies that all the variables are stationary at their first difference except for inflation in Nigeria.

a) Bounds Test Co integration Result

The long run relationship among the variables is tested with the null hypothesis of the non- existence of a long run relationship. The Pesaran et al. (2001) F-table is compared with the calculated F-statistics at various critical levels and it is generally assumed thatco-integration exists if the calculated F test statistics exceeds upper bound limit. However, if the test statistic is below the lower bound value, the null hypothesis of no co-integration is accepted and if the test statistics lies between the lower and upper bounds limit, the test of co-integration is indecisive. . From Table 3, the calculated F-statistics value is 5.4434 and it exceeds the upper bounds critical value of the Pesaran et al. (2001) bounds testing table. This implies that we reject the null hypothesis of no co-integration and accept the alternative hypothesis that says co-integration exists. Thus, long run relationship exists among the variables.

b) Diagnostic TESTS

i. *Testing for Serial Correlation*

According to the Breusch-Pagan test for serial correlation, the null hypothesis of no serial correlation is tested against the alternative hypothesis of serial correlation. In order to verify the existence of serial correlation in the model, the observed R-squared (Obs*R-squared) and its corresponding probability value (Pro. Chi-squared) are observed. In Table 4, the Obs*R-squared has a value 1.3629, while its corresponding p-value has a value of 0.5059. Since the probability value is greater than 5%, we accept the null hypothesis that there is no evidence of serial correlation in the model.

ii. *The Test for Heteroskedasticity*

To test for the presence of homoscedasticity in the model, the study chooses the Arch Test. In the Arch test, the Observed R-squared value is examined along with its corresponding probability value. The null hypothesis here is that the model is homoscedastic, while the alternative hypothesis here is that the model is heteroskedastic. We reject the null hypothesis if this probability value is less than 5%. From Table 5, since the probability value of 0.2887is greater than 0.05, at the 5% significance level, we accept the null hypothesis of homoscedasticity and reject the alternative hypothesis of presence of heteroskedasticity. Hence, the model is homoscedastic and this means the model has goodness of fit and the results are desirable.

c) Ardl Short and Long Run Estimate

Focusing on table 5, financial development index has a negative and insignificant effect on economic growth in Nigeria both in the short and long run. This implies that financial sector development does not affect economic growth in Nigeria during the period of study. Money supply on the other hand, positively and significantly affects economic growth in Nigeria in the short run but not in the long run. Also, inflation (by summing up the coefficients using Wald test) has a negative and significant effect on economic growth in Nigeria in the short run but its effect was insignificant in the long run (this supports the position of economic theory that says some level of inflation is good for the economy).

The pairwise granger causality test carried out revealed that financial development index does not granger cause economic growth in Nigeria during the period of study, thereby supporting the findings of the ARDL. However, economic growth granger caused financial development in Nigeria at 5% significance level. This shows that direction of causation between financial development and economic growth in Nigeria is unidirectional and it runs from economic growth to financial development. This implies that the supply-leading theory holds in Nigeria. This is similar to the findings of Odhiambo (2004, 2008) for South Africa and Kenya respectively.

Inflation was found to significantly granger cause economic growth in Nigeria at 5% significance level while economic growth does not granger cause inflation during the period of study. The result also revealed that there exists a significant unidirectional causality running from money supply to economic growth in Nigeria during the period of study.

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V. Conclusion

The finance-growth relationship has been an issue of concern among researchers in the literature over the years. This gave birth to two theories (demand-following and supply-leading) in the theoretical literature as well as different empirical findings on the finance-growth nexus. The present study (after ascertaining the order of integration and the structural break dates of the variables, using the Zivot-Andrews unit root structural break test) investigated the effect of financial sector development (using the financial development index generated by PCA) on economic growth in Nigeria; using annual data between 1981 and 2016. It also examined the direction of causality between financial development and economic growth in Nigeria, in order to know which theory holds for Nigeria between the demand-following and the supply-leading theory.

By adopting the ARDL technique of analysis and the pairwise granger causality test, the study found out that financial development (measured by financial development index) has a negative but insignificant effect on economic growth in Nigeria, both in the short and long run. The pairwise granger causality test revealed that financial development does not granger cause economic growth in Nigeria, however, economic growth significantly granger caused financial development in Nigeria during the period of study. This implies that the supply-leading theory holds in Nigeria and supports the early view of Robinson (1952).

Based on the foregoing, the major policy implication is that the government and policymakers should focus more on growth driven policies and less on financial development policies. This is because the achievement of growth in Nigeria will bring about stability in the financial sector.

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List of Tables

Table 1: Phillip-Peron Unit root test

Variables	Level	1st Difference	Status
LRGDP	-2.9484	-3.6394**	I(1)
FDIN	0.384	-4.8478**	I(1)
LM2	2.923	-3.7129**	I(1)
INFL	-2.7348	-9.6225**	I(1)

*Note: ** represents 5% significance level*

Table 2: Zivot-Andrews Structural Break Unit Root Test

Variables	Level	1st Difference	Status
LRGDP	-3.3306	-4.5069**	I(1)
LM2	-3.9889	-5.6451**	I(1)
FDIN	-3.6771	-5.2866**	I(1)
INFL	-6.5294**	----------	I(0)

*Note: ** represents 5% significance level*

Table 3: Bound Test Cointegration Result

Table 3 Ardl Bounds Test		
Null Hypothesis:No Long Run Relationship		
Test Statistic	Value	K
F-Statistic	5.443365	3
Critical Value Bound		
Significance	I0 Bound	I1 Bound
10%	2.38	3.45
5%	2.69	3.83
2.50%	2.98	4.16

Table 4 and 5: Test for Serial Correlation and Heteroscedascity

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.467116	Prob. F(2,21)	0.6332
Obs*R-squared	1.362959	Prob. Chi-Square(2)	0.5059
Heteroskedasticity Test: ARCH			
F-statistic	1.092789	Prob. F(1,29)	0.3045
Obs*R-squared	1.125734	Prob. Chi-Square(1)	0.2887

Appendix

Zivot-Andrews Unit Root Test	
Date: 03/08/18 Time: 21:03	
Sample: 1981 2016	
Included observations: 36	
Null Hypothesis: FD has a unit root with a structural	
break in both the intercept and trend	
Chosen lag length: 3 (maximum lags: 4)	

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Chosen break point: 2004		
	t-Statistic	Prob. *
Zivot-Andrews test statistic	-3.677148	0.294520
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	
* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process		

Zivot-Andrews Unit Root Test		
Date: 03/08/18 Time: 22:03		
Sample: 1981 2016		
Included observations: 36		
Null Hypothesis: DFD has a unit root with a structural break in both the intercept and trend		
Chosen lag length: 2 (maximum lags: 4)		
Chosen break point: 2007		
	t-Statistic	Prob.*
Zivot-Andrews test statistic	-5.286653	0.042604
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	
* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process		

Zivot-Andrews Unit Root Test		
Date: 03/08/18 Time: 22:03		
Sample: 1981 2016		
Included observations: 36		
Null Hypothesis: INF has a unit root with a structural break in both the intercept and trend		
Chosen lag length: 1 (maximum lags: 4)		
Chosen break point: 1996		
	t-Statistic	Prob. *
Zivot-Andrews test statistic	-6.529420	4.00E-05
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	
* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process		

Zivot-Andrews Unit Root Test		
Date: 03/08/18 Time: 22:03		
Sample: 1981 2016		
Included observations: 36		
Null Hypothesis: MS has a unit root with a structural break in both the intercept and trend		
Chosen lag length: 3 (maximum lags: 4)		
Chosen break point: 2004		
	t-Statistic	Prob. *
Zivot-Andrews test statistic	-3.988959	0.068074
1% critical value:	-5.57	
5% critical value:	-5.08	
10% critical value:	-4.82	
* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process		

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Zivot-Andrews Unit Root Test			
Date: 03/08/18 Time: 22:03			
Sample: 1981 2016			
Included observations: 36			
Null Hypothesis: DMS has a unit root with a structural break in both the intercept and trend			
Chosen lag length: 2 (maximum lags: 4)			
Chosen break point: 2006			
		t-Statistic	Prob. *
Zivot-Andrews test statistic		-5.645096	0.000347
1% critical value:		-5.57	
5% critical value:		-5.08	
10% critical value:		-4.82	
* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process			

Zivot-Andrews Unit Root Test			
Date: 03/08/18 Time: 22:03			
Sample: 1981 2016			
Included observations: 36			
Null Hypothesis: LRGDP has a unit root with a structural break in both the intercept and trend			
Chosen lag length: 1 (maximum lags: 4)			
Chosen break point: 1994			
		t-Statistic	Prob. *
Zivot-Andrews test statistic		-3.330606	0.406918
1% critical value:		-5.57	
5% critical value:		-5.08	
10% critical value:		-4.82	
* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process			

Zivot-Andrews Unit Root Test			
Date: 03/08/18 Time: 22:03			
Sample: 1981 2016			
Included observations: 36			
Null Hypothesis: DLRGDP has a unit root with a structural break in both the intercept and trend			
Chosen lag length: 0 (maximum lags: 4)			
Chosen break point: 2002			
		t-Statistic	Prob. *
Zivot-Andrews test statistic		-4.506932	0.003953
1% critical value:		-5.57	
5% critical value:		-5.08	
10% critical value:		-4.82	
* Probability values are calculated from a standard t-distribution and do not take into account the breakpoint selection process			

ARDL Bounds Test
Date: 01/06/18 Time: 20:45
Sample: 1985 2016
Included observations: 32
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.443365	3

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Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

ARDL Cointegrating And Long Run Form				
Dependent Variable: LRGDP				
Selected Model: ARDL(1, 0, 0, 4)				
Date: 01/06/18 Time: 20:44				
Sample: 1981 2016				
Included observations: 32				
Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDIN2)	-0.015791	0.010286	-1.535204	0.1384
D(LM2)	0.018162	0.009194	1.975481	0.0603
D(LNINFL)	-0.020985	0.009224	-2.275013	0.0325
D(LNINFL(-1))	0.015664	0.012426	1.260615	0.2201
D(LNINFL(-2))	0.016295	0.011365	1.433760	0.1651
D(LNINFL(-3))	0.015894	0.008709	1.825113	0.0810
CointEq(-1)	-0.036889	0.064107	-0.575433	0.0306
Cointeq = LRGDP - (-0.4281*FDIN2 + 0.4923*LM2 -1.3831*LNINFL + 12.0718)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDIN2	-0.428072	0.982702	-0.435607	0.6672
LM2	0.492332	0.652889	0.754082	0.4585
LNINFL	-1.383103	2.440306	-0.566774	0.5764
C	12.071807	4.845708	2.491237	0.0204

Pairwise Granger Causality Tests			
Date: 01/06/18 Time: 20:31			
Sample: 1981 2016			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
FDIN2 does not Granger Cause LRGDP	33	0.46301	0.6341
LRGDP does not Granger Cause FDIN2		3.76854	0.0355
LNINFL does not Granger Cause LRGDP	34	4.38954	0.0216
LRGDP does not Granger Cause LNINFL		1.31500	0.2840
LM2 does not Granger Cause LRGDP	34	4.04093	0.0283
LRGDP does not Granger Cause LM2		0.08534	0.9184
LNINFL does not Granger Cause FDIN2	33	3.22908	0.0547
FDIN2 does not Granger Cause LNINFL		0.49405	0.6154
LM2 does not Granger Cause FDIN2	33	1.64359	0.2114
FDIN2 does not Granger Cause LM2		2.45658	0.1040
LM2 does not Granger Cause LNINFL	34	2.19007	0.1301
LNINFL does not Granger Cause LM2		1.71102	0.1984

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Efficacite Technique des Entreprises Agro Industrielles au Cameroun: Approche Non Parametrique

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Abstract- The objective of this study is to analyze and measure the levels of technical efficiency of agro-industrial branches in order to detect the explanatory factors of these different levels. We used the DEA (Data Envelopment Analysis) method to measure the technical efficiency levels of Cameroon's agroindustrial branches over the 2005-2014, period using the SPAD 9.1 software. The non-parametric method as a framework of analysis that is justified by the uncertainty of the functional relationship linking inputs and outputs in the agribusiness sector. To identify explanatory factors for the efficiency levels of agro-industrial branches, then we estimated a multiple linear regression model. It appears that the total technical efficiency was 0.31; the technical efficiency at 0.503 and the efficiency of scale at 0.371. The best performance was achieved in 2008, i.e 0.836; the lowest 0.279 in 2012.

Keywords: *technical efficiency, agro-industrial branches, dea, nonparametric method.*

GJHSS-E Classification: *FOR Code: 349999*



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Efficacite Technique des Entreprises Agro Industrielles au Cameroun: Approche Non Parametrique

Vangvaidi Albert [α], Mbotta Ntjen Emmanuel Chamberlain [σ] & Dazoue Dongue Guy Paulin [ρ]

Résumé- L'objectif cette étude est d'analyser et de mesurer les niveaux d'efficacité technique des branches agro-industrielles afin de détecter les facteurs explicatifs de ces différents niveaux. Nous avons fait recours à la méthode DEA (Data Envelopment Analysis) pour mesurer les niveaux d'efficacité technique des branches agro-industrielles camerounaises sur la période 2005-2014 à l'aide du logiciel SPAD 9.1. La méthode non paramétrique comme cadre d'analyse qui se justifie par l'incertitude de la relation fonctionnelle liant les inputs et les outputs dans le secteur de l'agro-industrie. Pour cerner les facteurs explicatifs des niveaux d'efficacité des branches agro-industrielles, puis nous avons estimé un modèle de régression linéaire multiple. Il ressort que l'efficacité technique totale s'est établie à 0,31 ; l'efficacité technique à 0,503 et l'efficacité d'échelle à 0,371. La meilleure performance a été réalisée en 2008 soit 0,836 ; la plus faible 0,279 en 2012.

Motscles: efficacité technique, branches agro-industrielles, dea, méthode non paramétrique.

Abstract- The objective of this study is to analyze and measure the levels of technical efficiency of agro-industrial branches in order to detect the explanatory factors of these different levels. We used the DEA (Data Envelopment Analysis) method to measure the technical efficiency levels of Cameroon's agro-industrial branches over the 2005-2014, period using the SPAD 9.1 software. The non-parametric method as a framework of analysis that is justified by the uncertainty of the functional relationship linking inputs and outputs in the agribusiness sector. To identify explanatory factors for the efficiency levels of agro-industrial branches, then we estimated a multiple linear regression model. It appears that the total technical efficiency was 0.31; the technical efficiency at 0.503 and the efficiency of scale at 0.371. The best performance was achieved in 2008, i.e 0.836; the lowest 0.279 in 2012.

Keywords: technical efficiency, agro-industrial branches, dea, nonparametric method.

I. Introduction

Le contexte de libéralisation a conduit les économies nationales à un élargissement des domaines de la concurrence à l'internationale, soumettant ainsi les agro industries à l'exigence de développement technologique très rapide en vue de l'amélioration de leur processus productif. Cette profonde mutation de l'économie mondiale en période trouble a été caractérisée par des perturbations économiques fondamentales dans le secteur de l'agro-industrie conduisant à une crise alimentaire généralisée dans les pays en développement en 2008. En effet, l'agro-industrie concerne généralement les unités de production du secteur manufacturier qui transforment les matières premières et semi-produits de même nature, provenant de l'agriculture au sens large, mais aussi la foresterie et la pêche. Les branches agro-industrielles permettent alors la transformation des matières premières agricoles de même nature en produits semi-finis, à valeurs ajoutées plus grandes et créant en même temps des revenus et des emplois en contribuant au développement économique des nations.

Au Cameroun, à la veille de l'indépendance des nombreux sites agro industriels furent choisis pour l'expansion agro-industrielle illustrée par la création des vastes plantations nécessaires pour l'industrie naissante. Ainsi, l'agro-industrie a été un instrument-clé destiné à répondre aux besoins alimentaires des populations urbaines de plus en plus nombreuses suite à l'exode rural. Ce mouvement a permis l' amélioration des rendements des entreprises des secteurs publics et privés, et accroître de façon significative l'efficacité technique de ses branches agro-industrielles afin d'apporter des réponses appropriées et de les rendre plus compétitives. En effet, les agro-industries camerounaises du secteur public qui, pour la plupart ont été créées pour servir de moteur de la locomotive au développement économique et au progrès social se trouvent très souvent soumises à la mauvaise gestion ne leur permettant pas d'améliorer leur capacité de fournir les biens et services nécessaires à une économie encore peu performante, à la recherche d'une expansion pour des populations de plus en plus nombreuses et jeunes. Ainsi, nous sommes conduits à la question fondamentale suivante : Les branches agro-industrielles camerounaises sont-elles techniquement efficace?

Cette préoccupation pour l'efficacité technique des branches agro-industrielles camerounaises, nous amène à un certain nombre de questionnements qui

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permettront de mieux cerner le problème. Qu'est ce que l'efficacité technique? Quel est le niveau actuel de l'efficacité technique des branches agro-industrielles camerounaises? Quels sont les déterminants de l'efficacité technique? Comment mesurer l'efficacité technique des branches? Quels sont les facteurs explicatifs et constitutifs de leurs diverses efficacités techniques ? Comment les branches agro-industrielles peuvent améliorer l'efficacité technique afin de tirer le maximum de profit? L'absence d'une étude économique rigoureuse sur les branches agro-industrielles camerounaises avec des implications de politiques économiques milite en faveur d'une telle entreprise. D'où, la nécessité d'entreprendre cette étude relative à l'approche non paramétrique de l'efficacité technique des branches agro-industrielles camerounaises.

II. Definitions Conceptuelles et Mesures

a) Concept d'efficacité technique

L'efficacité technique concerne la capacité d'une organisation, une entreprise, une branche dans notre cas, à éviter le gaspillage. L'efficacité technique d'une branche mesure donc l'aptitude de celle-ci à obtenir le maximum d'output possible à partir d'une combinaison efficiente d'inputs et d'une technologie de production donnée ou son aptitude à réaliser un niveau d'outputs très élevés à partir des quantités d'inputs disponibles.

b) Concept d'efficacité allocative (efficacité prix)

L'efficacité allocative évalue la façon dont la firme choisit les proportions des différents inputs par rapport au prix du marché supposé concurrentiel. Théoriquement, un processus de production est dit allocativement efficace si le taux marginal de substitution entre chaque paire de facteurs est égal à la proportion du prix de ces derniers. En effet, l'efficacité allocative provient du fait que les facteurs de productions ne sont pas gratuits, ils ont un coût (un prix). De ce fait, en choisissant son programme de production, la firme doit en plus des paramètres techniques, tenir compte de leurs prix relatifs sur le marché.

c) Mesure de l'efficacité

La mesure de l'efficacité est apparue dans les travaux de Koopmans (1951) relatif à l'analyse de la production de Debreu (1951) qui introduit le coefficient d'utilisation des ressources. En 1957, Farrell a établi que l'efficacité de la firme peut-être empiriquement calculée et propose, pour la première fois une mesure radicale d'estimation des frontières à partir de l'observation des situations réelles de production. En effet, Farrell définit l'efficacité en dissociant ce qui est d'origine technique de ce qui est dû à un mauvais choix, en termes de combinaison des intrants (produits) par apport au prix des intrants (produits).

d) Mesure de l'efficacité technique

L'efficacité technique mesure la manière dont une firme choisit les quantités d'inputs qui entrent dans le processus de production, quand les proportions d'utilisation des facteurs sont biens définies.

e) Mesure de l'efficacité allocative

L'efficacité allocative mesure ainsi l'aptitude de l'unité de production à combiner ses inputs dans les proportions optimales compte tenu de leur prix relatif sur le marché et du budget alloué pour les acquérir. Ainsi, pour un ensemble de combinaisons de facteurs permettant la réalisation d'un niveau de production donné, la meilleure combinaison allocative, est celle qui est obtenue à moindre coût. L'inefficacité allocative provient donc de l'utilisation des facteurs de production dans les proportions ne minimisant pas les coûts compte tenu de leur prix sur le marché.

f) Mesure de l'efficacité économique

L'efficacité économique est déterminée par la combinaison de l'efficacité technique et de l'efficacité allocative d'une firme combinant par exemple les facteurs travail et capital pour produire un produit donné.

III. Revue de la Litterature : Fondements Théoriques

a) Approches explicatives du concept d'efficacité

L'approche de Farrell ci-dessous suppose les rendements d'échelle constants, sur la figure ci-dessous SS' est un isoquant représentant l'ensemble des combinaisons des facteurs capital et travail permettant à une firme techniquement efficace, de produire une unité d'output. Tout point de la firme en dehors de SS' est techniquement inefficace pour ce niveau de production donné. Le point Q représente la firme efficace dont les quantités de capital et travail utilisé sont proportionnelles à celle de la firme située au point P. Si on suppose que la firme Q parvient à produire la même quantité d'output que la firme P en utilisant seulement une fraction OQ/OP des facteurs de production, le niveau d'efficacité technique de la firme P est défini par le ratio OQ/OP. Ainsi, ce ratio est égal à l'unité pour une firme techniquement efficace c'est à dire situé sur SS'. Le degré relatif d'inefficacité technique de la firme est mesuré par rapport QP/OP et correspondant à la quantité d'input pouvant être économisée sans qu'il ait une réduction du niveau de production.

Cependant, pour qu'une firme soit économiquement efficace, il faudrait en plus qu'elle combine ses facteurs de production dans des proportions lui permettant de minimiser les coûts étant donné leurs prix relatifs. Ainsi, sur la figure ci-dessous, si AA' représente la courbe d'iso coûts (dans la théorie microéconomique, pour des prix des facteurs donnés, l'iso coût associé à une dépense est le lieu des

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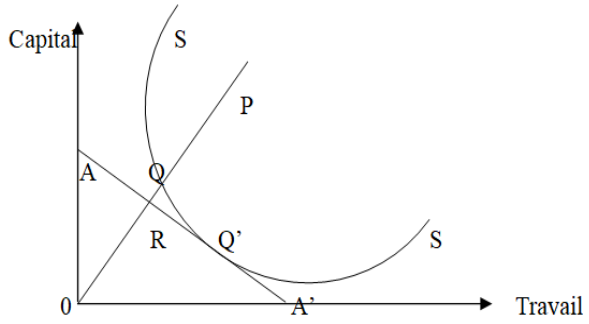
combinaisons des facteurs qui correspondent à cette dépense) associée au niveau de dépense dont dispose la firme pour acquérir ses facteurs de production, c'est le point Q' et non Q qui donc est le point optimal de production.

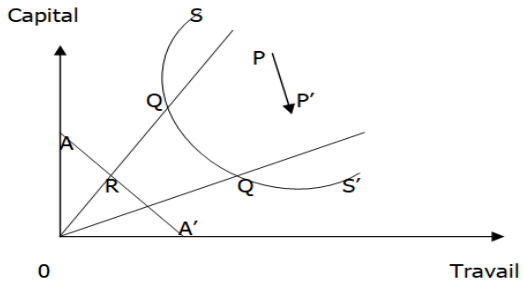


Source: Nabil, A. et Robert, R. (2000)

Figure 1: Efficacité technique et efficacité allocative : cas de deux intrants

C'est le point où le rapport des productivités marginales des facteurs est égal au rapport des prix. Q' et Q étant situés sur SS' leur efficacité technique est de 100% mais les coûts de production au point Q' ne représentent que la fraction OR/OQ de deux points Q.

L'efficacité allocative ou des prix de la firme Q est donc de mesure par le rapport OR/OQ. Si la firme P (figure 2.2) change la proportion d'utilisation de ses combinaisons dans les quantités proportionnelles à celles données au point Q' (en passant de P à P'), tout en gardant le même indice d'efficacité technique, elle améliore ses coûts de production par le rapport OR/OQ de ceux de P. Ce ratio OR/OP = OQ/OP x OR/OQ, qui est le produit de l'efficacité technique et de l'efficacité allocative au point P, mesure le niveau d'efficacité économique de la firme p.



Source : Farrell, (1957) P. 254 ; cité Joumady (2000)

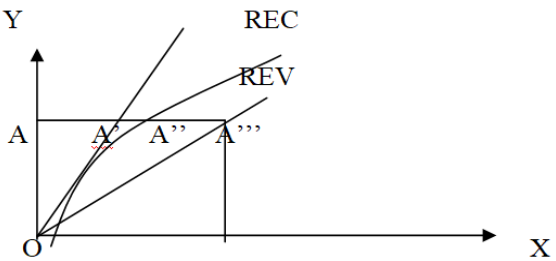
*Figure 2:*Changement de la proportion d'utilisation des inputs de la firme P

Ainsi, *l'efficacité allocative* met l'accent sur la manière dont les inputs sont combinés étant donné leurs prix relatifs. Par contre, l'efficacité technique s'intéresse à la façon dont le processus de production transforme les inputs en outputs. Alors que, *l'efficacité technique* mesure l'aptitude d'une unité de production à obtenir le maximum d'output possible à partir d'une combinaison d'inputs et d'une technologie de production donnée ou son aptitude à réaliser un niveau d'output donné à partir des plus petites quantités d'inputs possible. Elle concerne donc la capacité à éviter le gaspillage. Une entreprise est déclarée techniquement efficace si pour les niveaux d'inputs utilisés et d'outputs produits il lui est impossible d'augmenter la quantité d'output sans augmenter la quantité d'un ou plusieurs inputs ou réduire la quantité d'autre output. Elle correspond donc soit à une production en deçà de ce qui est techniquement possible pour une technologie donnée ou à utilisation des quantités d'inputs au dessus du nécessaire pour un niveau d'output donné. Si on tient compte du type de rendement dans lequel s'effectue la production, l'efficacité technique peut elle-même être décomposée en efficacité technique pure et efficacité d'échelle (Farrell(1957) cité par Joumady (2000)).

L'efficacité technique pure reflète la capacité d'une entreprise à optimiser sa production pour un niveau donné d'input symétriquement à minimiser ses consommations en ressources pour un niveau de production, l'habileté d'organiser, de motiver, et de surveiller efficacement les employés et les superviseurs ou encore l'habileté à éviter les erreurs et les mauvaises décisions. En revanche l'efficacité d'échelle permet de rapporter la mesure de l'efficacité technique aux rendements d'échelles obtenus dans les niveaux d'activités optimaux. L'échelle optimale est entendue aussi ici comme étant la meilleure situation à la quelle peut parvenir à l'unité de production en augmentant proportionnellement la quantité de tous les facteurs.

Pour illustrer le cas d'une agro-industrie qui produit un output Y à partir d'un seul input X (figure 3) en supposant la technologie de production à rendements d'échelle variables. Une technologie est à rendement d'échelle variable si à la suite d'une augmentation proportionnelle de tous les facteurs de production, la production varie dans une proportion différente. Par contre elle est à rendements d'échelle constants si une augmentation proportionnelle de tous les facteurs de production entraîne une augmentation de la production dans la même proportion.

La frontière des possibilités de production de cette agro-industrie est représentée par la courbe à rendement d'échelle variable (REV) sous l'hypothèse de rendements d'échelle constants (REC), cette frontière est représentée par la droite (REC).



Source : Joumady (2000)

Figure 3: Frontière de production et rendement d'échelle

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Au point A''', l'agro-industrie est techniquement capable de produire la même quantité d'output en utilisant moins d'inputs. Elle est par conséquent inefficace dans la mesure où elle peut réaliser une économie d'input correspondant à A''A'''. Le niveau d'efficacité technique pure est le rapport AA''/AA'''. L'efficacité d'échelle quant à elle est fournie par la distance entre frontière REC et REV et est mesurée par le rapport AA'/AA''. Le produit de l'efficacité technique pure et l'efficacité d'échelle représentent l'efficacité technique totale, donne le rapport AA'/AA''' et correspond à la mesure de l'efficacité technique dans le cas de rendements d'échelle constants. Ainsi, la notion d'efficacité technique est indépendante des prix des produits et des inputs et de la disponibilité de ces derniers contrairement à l'efficacité allocative.

Il ressort des deux notions abordées ci-dessus que pour une unité de production, la combinaison optimale des facteurs de productions est celle qui s'obtient à moindre coût et qui permet d'obtenir le maximum d'output possible compte tenu de la technique utilisée. L'unité de la production dans ce cas est dite économiquement efficace dans la mesure où elle utilise une meilleure combinaison d'input possible dans le processus de production. L'inefficacité économique intègre donc l'inefficacité technique et l'inefficacité allocative d'où l'exploration méthodologique permettant de mesurer de l'efficacité technique.

b) Approche non paramétrique d'estimation de la frontière d'efficacité technique

Dans l'approche d'estimation de la fonction d'efficacité technique, Farrell (1957) a suggéré d'utiliser deux types de frontières de production, ce qui a conduit au fait que deux paradigmes distincts ont été développés quant à la méthode de construction de la frontière de production. Ceci a conduit au développement de deux approches : paramétriques (Aigner et Chu, 1968 ; Aigner et al, 1977) et (Meeusen et al, 1977) et non paramétrique (Charnes, Cooper, et Rhodes, 1978 et Banker et al 1984), qui doivent lieu à des interprétations particulières de la déviation par rapport à la frontière d'une firme.

L'approche non paramétrique présente la particularité de n'imposer aucune forme fonctionnelle aux frontières de production. Celles-ci sont construites par la résolution des problèmes: primal et dual de programmation linéaire, une fois définis les inputs et les outputs des unités de production (firmes, fermes etc.…). Une unité de production (UP) est considérée comme efficace dans un échantillon si aucune unité de production ne produit plus d'output avec la même quantité d'inputs. L'une des méthodes les plus utilisées est l'analyse d'enveloppement des données (AED) ou Data Enveloppement Analysis (DEA). Mais il existe une deuxième, la méthode « Free Disposal Hull (FDH) »

La méthode d'analyse d'enveloppement de données (AED) prend ses origines dans les travaux de Farrell (1957), et Farrell et Fieldhouse (1962) qui proposent une mesure de l'efficacité relative. En 1978 Charnes, Cooper et Rhodes reprennent l'approche proposée par Farrell étendent à des situations dans lesquelles les firmes ont des inputs et outputs multiples et non équivalents. Plus connue sous son nom en anglais « Data Envelopment Analysis » la méthode d'enveloppement des données est une méthode déterministe non paramétrique d'estimation des frontières, qui suppose l'ensemble de possibilité de production comme étant un ensemble convexe.

La mesure de l'efficacité technique par la méthode DEA peut-être faite suivant deux orientations. La première orientation tournée vers la maximisation des outputs est appliquée lorsque l'on cherche à augmenter les quantités d'outputs sans changer les quantités d'inputs utilisés. Par contre, l'orientation tournée vers la minimisation des outputs est appliquée lorsque l'on cherche à diminuer proportionnellement les quantités d'inputs.

La méthode DEA s'appuie sur les techniques de programmation linéaire pour mesurer une frontière de production d'un échantillon des observations. Cette frontière de production se situe au sommet des observations et correspond aux unités de l'échantillon les plus efficaces. Elle enveloppe l'ensemble des observations de telle sorte que les unités les moins efficaces se situent en dessous de l'enveloppe. L'efficacité technique d'une unité d'échantillon correspond ainsi à une distance qui sépare les enveloppes. Elle est une efficacité relative dans la mesure où elle dépend des unités les plus efficaces de l'échantillon. La figure ci-dessous permet d'illustrer cela dans le cas d'un échantillon d'unités utilisant un seul input pour produire un seul bien avec les rendements d'échelle supposés non constants.

Sur la figure ci-dessous, les unités de production: A, B, C, D et E constituent une enveloppe de référence par rapport à laquelle est évaluée l'efficacité technique des unités de l'échantillon. Elle correspond aux unités les plus efficaces de l'échantillon observé et leur efficacité technique est par définition égale à 1. Le point P n'étant pas sur la frontière, représente une firme techniquement inefficace. En effet, à partir de la quantité d'input Xp dont elle dispose, elle est techniquement susceptible de produire la quantité la quantité Yp d'output supérieure à celle qu'elle réalise Y*p. Son efficacité technique dans ce cas vaut Y°p/Y*p inférieur à 1 et correspond au rapport de la quantité d'output qu'elle produit à partir de cette même quantité d'input au regard des meilleures unités de l'échantillon. Cette façon mesurer l'efficacité technique correspond à une orientation output. La firme peut également produire la quantité Y°p en utilisant moins d'inputs notamment une quantité X°p inférieur Xp. Son efficacité technique

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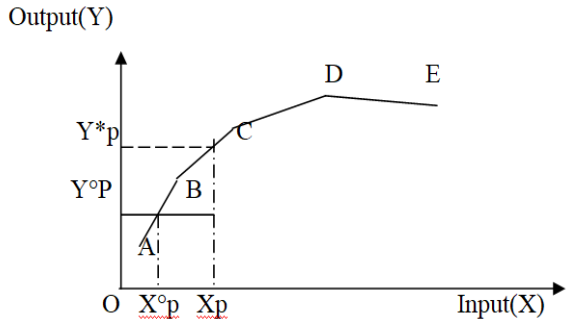
dans ce cas vaut X°p/Xp<1 et correspond à une orientation input. Selon Farell et Lovell (1978), cités par coelli (1996), les indices d'efficacité technique orientation output et orientation input sont égaux dans le cas de rendements d'échelle constants et différent dans les cas de rendements d'échelle variables. Cependant, notons que les unités de production situées sur la frontière estimée sont les mêmes quelque soit l'orientation choisie.



Source : Yves Kamgna et Léonnel Dimou (2008)

Figure 4: Illustration de la mesure de l'efficacité technique par la méthode DEA.

Le programme linéaire permettant la construction de la frontière d'efficacité dépend du type de rendement dans lequel s'effectue la production. On distingue ainsi le modèle à rendements d'échelle constants (REC ou CRS) et celui à rendements d'échelle variables (REV ou VRS).

Le modèle à rendements d'échelle constants ou modèle CRS (orientions input) attribué à charnes (1978) est basé sur la maximisation pour une firme donnée, du ratio correspondant à la somme pondérée de ses outputs sur la somme pondérée de ses inputs et considéré comme étant une mesure de son efficacité technique. Ainsi, si on dispose un échantillon de N unités de production, de K inputs et M outputs, pour chacune de ces unités, la mesure de l'efficacité de l'unité i de l'échantillon donné par le programme de maximisation ci-dessous est :

$$Max(uv)h_i = \frac{\sum_{m=1}^{M} u_m Y_{mi}}{\sum_{k=1}^{K} v_k X_{ki}}, i = 1,2.....N \quad \text{S/C} \quad Max(uv)h_i = \frac{\sum_{m=1}^{M} u_m Y_{mj}}{\sum_{k=1}^{K} v_k X_{kj}} \leq 1,\ j = 1,2.....N$$

* h_i est l'indice d'efficacité de l'unité de production ''i''
* m et k sont respectivement d'indice des outputs et l'indice des inputs

$X_{k,i}$ et $Y_{k,i}$ représentent respectivement $k^{ième}$ input et $m^{ième}$ output de l'unité i
$X_{k,j}$ et $Y_{m,j}$ représentent respectivement $K^{ième}$ input et $M^{ième}$ output de l'unité j
u_m et v_m sont des paramètres à estimer représentant les coefficients de pondération des outputs et inputs
Résolution de ce programme n'est pas aisée

$\sum_{k=1}^{K} v_k \times X_{ki} = 1$ Le programme devient alors $Max \sum_{m=1}^{M} u_m Y_{mi}$

$$\text{S/C} \quad \sum_{k=1}^{K} v_k X_{ki} = 1 \quad \text{alors} \quad \sum_{m=1}^{M} u_m Y_{mi} - \sum_{k=1}^{K} v_k X_{ki} \leq 0 \quad \text{et enfin on a } u_m V_k \geq 0$$

Les rendements d'échelle constants ne distinguent pas les deux formes d'efficacité c'est-à-dire efficacité technique pure et efficacité d'échelle.

Modèle à rendements d'échelle variables ou modèle VRS (orientation input) l'hypothèse de rendements variables apparaît plus vraisemblable que celle de rendements constants. La prise en compte de rendements non constants dans la mesure de l'efficacité technique (orientation input) proposée par Banker et al (1984) s'obtient en ajoutant au programme dual précédent, une contrainte de convexité est $\sum_{j=1}^{M} \lambda_i = 1$. On obtient alors les programmes suivants:

$$Min\Phi_1(1 \leq i \leq N) \text{ et } Y_i + \sum_{j=1}^{N} \lambda_j Y_{mj} \geq 0 \quad \text{avec} \quad \Phi X_i - \sum_{j=1}^{N} \lambda j X_{kj} \geq 0 \quad ; \quad \text{Ou, } Max \sum_{j=1}^{N} \lambda j = 1 \quad \text{tel que} \quad \lambda_j \geq 0 \ ;$$

Le score d'efficacité de l'unité de production *i* est déterminé par la grandeur $1/\Phi_1$ comprise entre 0 et 1.

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L'approche DEA comporte certains avantages par rapport à d'autre approche notamment, (1) elle permet de se focaliser sur les observations individuelles, plutôt sur les moyennes d'échantillon (2) elle produit une mesure agrégée pour chaque unité de production, en terme de son utilisation des inputs (variables indépendantes) pour produire les outputs désirés (variables dépendantes), (3) elle permet la prise en compte simultanée d'inputs multiples et outputs multiples, même lorsqu'ils sont tous exprimés en mesures différentes (4) elle ne nécessite pas des spécifications particulières ou de connaissance à priori des pondérations et les prix des inputs ou outputs et enfin (5) elle ne pose pas de restrictions sur la forme fonctionnelle de la fonction de production.

Elle porte en elle aussi certaines limites. Le problème majeur des modèles DEA est que si les données sont sujettes à des erreurs aléatoires, alors le Calcul de la frontière de possibilité de production (FPP) est biaisé. Comme la méthode DEA est une méthode non paramétrique, alors tests statistiques d'hypothèse sont difficiles (ils font l'objet des recherches actuelles).

La méthode non paramétrique « Free Disposal Hull » a été proposée pour la première fois par Deprins, Simar, Tulkens (1984). La construction de l'ensemble de références « FDH » repose sur deux postulats. *Le premier,* le déterminisme fait partie de l'ensemble de référence inter temporel « FDH », tous les plans de production sont observés. *Le second*, libre disposition ou « Free Disposal » fait également partie de tous les plans de production (observés ou non) de niveau d'output égal ou plus petit et ayant au moins une quantité supérieure d'un input (c'est-à-dire les plans de production faiblement dominés en inputs) avec des niveaux d'input égaux ou plus grand et ayant une quantité inférieure de l'output. Les inputs capital (K) et travail (L) du pays h (h=1…n) à la période t, et y output correspondant Y.

Le degré d'efficacité non paramétrique en output de l'observation k à la période, indique la mesure dans la quelle son output peut-être augmenté tout en restant dans l'ensemble de référence. L'observation kt est efficace en output, aucune autre observation de l'ensemble de référence ER, Y n'a donc un output strictement supérieur au plan de reproduction kt tout en utilisant moins ou une quantité équivalente d'input (s).

L'observation est inefficace en output puisqu'il existe au moins une autre observation de niveau d'output strictement supérieur utilisant moins ou une quantité équivalente d'input (s). Si nous désignons par hs* le plan de la production d'output maximum utilisant, le cas échéant, le moins d'input (s) que l'observation kt, il sera possible d'accroître l'output de l'observation kt pour atteindre le niveau d'output de l'observation hs* sans pour cela utiliser une quantité supérieure d'input (s). Cette approche non paramétrique jusqu'à peu utilisé fait l'objet des grandes recherches dans les laboratoires des Sciences Economique et de Gestion.

IV. Methodologie, Analyse et Interpretation des Resultats de L'etude

Nous avons fait recours à la méthode DEA (Data Envelopment Analysis) pour mesurer les niveaux d'efficacité technique des branches agro-industrielles camerounaises sur la période 2005-2014 à l'aide du logiciel SPAD 9.1. La méthode non paramétrique comme cadre d'analyse qui se justifie par l'incertitude de la relation fonctionnelle liant les inputs et les outputs dans le secteur de l'agro-industrie. Pour cerner les facteurs explicatifs des niveaux d'efficacité des branches agro-industrielles, puis nous avons estimé un modèle de régression linéaire multiple. Ce modèle a pour variable expliquée les scores d'efficacité technique pure et comme variables explicatives et certains ratios de gestion pertinents. Les données utilisées pour l'estimation des scores et l'analyse des déterminants de l'efficacité technique proviennent de l'Institut National de la Statistique (INS) du Cameroun et du Groupement inter patronal du Cameroun (GICAM). Nous disposons de 11 points d'observations chaque année et de 110 points d'observations sur toute la période permettant la construction d'une frontière de production et l'estimation des scores annuels des branches agro-industrielles observées.

Deux principales méthodes sont à l'origine de la modélisation des déterminants de l'efficacité. Le modèle logit ou tobit et la régression linéaire utilisant les moindres carrés ordinaires (MCO). Mais, le modèle tobit dans l'estimation des déterminants de l'efficacité technique a un inconvénient, car il requiert une hypothèse concernant l'indépendance des scores les uns par rapport aux autres, condition qui n'est pas souvent vérifiée. Les effets spécifiques ou temporels éventuels n'ont pas été pris en compte afin de simplifier le modèle. En effet, elle identifie les facteurs explicatifs de la gestion d'une branche agro-industrielle qui déterminent les scores en une année donnée, en considérant une branche comme deux individus différents lorsqu'on passe d'un exercice comptable à un autre.

a) Spécification des inputs et output agro-industriels

De nombreuses approches permettant d'identifier les inputs et outputs agro-industriels. Pour cette analyse de l'efficacité technique des branches agro-industrielles camerounaises nous allons fait l'approche par la production qui s'avère être la plus appropriée. Elle considère une entreprise agro-industrielle comme étant un producteur des biens et services, à partir des inputs que sont le capital (immobilisations) et le travail (nombres des employés).

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La production est mesurée en unité physique par le volume, par branche d'activité. Ainsi, on a deux inputs qui produiront un output:

Le facteur travail (input 1): qui constitue un des éléments indispensables à toutes combinaisons économiques quelque soit le système économique sur lequel on raisonne, le coût du travail a été estimé par les charges de personnels y compris les charges sociales. Dans ce cas, il est estimé par le nombre des employés de la branche concernée.

Le capital physique (input 2): est le facteur de production qui existe toujours quelque soit le système économique. Il s'agit pour l'essentiel des immobilisations incorporelles (actifs financiers), corporels (équipements, coût des matières premières).

La production (output): Elle naît de la combinaison de plusieurs facteurs (travail, capital etc.). Elle est exprimée par la quantité des biens et services produits au cours d'un cycle de fabrication ou en un temps donné.

b) *Analyse en composantes principales (ACP) des branches agro-industrielles camerounaises*

L'analyse en composantes principales consiste à analyser les données appliquées sur un tableau rectangulaire individus-variables ; où N individus sont décrits par P variables quantitatives. Elle résume de manière synthétique les informations contenues dans le tableau de données. Elle permet ainsi d'analyser les proximités entre les individus, les corrélations entre les variables, les individus et les variables simultanément. L'ACP permet de regrouper les branches agro-industrielles qui ont eu des performances similaires durant la période de l'étude. Elle a permis d'obtenir les résultats suivants:

Tableau 1: Tableau des valeurs propres

Numéros	Valeurs propres	Pourcentages	Pourcentages cumulés
1	2,8192	56,38	56,38
2	1,0348	20,70	77,08
3	0,6977	13,95	91,03
4	0,3580	7,16	98,19
5	0,0904	1,81	100

Sources : INS, nos calculs

L'inertie totale du nuage des individus et des variables dans une ACP normée est égale au nombre des variables actives. L'examen du tableau des valeurs propres ci-dessus permet de constater que le premier axe factoriel avec une inertie de 2,8192 explique 56,38% de l'inertie totale des nuages. Le deuxième axe quant à lui n'explique que 20,70% de l'inertie du nuage. Les deux premiers axes factoriels expliquent ainsi à eux seuls 77,08% de l'inertie totale de nuage. Nous pensons que ce pourcentage d'inertie cumulé est satisfaisant pour mener nos interprétations à partir des deux axes factoriels. D'autre part, si chacune des 11 branches contribuaient à part égale à la détermination des axes, la contribution de chacune devrait être de 100/11 = 9,09% pour la détermination de chaque axe.

La matrice donnant les coordonnées des variables sur les axes factoriels laisse entrevoir que la quasi-totalité des variables sont corrélées positivement au premier facteur (capital). Ce qui signifie que pour toutes les branches agro-industrielles bien représentées sur cet axe avec une coordonnée positive, les scores annuels ont été supérieurs aux moyennes annuelles pratiquement sur toute la période de l'étude. De même, pour toutes les branches agro-industrielles bien représentées sur cet axe, mais plutôt avec une coordonnée négative, les scores annuels ont été inférieurs à la moyenne presque sur toute la période de l'étude. L'examen des nuages des branches agro-industrielles ci-dessus permet de constater que le premier axe factoriel oppose deux groupes de branches à gauche et à droite de l'origine. Le premier groupe situé à droite de l'origine est constitué essentiellement de branches agro-industrielles de transformation des produits d'origine agricole, fabrication des papiers et article en papier, travail de grains et production de farines, industrie chimique et fabrication des produits chimiques dont les scores annuels sont supérieurs aux moyennes annuelles des scores sur toute la période. Le deuxième groupe situé à gauche de l'origine est constitué essentiellement des branches d'industries textiles et confection, fabrication des chaussures et industrie cuir. Les branches de ce groupe qui sont bien représentées sur le premier facteur ont eu des scores annuels inférieurs aux moyennes annuelles des scores sur toute la période.

Le deuxième axe factoriel quant à lui oppose également deux groupes de branches agro-industrielles au dessus et en dessous de l'origine. La matrice des coordonnées des variables sur les axes factoriels montre que toutes les variables correspondant à l'année 2012 sont négativement corrélées au deuxième facteur (travail). Ce qui signifie que pour les branches agro-industrielles bien représentées sur cet axe avec une coordonnée négative, les scores annuels ont été supérieurs aux moyennes annuelles des scores durant l'année 2012. Il s'agit notamment des branches : industrie du bois et fabrication des meubles, autres industries alimentaires situées en dessous de l'origine dont les contributions sur le deuxième facteur sont supérieures à la contribution moyenne de ce facteur. De manière analogue, les branches bien représentées sur cet axe plutôt avec une coordonnée positive, ont eu des scores annuels inférieurs aux moyennes annuelles durant toute l'année 2012. L'on constate que la quasi-totalité des autres variables sont faiblement et positivement corrélées au deuxième facteur.

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L'ACP permet donc de distinguer deux grands groupes : Les branches transformation des produits d'origine agricole, fabrication des papiers et article en papier, travail de grains et production de farines, industrie chimique et fabrication des produits chimiques, industrie textile et confection, fabrication des chaussures et industrie du cuir, dont les scores moyens annuels sont supérieurs à la moyenne annuelle sur toute la période. Les autres branches de l'agro-industrie camerounaise, dont les scores moyens annuels sont inférieurs à la moyenne annuelle sur toute la période. L'investissement productif étant le moteur de la croissance économique, il convient donc, afin d'assurer son financement de rechercher les facteurs sur lesquels on pourrait agir pour améliorer l'efficacité technique des branches agro-industrielles en valorisant les produits et inputs nationaux.

c) Analyse descriptive des scores d'efficacité

Les résultats obtenus supposent que toutes les agro-industries de l'échantillon sont placées dans les mêmes conditions c'est-à-dire qu'elles utilisent les mêmes inputs pour produire les mêmes outputs, elles sont soumises aux mêmes normes réglementaires et que la technologie constante (absence de progrès technique) durant la période d'étude. Ce préalable nous permettra de mieux manipuler les variables (inputs et outputs) afin de déterminer l'évolution des scores moyens annuels.

d) Evolution des scores moyens annuels

Le tableau présente les niveaux moyens annuels d'efficacité technique totale de l'ensemble de l'échantillon sur la période de l'étude, ainsi que leur décomposition en efficacité technique pure et en efficacité d'échelle via les données des différentes branches agro-industrielles camerounaises suite à un traitement avec SPAD.9.1. Ces résultats ont subi des nombreux calculs d'agrégations.

Tableau 2: Evolution des scores moyens d'efficacité

Periode	Totale	Pure	Echelle
2005	0,272	0,464	0,306
2006	0,427	0,727	0,509
2007	0,262	0,296	0,268
2008	0,556	0,836	0,582
2009	0,375	0,645	0,393
2010	0,347	0,595	0,413
2011	0,246	0,419	0,368
2012	0,185	0,279	0,271
2013	0,221	0,352	0,3
2014	0,212	0,411	0,298
2005-2014	0,310	0,503	0,371

Source : INS, GICAM, nos calculs

Le tableau ci-dessus montre que l'indice d'efficacité technique totale des branches agro-industrielles s'est établi à 0,31 sur la période de l'étude. Ces résultats signifient qu'en moyenne, sous l'hypothèse des rendements constants les agro-industries camerounaises n'ont produit que 31% de la quantité d'outputs qu'elles auraient pu produire à partir de leurs ressources. En supposant les rendements sont plutôt variables, le niveau moyen d'efficacité technique pure s'est établi à 0,503 signifiant que les agro-industries n'ont produit en moyenne sur la période de l'étude que 50,3% de ce qu'elles étaient capables de produire à partir de leurs ressources. L'hypothèse selon laquelle les branches agro-industrielles camerounaises ne sont pas optimales dans la gestion de leurs ressources se trouve ainsi confirmé. Le score d'efficacité d'échelle sur la période s'est élevé à 0,371 signifiant que sous des rendements variables, les branches agro-industrielles déclarées techniquement efficaces n'ont produit que 37,1% de la quantité de production qu'elles auraient pu produire si elles opéraient à rendements constants. Ce dernier résultat prouve que les branches agro-industrielles camerounaises souffrent énormément du problème d'inefficacité. Il montre également que le rythme de la croissance de la production (output) a été inférieur à celui des investissements (inputs) durant la période de l'étude. Ce qui confirme le fait que les agro-industries ont assez d'inputs mais ne les combinent pas de manière optimale.

L'observation minutieuse, montre que le niveau moyen d'efficacité technique pure est resté pratiquement constant sur toute la période. On remarque des augmentations en valeur en 2008 et 2010, et des baisses drastiques en 2007 et 2012. Sa valeur est moyenne dans la mesure où elle se situe juste au dessus de 0,5 sur toute la période de l'étude. La constance de l'indice d'efficacité technique pure des branches montre que les pratiques de gestion des entreprises agro-industrielles ne varient pas beaucoup sur la période de l'étude. Par ailleurs, le niveau d'efficacité technique totale dont la valeur est resté toujours inférieure à 0,5 sauf en 2008 et décroît considérablement en 2012, puis une légère hausse en 2013 et 2014. Le niveau d'efficacité d'échelle quant à lui est resté très constant quasiment sur toute la période de l'étude. On suppose au regard de ces constats que l'efficacité d'échelle n'explique pas à elle seule, l'évolution du niveau d'efficacité technique totale des branches agro-industrielles.

Les branches agro-industrielles camerounaises ont souffert d'inefficacité d'échelle (indice d'inefficacité = 1 - efficacité) et de mauvaises pratiques de gestion. Mais, la sous production constatée est beaucoup plus liée à un problème d'optimalité (utilisation et combinaison sous optimales des inputs) qu'à celui de mauvaise pratique de gestion.

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e) Scores moyens d'inefficacité sur la période

Il ressort du tableau ci-dessous que le niveau moyen d'inefficacité s'est établi à 0,69 signifiant que sous l'hypothèse de rendements constants, les branches agro-industrielles auraient pu accroître proportionnellement leur volume de production de 222,58% [(0,69/0,31) x 100] en maintenant le niveau des inputs constants. Sous l'hypothèse de rendements variables, cet accroissement s'élève plutôt.

Tableau 3: Scores moyens d'inefficacité sur la période

Periode	Totale	Pure	Echelle
2005	0,728	0,556	0,694
2006	0,573	0,273	0,491
2007	0,738	0,704	0,732
2008	0,444	0,164	0,418
2009	0,625	0,355	0,607
2010	0,653	0,405	0,587
2011	0,754	0,581	0,632
2012	0,788	0,721	0,729
2013	0,779	0,648	0,7
2014	0,788	0,589	0,602
2005-2014	0,69	0,497	0,629

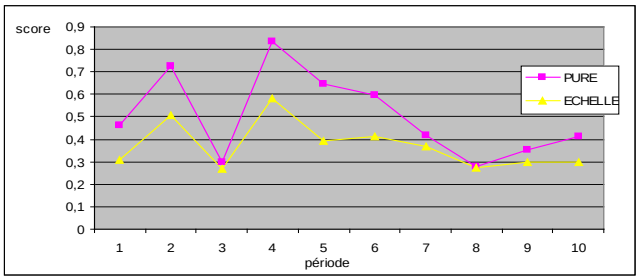
Source : nos calculs

L'inefficacité d'échelle quant à elle s'est établie sur la période de l'étude à 0,629 signifiant que les branches agro-industrielles déclarées techniquement efficaces sous l'hypothèse des rendements variables, pourrait accroître leur volume de production de 58,98% (0,371/0,629) sans changer les inputs si elles opéraient à rendements constants.

Pendant le début et la fin de l'étude, les branches agro-industrielles ont été techniquement inefficaces car ce sont les périodes où les courbes sont au maximum. Il ressort aussi que l'inefficacité pure n'a pas beaucoup varié sur toute la période de l'étude avec une valeur relativement faible tournant autour de 0,25. Ce qui veut dire que les pratiques de gestion dans les branches agro-industrielles n'ont pas changé toute la période. L'inefficacité d'échelle en 2007, 2012 et 2013 ; avaient atteint les maxima. L'inefficacité d'échelle est restée au dessus de l'inefficacité pure pendant toute la période.

Le graphique ci-dessous donne l'évolution des scores moyens annuels d'efficacité technique pure et d'échelle pour la période.

Graphique: Evolution des scores moyens annuels d'efficacité



Source : INS, nos calculs

Le graphique présente des variations brusques des scores d'efficacité technique pure pendant la période. Oscillant entre 0,05 et 0,53. Les pratiques de gestion sont restées les mêmes tout au long de la période. La meilleure performance du système a été réalisée en 2008, soit 0,836 contrairement à l'an 2012 ; où le système a réalisé sa plus faible performance avec un score moyen qui s'établi à 0,279.

f) Spécification du modèle empirique

A la suite, le modèle linéaire multiple a été retenu sa forme est suivante :

$$Y_i = \beta_I X_{1i} + \beta_2 X_{2i} + \beta_3 X_{2i} + \ldots + \beta_K X_{ki} + \varepsilon i, \quad i = 1,2\ldots..,110 \qquad (1)$$

Où, Y est un vecteur de dimension 110 x 1 représentant les scores annuels d'efficacité technique pure (ETP) des branches agro-industrielles camerounaises sur toute la période de l'étude. Il représente la variable expliquée du modèle.

X_{1i}, X_{2i}, X_{3i} …, X_{ki} ; représentent respectivement les *k* variables explicatives exogènes et potentielles des scores de branches agro-industrielles ''*i*''.

εi est l'erreur de spécification (entre le modèle vrai et spécifié).

B*1*, B2,…….B*k* sont les paramètres du modèle.

i est le nombre d'observation.

Les variables explicatives utilisées dans l'estimation de ce modèle représentent quatre ratios de gestion des agro-industries:

Le ratio de la valeur ajoutée (RVA): pour déterminer l'apport de la branche ou du secteur dans le PIB. Il est déduit à partir de la somme des valeurs ajoutées.

Le ratio d'exportation (REX): mesure l'importance des transactions réalisées avec l'étranger. C'est la part du

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chiffre d'affaire réalisée à l'exportation dans le chiffre d'affaire total. Il mesure le degré d'ouverture.

Le ratio de rentabilité des immobilisations (RRI): détermine le rapport entre un revenu obtenu et les ressources employées pour l'obtenir.

Le ratio marge brute d'exploitation (RMBE) : mesure la croissance globale de l'économie via les branches agro-industrielles.

La spécification du modèle empirique d'estimation des déterminants de l'efficacité technique est donc la suivante:

$$ETP = \beta_0 + \beta_1 RVA_i + \beta_2 REX_i + \beta_3 RRI_i + \beta_4 RMBE_i + \varepsilon_i,\ i = 1,2, \ldots,110 \quad (2)$$

L'estimation de ce modèle met en relief les facteurs qui peuvent influencer la transformation des ressources agro-industrielles en produits manufacturiers. Afin de corriger une éventuelle auto-corrélation des erreurs du modèle, on a introduits le terme AR (1) dans le modèle.

L'équation qui en ressort est la suivante :

ETP = 0,385 + (-0,0065) x RVA + (0,0024) x REX + (–0,0078) x RRI + (0,0119) x RMBE

Ecart-type	(0,0595)	(0,00367)	(0,00149)	(0,00199)	(0,00395)
t - Student	(6,46)	(-1,77)	(1,59)	(-3,92)	(3,00)

g) Interprétation des résultats

Le modèle estimé sur les déterminants de l'efficacité technique des branches agro-industrielles camerounaises a suggéré les explications suivantes si toutes choses égales par ailleurs :

Le ratio de la valeur ajoutée (RVA): il semble inefficacité dans la transformation des produits manufacturiers. Puisqu'il agit négativement sur les scores d'efficacité signifiant que plus la proportion du taux de la valeur ajoutée dans une branche agro-industrielle augmente, plus cette agro-industrie n'est efficace dans la transformation des ressources. Autrement dit, dans une branche agro-industrielle lorsque les consommations intermédiaires sont importantes, elle devient techniquement inefficace. Alors, une augmentation de 1% des ressources de la proportion du taux de valeur ajoutée diminuerait le score d'efficacité de 0,65%.

Le ratio d'exportation (REX): Le signe positif signifie qu'il positivement sur l'efficacité de la branche agro-industrielle dans la transformation des ressources. En effet, lorsque les exportations augmentent, la branche assure continuellement la transformation des ressources. Ainsi, une augmentation de 1% du taux d'exportation, entraînerait une augmentation du score d'efficacité technique pure 0,238%. Ce résultat reflète la bonne qualité de nos produits agro-industriels, et traduit la volonté des demandeurs étrangers à les consommer. Il traduit également un climat des affaires satisfaisant dans l'agro-industrie et capable desservir les marchés intérieur et extérieur, donc résister à la concurrence extérieure.

Le ratio de rentabilité des immobilisations (RRI): influence négativement l'efficacité des entreprises agro-industrielles dans la transformation des ressources en produits manufacturiers. Son signe négatif traduit le fait que plus la proportion du taux de rentabilité des immobilisations augmente, moins la branche agro-industrielle transforme ses ressources en produits manufacturier. Avec un coefficient de régression de (-0,00782) ; une augmentation de ce ratio de 1 %, entraînerait une diminution du score d'efficacité de (0,782 %). Ce qui confirme l'hypothèse selon laquelle, plus la branche accumule le taux de rentabilité des immobilisations, plus elle devient réticente à la transformation des ressources par conséquent techniquement inefficaces. Les branches agro-industrielles camerounaises ne font donc pas une transformation optimale de leurs ressources lorsque le taux de rentabilité des immobilisations augmente. Cela pourrait aussi traduire le financement d'un certain nombre élevé de projets d'investissement non viables, mal montés, ne présentant aucune perspective de rentabilité.

Le ratio marge brute d'exploitation (RMBE): qui est considéré comme l'ensemble de ressources dont dispose la branche agro-industrielle à un moment donné. La marge d'exploitation constitue le solde positif entre des emplois et les ressources disponibles. Le signe positif de ce ratio signifie que plus la part de l'excédent d'exploitation dans une branche augmente, plus la branche est efficace dans la transformation de ses ressources. De manière formelle, une augmentation de 1 % de ce ratio, provoquerait une augmentation du score d'efficacité de 1,19%. Par ailleurs, une marge pléthorique pour une agro-industrie pourrait donc s'interpréter comme la manifestation d'une efficacité dans la transformation de ses ressources. Ce résultat pourrait s'expliquer par le fait que les branches agro-industrielles camerounaises préfèrent orienter leurs ressources dans les emplois de marge.

V. Conclusion

En définitive, l'analyse descriptive des résultats et le survol méthodologique ont permis de déterminer les scores d'efficacité par le moyen du logiciel SPAD 9.1 qui s'est fait à la suite de la spécification des inputs et outputs. Les scores d'efficacité nous ont permis de

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déterminer les scores d'inefficacité. Il ressort que l'efficacité technique totale s'est établie à 0,31 ; l'efficacité technique à 0,503 et l'efficacité d'échelle à 0,371. La meilleure performance a été réalisée en 2008 soit 0,836 ; la plus faible 0,279 en 2012. Ces résultats prouvent que les branches agro-industrielles camerounaises souffrent énormément et principalement de problèmes d'inefficacité que de la mauvaise pratique de gestion. L'analyse des composantes principales a montré que les branches les plus efficaces sont celles de transformation des produits agricoles, fabrication des papiers et articles en papiers et les moins efficaces techniquement sont celles de l'industrie du caoutchouc et articles en plastique. Il s'est avéré que le facteur capital est mieux corrélé aux branches qui sont techniquement efficaces et le capital à celle dont l'efficacité technique est moindre. Ceci nous conduit inévitablement à faire une estimation du modèle économétrique donc les ratios d'exportation (REX) et marge brute d'exploitation (RMBE) sont positivement corrélés et techniquement efficace.

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The Activities of Niger Delta Militants: A Road March to Development

By Past. Dr. Abomaye-Nimenibo, Williams Aminadokiari Samuel, Barrister, Miss Abomaye Nimenibo, Comfort Tamunobarasinpiri Emmanuel & Hannah Iyerikabo
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Abstract- This research work investigates the activities of the Niger Delta militants and how it affects the developmental strides of the Nigerian economy. We use primary data with a target population of students, oil company workers, civil servants, public servants, farmers, and entrepreneurs in Bayelsa State being the main hob of militancy and very rich in oil production than any other state. Tables were constructed to show the level of responses and their percentages. In the end, Chi-Square was used to test the relationship between militancy and the economy. The results revealed that militancy has a strong significant effect on crude oil production/supply as well as the Nigerian economy. Militancy in the Niger Delta Region has led to the loss of revenue accruable to the Federal Government of Nigeria. The activities of militants in the Niger Delta Region have significantly affected business life, create unemployment and devastated human lives in the Niger Delta region. Militancy also supports illegal bunkering.

Keywords: militancy, unemployment, business activities, development, revenue, and economy.

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The Activities of Niger Delta Militants: A Road March to Development

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Abstract- This research work investigates the activities of the Niger Delta militants and how it affects the developmental strides of the Nigerian economy. We use primary data with a target population of students, oil company workers, civil servants, public servants, farmers, and entrepreneurs in Bayelsa State being the main hob of militancy and very rich in oil production than any other state. Tables were constructed to show the level of responses and their percentages. In the end, Chi-Square was used to test the relationship between militancy and the economy. The results revealed that militancy has a strong significant effect on crude oil production/supply as well as the Nigerian economy. Militancy in the Niger Delta Region has led to the loss of revenue accruable to the Federal Government of Nigeria. The activities of militants in the Niger Delta Region have significantly affected business life, create unemployment and devastated human lives in the Niger Delta region. Militancy also supports illegal bunkering. This research work also provided some recommendations to help solve the problem of militancy in the Niger Delta region. These includes: the correction of systemic error in administration or governance, real development of the Niger Delta and not mushroom development; the federal government and oil companies should use security vote for the region to develop the region; Youths of the Niger region be gainfully employed; the federal government should increase the budget of the Niger Delta to enhance real development; Continual implementation of amnesty programme; with review in terms of Post amnesty programs and Indigenes of the region be allowed to have appreciable stake in the proceeds of their oil; discouragement of military approach to solving problems of the Niger Delta and for the militants to drop their guns and apply dialogue in resolving issues affecting them.

Keywords: militancy, unemployment, business activities, development, revenue, and economy.

I. Introduction

The Niger Delta covers an area of over 70,000 square kilometres, covering the larger part of the South-South region and some parts of the South East region of Nigeria. It derives its name from the River Niger and is one of the world's largest wetlands and Africa's largest delta. The Niger Delta is one of the biggest deltas in the world, probably the third largest on earth. The region is regarded as one of the nine most difficult deltas of the world comparable to the Mekong, the Amazon and the Ganges. It is situated in the central part of southern Nigeria. It is situate between latitudes 4o and 6o north of the Equator and 4o and 8o east of the Greenwich. According to the Niger Delta Regional Development Master Plan (2007), the area is said to have a targeted population of about twenty five million people (2006 National census figures and National Bureau of Statistics, 2006) with various ethnic groups numbering about forty-five, having the Ijaw, Edo, Igbo, Efik, Ibibio and Oron speaking tribes. The 2006 Population Census figure for Bayelsa State is 1,704,515 (One Million, Seven Hundred and Four Thousand, Five Hundred and Fifteen). The region is said to be rich in both renewable and non-renewable natural resources in terms of oil, gas, bitumen, etc., and accounts for 95% of the total revenue of Nigeria. This revenue is generated from oil and gas exploration with a contribution of not less than 80% of national wealth as was succinctly pointed out by Brisibie, 2001 and Tell Magazine No.33, 2008).

The swamp of the Niger Delta region (of which Bayelsa State is an integral part) is particularly blessed with crude oil. Crude oil in commercial quantity was first discovered in Nigeria at Oloibiri, Niger Delta region situate in present day Bayelsa State. Crude oil from the Niger Delta has been the lifeblood of Nigeria's economic wealth. About 2.6 million barrels of crude is taken daily from the region, and this accrues millions of Dollars daily to the federation account of Nigeria (Ejibunu, 2007: 9-20).

The unquantifiable proceeds from crude oil is what the Nigerian government uses to build up its infrastructures such as the construction of dual carriage roads across the country, build extravagant physical structures and institutions in Abuja and other parts of the country, and even have fuel for her use. Irrespective of the fact that crude oil is produced in the Niger Delta region to sustain the Nigerian economy yet, contrary to expectations of its people, oil has failed to translate to regional prosperity and development in the Niger Delta" (Kimiebi, 2010).

The same oil that is the "hallelujah-glory" in other parts of the country has very little or no positive impact in the lives of the people from whose land this oil

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came from. Unfortunately, Niger Delta the home of petroleum resources had no electricity, no potable drinking water, no decent hospitals, no respectable school buildings, and not even a standard trunk road. Residents rely on wooden boats and canoes for transportation, except for foreign oil company workers who travel by helicopters and sea trucks with high powered engines. Regrettably, the cost of one single flyover or bridge in a dry land such as Abuja is more than the length of all bridges in the Niger Delta region put together. The people of Niger Delta are executed and in great agony instead of being blessed by this black gold called crude oil.

In fact, crude oil that is a great blessing elsewhere became a curse to the people whose land produced it. The people, who once had enough to eat both from water and land, now, can hardly fill their stomach with crumbs as oil activities pollute both the land and water, impoverishing the area of Niger Delta. The people were even too poor to travel elsewhere to buy food since they were not even employed by these oil companies who pollute their land and water. The people suffered both culturally, economically, psychologically and even spiritually as some of their shrines were demolished because of oil locations. To add insult to injury, anybody who raises an eyebrow will be beaten, locked up by security operatives and even executed.

Finally, reality dawn on the people; and as a cow pushed to the wall, these oppressed people at a time had no choice than to fight back. MAJOR JASPER ISAAC ADAKA BORO started the physical struggle but died shortly. The seed had been planted in the sub-conscience of the people of Niger Delta. The tussle of the politicians like HAROLD DAPPA BIRIYE was not strong enough to repel the hands of both the colonial and Nigerian leaders.

The seed grew in KEN SARO-WIWA who also spearheaded the struggle in his peculiar way. He was brutally murdered with nine others by the SANI ABACHA administration. After then came the famous Kaiama declaration, and the Militancy phase of the struggle include: Niger Delta Freedom fighters such as Movement for the Survival of the Ijaw Ethnic Nationality (MOSIEN), Joint Revolutionary Council, MENBU, Niger Delta Volunteer Force and the Movement for the Emancipation of the Niger Delta (MEND), etc.

The Militancy phase of the struggle became a violent arm struggle after the 2003 general elections. Politicians dangerously armed these already angry youths as thugs to win elections for them. After the elections, the boys were abandoned; and the politicians could not retrieve back those guns given to these boys. From then on, militancy and blowing up of oil wells took a new dimension, precisely January 11, 2006. The boys tested the rough waters of kidnapping, pipeline vandalization, and destruction of oil company locations (Amaize, 2006). Ever since Militancy had become a formidable force smothering or stifling the Nigerian economy so much that the Nigerian government with its entire military could not overpower them and somewhat resorted to the granting of amnesty to these boys. The live-wire of the Nigerian economy is today devastated as a result of the activities of Niger Delta militants. To what extent was the economy affected is not known. This study, therefore, seeks to find out the effects of the activities of these militant's struggle on the Nigerian economy. Bayelsa State was used as a case study since she is a leading producer of crude oil; and also the centre of militant activities.

a) Statement of the Problem

It is the desire of the federal government of Nigeria to produce crude oil uninterrupted to generate revenue for the country and also to meet its crude oil quota, but this desire is not achieved due to the activities of Niger Delta militants. Since this desire is not met or achieved, then what is responsible? Is it as a result of activities of militants or for some other reasons that production quota fell short?

To curb the excesses of these militants in the Niger Delta, the Federal government came up with amnesty programme. However, to what extent has this solve the teething problem in the Niger Delta needed to be investigated.

Since the advent of militancy; particularly hostage-taking and attacks on oil installations, scholars have argued that it is not the activities of militants but inefficiency on the part of oil companies that have affected the revenue generation through crude oil.

Students alienate and hardly agree in arriving at a definite answer or solution. It is, therefore, the desire of the researchers to examine the effect of the low productivity of crude oil production and its effect on the Nigerian populace especially the Niger Delta area. It is also not clear why Niger Delta youths have taken to arms struggle and other criminal activities despite the amnesty programme granted them. Therefore, these issues needed to be investigated.

b) Objective of the Study

The core objective of this research work is to ascertain the immediate and remote causes of the Niger Delta militancy and how their activities affect the economy.

The specific objectives of the study include:

i. To investigate and ascertain the extent of loss of government revenue as a result of the activities of these Niger Delta militants.
ii. To ascertain the extent to which the activities of militancy has affected crude oil production.
iii. To determine the level to which 13% derivation fund has improved the Niger Delta region.

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Finally, the study seeks to explain the causes of militancy in the Niger Delta region and provides a concrete solution that will savage the problem.

c) Research Questions

The following research questions guide the researchers in this research work.

i. How does militancy affect the production of crude oil in Niger Delta region?
ii. How does militancy affect the production of crude oil in the Niger Delta region?
iii. How does militancy affect business activities in the Niger Delta region in particular and the nation in general?
iv. How does militancy lead to unemployment in the region?

Hypothesis

The following hypotheses are set forth to guide this research work:

i. *Ho:* Militants activities do not have a significant effect on the Nigerian economy.
   H1: Militants activities have significant effect on the Nigerian economy.
ii. *Ho:* Militancy does not have a significant effect on business activities in the Niger Delta.
   H1: Militancy has a significant effect on business activities in the Niger Delta.
iii. Ho: Militancy in the Niger Delta has not significantly led to the loss of thousands of lives.
   H1: Militancy in the Niger Delta has significantly led to the loss of thousands of lives.

d) Significance of the Study

It is believed that the result of this research work will be useful to the Federal Government of Nigeria in general and the Bayelsa State government in particular as well as the general public. The result of the research is believed to clearly show the impact of militancy on the economy of Nigeria.

It is also believed, that the research will be an eye opener to oil companies operating in the Niger Delta to adjust their operative patterns. The totality of the human race and the African continent shall benefit from this study if they would identify the pitfalls and make necessary adjustments.

e) Definition of Terms

Effect: Change (either positive or negative) that somebody or something causes on another person or thing.

Militant: An aggressive combatant, vigorously active, especially in support of a cause who uses destructive force to achieve his/her aims.

The Collins Cuboid Advance Learner's English Dictionary, 4th edition described a militant as someone who believes in something very strong and is active in trying to bring about political or social change, often in extreme ways that other people find unacceptable.

The New Oxford Dictionary of English (2001) defines a militant as a person who is combatant and aggressive in support of a political or social cause and typically favouring extreme, violent or confrontational methods.

The 6th edition of the Oxford Advanced Learner's Dictionary defined militant as using or willing to use force or strong pressure to achieve his aims especially to achieve social or political change.

Militancy: The act of aggressive combatants coming together as militants to use destructive force to achieve their aims. The word militancy is a derivative of the word militant.

Economy: An economy is an area of the production, distribution, or trade, and consumption of goods and services by different agents in a given geographical location. It is the relationship between production, trade, and supply of money in a particular country or region.

Illegal Bunkering: The act of practicing siphoning and transporting stolen petroleum products from one area to another.

II. Review of Related Literature

a) Historical Background

Works of eminent scholars on Niger Delta militancy has been examined.

The Niger Delta covers an area of over 70,000 square kilometres, which covers a major part of the south-south region and some parts of South East region of Nigeria. The swamp of the Niger Delta region (of which Bayelsa State is an integral part) is particularly blessed with crude oil. Niger Delta region crude oil was the first to be discovered in commercial quantity at Oloibiri in 1958 at Oloibiri situate in present day Bayelsa State (Abomaye-Nimenibo, 2015). Crude oil from the Niger Delta has been the lifeblood of Nigeria's economic wealth. About 2.6 million barrels of crude is taken daily from the region, and this accrues millions of dollars daily to the Federation of Nigeria's account (Ejibunu, 2007: 9-20).

These colossal proceeds from crude oil are what the Nigerian government uses to build up its infrastructures such as the construction of dual carriage roads across the country, build extravagant physical structures and institutions in Abuja and other parts of the country, and even have fuel for her use. Whereas the oil produced in the Niger Delta is the lifeblood of the Nigerian economy, but oil has failed to translate to regional prosperity and development in the Niger Delta (Kimiebi, 2010).

But the same oil that is the "hallelujah-glory" in other parts of the country has very little positive impact on the lives of the people from whose land it is produced. Niger Delta, the home of petroleum resources, had no electricity, no potable drinking water, no good hospitals, no good school buildings, and not

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even a standard trunk road; although a negligible part had a handful of these in the cities. Residents rely on wooden boats and canoes for transportation, except for foreign oil company workers who travel by helicopters and sea trucks with high powered engines. The people of Niger Delta are continually being executed and in great agony instead of being blessed by this black gold called crude oil. In fact, this crude oil that is a blessing elsewhere became a curse to the people whose land produced it. The people, who once had enough to eat both from water and land, now, could hardly fill their stomach with crumbs as oil activities polluted both the land and water, impoverishing the area of Niger Delta. The people were even too deprived to travel elsewhere to buy food since eighty percent of her population were not engaged as workers by these oil companies who pollute the land and water. The Niger Deltans have suffered both culturally, economically, psychologically and even spiritually as some of their shrines were consciously destroyed because of oil locations. To add insult to injury, anybody who raises an eyebrow will either be beaten, locked up by security operatives or executed.

b) Historical Perspective of the Niger Delta Crisis

According to Ejibunu (2007: 26), the discovery of oil in Nigeria's Niger Delta Region in 1957 triggered a chain of events that led to the political and economic marginalization of the inhabitants. Indeed, it has been argued that oil has been more of a curse than a blessing to the people who have been at the receiving end of horrendous government oppression and brutality, often resulting in fatalities. Ejibunu (2007) went ahead to say that over 60 years of oil production and hundreds of billions of dollars of oil revenue were realized by government and yet, the local people remained in abject poverty and without basic amenities such as water and electricity. The Niger Delta has a long history of violence; and insomuch that the situation has gone from bad to worse. This situation has given rise to the recent emergence of armed militant groups, willing to kill as part of their campaign to have control of the share of the regions oil wealth.

The campaign for fair deal or control of the oil wells by the people did not start today but rather in 1966 when Isaac Jasper Adaka Boro led a rebellion under the umbrella of the Delta Volunteer Service (DVS) which organises campaign against the Federal Government by declaring the Niger Delta a Republic. However, the insurgency was crushed, but it has brought consciousness into the minds of the people. The spirit and consciousness to bring to the international level, the suffering and deprivation of the people of the Niger Delta were championed by Ken Saro-Wiwa in the 90s. He applied peaceful, non-violent means reminiscent of the strategy and tactics of Mahatma Gandhi but to no avail. He aimed to redress the political and socio-economic wrongs imposed on the Niger Delta people. He was tenacious and determined in the pursuit of emancipator ideals through the platform of the Movement for the Emancipation of the Ogoni People (MOSOP), which he founded in 1992 with other like minds. The government of General Sanni Abacha and the oil companies were not comfortable with the activities of Saro-Wiwa and his Movement. In no time, Saro-Wiwa was accused of inciting members of MOSOP to kill four Ogoni elders. He and eight other fellow compatriots were arraigned for trial, in a military tribunal, set up by the despotic and repressive government of General Sanni Abacha, for the murder of the four Ogoni elders including Mr. Albert Tonbari Badey the then Secretary to Rivers State Government and Head of Service; and they were convicted and hanged in November 1995 and buried at Port Harcourt Cemetery having poured acid on the lifeless body of Ken Saro Wiwa to prevent immortalization of the body by the Ogonis (Abomaye-Nimenibo, W. A. S. eyewitness account). However, Saro-Wiwa's more likely ''crime'' is his effort to organize the Ogoni ethnic minority to stop the destruction of their homeland caused by operations of Shell and Chevron, the multinational oil companies, and seek compensation for his people's lost farmland and fisheries" (Ejibunu, 2007: 35).

A decade after the hanging, the potential consequences of the Niger Delta conflict have escalated in both human and economic terms. Various militant groups have sprung up of recent to undermine the activities of the oil companies using different methods and tactics, thereby daring the Nigerian state. Prominent among such groups are the Movement for the Emancipation of the Niger Delta (MEND), the Niger Delta Peoples Volunteer Force (NDPVF), the Joint Revolutionary Council (JRC), and Movement for the Survival of the Ijaw Ethnic Nationality (MOSEIN) and of recent, the Niger Delta Avengers.

Finally, reality dawn on the people; and like a cow pushed to the wall, these oppressed people at a time had no choice than to fight back. The Militant phase of the struggle became a violent arm struggle after the 2003 general elections. Politicians dangerously armed these already angry youths as thugs to win their elections. After the elections, the boys were dumped; and the politicians could not retrieve back those guns given to them. From thenceforth, militancy and blowing up of oil wells took a greater dimension, precisely January 11, 2006; the boys tested the rough waters of kidnapping, pipeline vandalization, and destruction of oil company locations (Amaize, 2006). Ever since Militancy had become a formidable force smothering or stifling the Nigerian economy so much that the Nigerian government with its entire military could not overpower them and rather resorted to the granting of amnesty.

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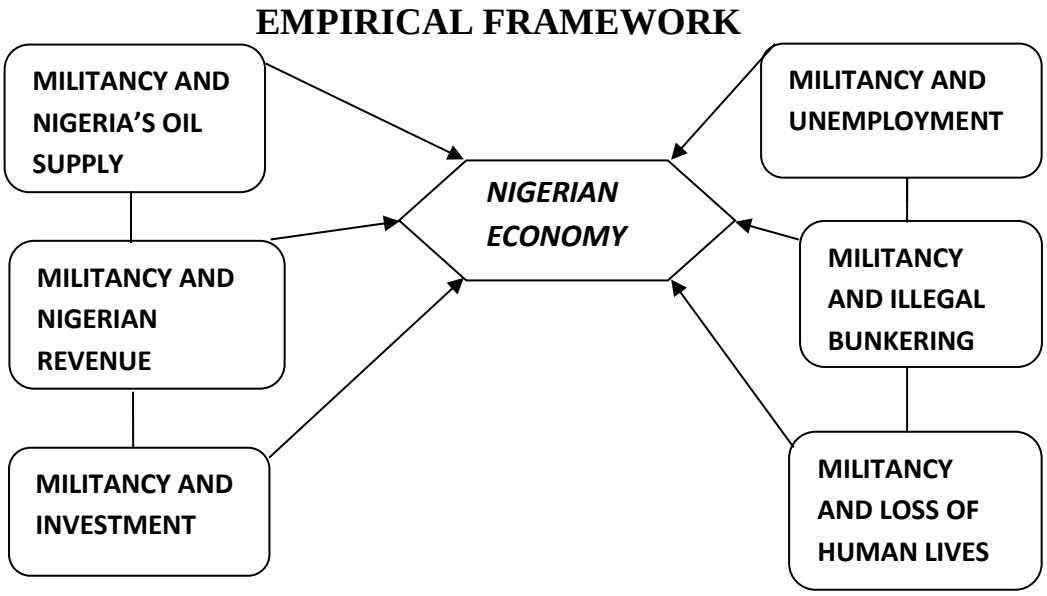

Fig 1: Militancy and the Economy

c) *Militancy and Nigeria's Oil Supply*

Ayodele (2008) cited the crises in the Niger Delta among others for the surging price of crude oil in the international market saying that, when the Niger Delta sneezes, both Nigeria and the international community catch a cold.

Chris (2009) explained the situation better by saying that the rising spate of militancy in the Niger Delta has taken on Nigeria's oil supply; and that Nigeria has lost at least one-quarter of its oil production due to the frequent attack by militants on oil installations resulting to shutdowns.

Anayochukwu (2009) explained the decreasing nature of Nigeria oil production due to militancy. From a peak of an average of 2.1mbpd (million barrels per day) achieved in March 2008, he said Nigeria's production decline to 1.7mbpd by May 2009. He went further to state that because of the same attacks by militants, production decline to between 800,000bpd (barrels per day) and 1.2 mbpd in June same year. Explaining further, he said Shell Petroleum Development Company (SPDC) which account for 60% of Nigeria's oil production capacity suffered the most that year. From a previous production capacity of about 1.0 mdpd, Shell's delivery drastically dropped to an alarming 140,000 bpd as at June 30, 2009 indicating a 85.9% drop in production due to relentless shut-downs caused by militant attacks.

Still writing on the topic, Anayochukwu stated that with the Bonga Oil well attack, Shell alone now accounts for about 745,000mbpd shut-ins. Three times that year, the sweating oil major has declared "force Major" an official announcement that it will be unable to meet its supply obligation.

Eni (2008), exactly confirmed this report of Bonga attack, saying that, within 24 hours of the Bonga attack, Chevron was hit by rampaging militants resulting to a production loss of 225,000 and 120,000 bpd respectively; which reduces the country's output by 345,000bpd with dire consequences on the economy.

Eni went further to say that the activities of militants have not only reduced Nigeria's oil production, but also crippled government future production plan of four million barrels of crude oil per day in the coming years.

Most elaborate of these militant activities and the resultant effect is the work of Ledum (2009). Ledum & Azubike (2009) stated the dates of attack and the barrels of oil loss per day. Ledum's work is more elaborate about militant activities than other scholars.

President Yar'Adua in 2009 supported and crowned this report by mentioning all these writers while signing the 2009 budget into law. In his speech, he said, "due to militant activities in the Niger Delta, our oil production has declined to as low as 1.6 mbpd from a projection of 2.209 mbpd" (cited from Newswatch, May 4th, 2009, p.12).

d) *Militancy and Nigerian Revenue*

The direct translation of the thousands and millions of barrels of crude oil loss of Nigeria's revenue as a result of militancy is in billions and even trillions of naira. Many authors have also written about this loss caused by militants. According to Ledum & Azubuike (2009), the total cost of oil loss per barrel due to the activities of militants in 2006 alone is N2.45 trillion or $27.2 billion. He stated that the number of oil barrels lost in the first nine months of 2008 alone was about $20.7 billion. Ledum's report tallies slightly with NNPC official statistics for that year 2006.

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According to NNPC official statistics, the total amount lost to militant activities for the year 2008 is about N6.27 trillion or $44 billion.

Eni (2008) focusing on the monthly and yearly loss of oil revenue, went down in clear gave details of the daily loss of oil revenue as a result of Bonga and the Escravos attack which figure she put at $46.5 million per day. Eni's report differs from the account of Babalola (2008) who set the daily loss of crude oil revenues at about $84million, which is about $39.5 million difference. Hassan (2007) on his part added that militant activities affected both the federal government and oil-producing State government revenues. He wrote that due to militancy, Niger Delta States have been falling in their oil production quota and that means a lower 13% derivation fund. Hassan even quoted a (then) nearly elected State Governor who cried out that it was as if his state was no longer producing oil.

Table 2.1: Crude Oil Production From 1981-2016

YEAR	PRODUCTION (mbpd)	BILLIONS OF NAIRA
1981	1.433	7.51
1982	1.295	5.82
1983	1.241	6.27
1984	1.388	7.27
1985	1.495	10.0
1986	1.467	7.97
1987	1.341	16.93
1988	1.45	15.59
1989	1.716	25.89
1990	1.81	38.15
1991	1.892	30.83
1992	1.943	53.26
1993	1.96	126.07
1994	1.931	90.62
1995	1.993	249.77
1996	2.001	325.14
1997	2.132	351.26
1998	2.153	353.72
1999	2.1 30	662.59
2000	2.165	597.28
2001	2.256	796.98
2002	2.118	716.75
2003	2.275	1,023.24
2004	2.329	1,253.24
2005	2.267	1,660.70
2006	2.440	1,836.61
2007	2.350	2,333.66
2008	2.165	3,193.44
2009	2.208	2,642.98
2010	2.455	3,089.18
2011	2.550	3,553.54
2012	2.52	3,629.61
2013	2.367	4,031.83
2013	2.423	3,751.71
2015	2.280	3,431.07
2016	2.000	6.07 trillion

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So far, the Niger Delta militants have disrupted the nation's oil production level as opined by Anachukwu (2008). He wrote on the barrels of oil loss, due to militant activities. The attack on Bonga oil field, located 75 nautical miles (120 kilometres) off the coast of Bayelsa State resulted to a loss of 225,000 bpd. The next day Egbema 1 militant group attacked the Abiteye-Olero pipeline, Okada village in Edo State; causing a shut-in of another 120,000 bpd. With these shut-ins, Nigerian crude oil export dropped by 1mbpd.

e) Militancy and Investment

We all know that there shall be no meaningful investment in an area of crises. Thus, according to Onwaurnegbe (2008), oil production in the Niger Delta is being produced at gun points; else the militants will sack them. He went on to say companies are folding up and those left are producing under military protection. Almost all writers agree with the above reality. Hassan (2007, p. 22) writes that since the start of the crisis, particularly hostage-taking and attacks on the oil installation in the Niger Delta, there has been the drought of business activities. The area has also experienced restiveness which has reduced growth in the business sector in the past eight years. Writing further, it says that in Rivers State alone, companies stopped operations as expatriates have either gone back to their countries or have taken cover in other areas.

Mr. Tele Ikuru (then Deputy Governor of Rivers State) completely agreed with Hassan's report in 2007 when he said "Rivers State has become a carcass of itself. Go to Trans-Amadi, and you will see that about 80% of the companies have closed; not because of their inability to manage the business properly, but because of the demonic activities of our youths" (http:// dailytmst.com).

Ayodela (2008), on his part, went further to explain that militancy in the Niger Delta does affect investment in the oil and other sectors of the economy. He explained that foreign investment in other sectors which has been on the ascendancy since 1999 may have likely freeze. To the government, there are no thanks to militancy in the Niger Delta.

f) Militancy and Unemployment

Militant activities in the Niger Delta scare both new and existing investors away. Companies are folding up, and expatriate workers either going back to their countries or goes into hiding as a result of the activities of militants in the Niger Delta region. "SPDC retrenched 3,500 workers in September 2007" (Punch Newspapers, 2007a: p.14). Indoroma Petrochemical Company shut down its operations thereby rendering over 3,000 youths jobless and aggravating the unemployment situation in Nigeria (Sunday Trust Newspaper, 2007).

As a result of militants' activities, Royal Dutch Shell oil production has dropped from one million bpd to about 380,000 bpd at its Bonny terminal in the South of the Niger Delta as a result of militants activities. Exxon Mobil has also experienced increased insurgent activities in its Nigerian operations.

Hassan (2007) reported that Anglo/Dutch oil firm Shell Petroleum Development Company (SPDC) sacked 3,500 workers in September 2007. He also wrote that a similar action took place in 2004 where Shell retrenched about 1,400 workers all in a bit to reduce operational cost. Once again no thanks to militancy by the Federal and State Governments.

Anayochukwu (2009) wrote that in 2008, Shell owed her contractors and workers, and went ahead to sack about 4,000 of her workers. These were both full time and contract staff, and many of them were from the Niger Delta, a sad effect of militancy on the people of the region.

Daily Trust, July 7th, 2009, also reported the same episode. Mr. Tele Ikuru (the then Deputy Governor of Rivers State), opined that Indorama Petrol Chemicals has shut down operations thereby rendering over 3,000 youths jobless and aggravating the unemployment situation in Rivers State.

g) Militancy and Illegal Bunkering

The International Crises Group (ICG) report N0. 118, September 28, 2006, defined illegal bunkering as a dangerous practice of siphoning and transporting stolen fuel from one place to another.

Cole (2010) wrote that the issue of bunkering is at the heart of Nigeria's many problems and trying to solve the instability in the Niger Delta without confronting these problems is like trying to bribe a billionaire with a thousand dollars. He estimated that an upward of 200,000 barrels of oil was stolen each day from the region.

Cole's estimate of about 200,000 barrels falls within the estimated range of the TCG, which projected that Nigeria's loss to illegal bunkering is from 70,000 to 300,000 barrels per day which figure is an equivalent output of a small oil-producing country.

On his part, Ledum (2009) focused only on the amount of lost to illegal bunkering estimated at $3billion in the first seven months of 2008.

While other authors wrote only on the monetary loss to illegal bunkering, Hassan (2007) went further to talk about the reasons for illegal bunkering. According to him, illegal bunkering has been a fundamental source of fund for anti-government militant groups whose warlords, has publicly admitted their involvement and others have said they consider the practice a defendable means of providing income for aggrieved and impoverished residents of the oil producing communities.

ICG's interview with warlord and leader of the Niger Delta People's Volunteer Force (NDPVF), Alhaji Mujahid Asari-Dokubo supported this claim of Hassan.

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Asari-Dokubo is being quoted to have said in his defence of illegal bunkering that "My people are taking back what is ours."

Hassan also went further to say illegal bunkering do not only tell hard on the government, but even harder on the oil companies. He revealed that oil industry officials admitted during a research interview that paying off militants and criminal groups is a far better and cheaper option than dealing with costly bunkering related shutdowns and repairing physical damages caused by the militants.

Hassan concluded by saying that, even the government is aware of this illegal bunkering and may have decided to deliberately keep silence over the issue. Quoting a Bayelsa State high anonymous official, he said "when the boys are able to do bunkering, they are quiet. There is restiveness when bunkering stops and they have nothing else to do."

The operation of militants in the Niger Delta and the insecurity has made it impossible for security agencies to adequately cover locations of various oil facilities; and this has created a soft landing ground for illegal oil bunkering to thrive in the region. Illegal Oil Bunkering and euphemism for oil theft have assumed considerable dimensions in the Niger Delta. An estimate ranging from 30,000 to 200,000 bbl/day of crude oil is lost to bunkering (Oudeman, 2006). Can the government stop it when her militia of all ranks are the alias? Who or how can this oil bunkering by Militant groups be check-mated is food for thought in Nigeria.

h) Millitancy and Lost of Human Lives.

The most valuable resources Nigeria has lost due to militancy activities in the Niger Delta is the loss of human lives. "We are not only talking regarding money lost but real lives that were lost; and it is quite a tremendous loss to the economy. There are unaccounted costs in human misery with about 6,000 persons killed during the period of militancy and another 2,000 taken as hostages. If we were to buy peace, we would have spent less, (Ledum cited from Newswatch May 4, 2009, p.14).

Anayachukwu (2009) writing on the lives lost due to militancy added that the loss of lives does not come only from the side of militants' activities; but also from retaliatory attacks from the Military Joint Task Force (JTF). He took his reference from the Ijaw Youth Council (JYC) who constantly accuses the JTF of attacking Ijaw communities and killing lots of innocent persons all in the name of searching for militants.

Chris (2009) explained some of the instances that people were killed because of militancy. He said on April 2, 2008; two flow stations belonging to Agip; located in the Forcados were blown off. 11 soldiers were reportedly killed. Writing further, he said over 100 persons were said to have been killed during the attack on Bonga oil field by the Movement for the Emancipation of the Niger Delta (MEND) on the 17th of July 2008. The list of loss of lives in the Niger Delta does not end but rather, is on a daily basis.

i) Causes of Militancy

Almost all writers point accusing fingers to the Federal Government of Nigeria as the cause of combativeness. The long neglect of the region is the remote cause of the emergence of belligerency.

Oladimeji (2009) cited in Atlantic Express, Vol. 9, 2009, said "If we are, to be honest with ourselves, we have not been fair to the Niger Delta. The Niger Delta has been producing the funds with which we've been running this country for so many years. The funds were used to build Abuja where I came from this morning, those lovely roads, bridges, and offices came from Niger Delta". Oladimeji's statement is just one of the numerous statements from top federal government officials admitting that the federal government has indeed neglected the region for too long.

Eneware (2009) approached this issue aggressively. Using the Oxford Advanced Learners' Dictionary's definition of militants as a yardstick, he said all past and present Nigerian leaders are militants. Speaking further, "militancy will not end in the Niger Delta region until the federal government itself denounces it militant approach to the problems of the Niger Delta region; because Alhaji Umaru Musa Yar'adua is a militant, so is Gen. Olusegun Obasanjo."

In an open letter to Mr. President, Ekpemupolo 2009 asked the following questions: "Mr. President, how many Niger Deltans have oil fields, blocs or even allocations that girlfriends are entitled to in Abuja? Does it sound just amidst such truth that General T.Y. Danjuma sold 45% of one of his marginal field (Akpo field) to a Chinese firm for 2.3 billion dollars, still keeping 55%? Can this happen to the Hausas, Yorubas or Igbos? Do you think there can be peace where the people do not have appreciable stakes in their resources, composition, and corporations of multi-nationals in the region? The answer emphatically is "No!" cited from the vanguard, August 31st, 2009, p. 39. The above utterances show that outsiders' benefiting from oil proceeds and side-lining the owners is the core cause of militancy.

Boyloaf, however, sees lip service and unnecessary government procedure as the cause of the neglect of the region which has led to militancy. "You can imagine when they built Abuja, they did not set up any committee, when they (federal government of Nigeria) built Third Mainland Bridge in Lagos, no committee was also formed. Regarding the Niger Delta, they will be creating different committees and offices for people to make money" cited from Tell Magazine, July 14, 2008, p.21.

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Suleiman (2008) supported the view of Boyloaf when he said poor management from the top is responsible for this protracted crisis in the region. All they do is to give lip service to issues affecting the area without implementing anything reasonable.

Ayodele (2009) on his part stated that the heart of the matter in the Niger Delta is an injustice done to her; more so, the region is the goose that lays the nations golden egg; but it has nothing to show for it except a wasted landscape.

j) Summary of Literature Review

Having analysed militancy empirically, especially as it affects Nigeria's oil production; revenue; investment; unemployment; illegal bunkering; and loss of human lives, it is indeed clear that militant activities has caused a lot of havoc to the Nigerian economy as a result of the negligent of the Niger Delta. Thanks to fallen heroes like Major Isaac Jasper Adaka Boro, Ken Saro Wiwa, Chief Dappa Biriye, and others who pioneered this struggle with good intention.

However, present-day militancy cannot be discussed without mentioning names like high chief Micheal Ateke Tom (a.k.a Abuja Daddy), Alhaji Mujahid Asari-Dokubo, High Chief Government Ekpemupolo (a.k.a Tompolo), Boyloaf the trigger puller of Niger Delta, Joshua Maikava, The Young shall grow, Electoral Samuel Umunaro, Henry Okah, Africa Ekperesingha, Ogun Boss, Invisible Grenade, High Chief Ajube Bibopere alias Shoot at sight, with women to mention but a few. These people are called freedom fighters of the region, but the federal government of Nigeria calls them militants and even criminals.

Though militancy is evil per se, it should be noted that it has brought some benefit to the region. It has brought some recognition to the region in the eyes of both the local and international community. Gen. Azazi was appointed Chief of Defence Staff to compensate the region. We have the Niger Delta Development Commission (NNDC) and the ministry of Niger Delta. The Obasanjo administration employed thousands of youths even those unqualified; into federal offices because of militancy in the region. Most importantly the region produced its first Vice-President who later became the President of the Federal Republic of Nigeria in recognition of a just cause as compensation for the backwardness of the Niger Delta. It is an agreeable fact that the region's security, for now, is still not encouraging. However, if proffered solutions are accepted and implemented, about 80% of the security challenges in Nigeria or even the world would have been solved. The Niger Deltans are naturally warriors yet, they are peace loving people who are ever ready to resist or repel any oppression when pushed against the wall.

III. Method of Study

The method of study guided the investigators in the process of collecting, analysing and interpreting observations. Thus, the research design used in this work is the survey design; specifically, the questionnaire survey.

With a census figure of about 150 million people in Nigeria, it will be very difficult or even impossible to study the entire population hence, our case study centres on Bayelsa State the hob of all petroleum activities; and the sample population was that of oil companies, selected state ministries, students, public servants, farmers, fishermen, and entrepreneurs.

Regarding sampling design and procedures, the study was based on the effect of militancy on the Nigerian economy, with Bayelsa state as the targeted

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population to arrive at the desired result. Hence, one thousand six hundred (1600) questionnaires were prepared and sent out. These questionnaires were randomly distributed among youths, oil company workers, civil servants, public servants, farmers and entrepreneurs in Bayelsa State. Questionnaires were simple choice of an answer that was marked Yes or No and also some open-ended questions. Personal interviews were conducted as well as personal observations carried out and noted.

Regarding the data, the primary data collection method was applied instead of the secondary data collection method. One of the researchers and two other relatives joined to distribute the questionnaires and also did well by collecting them back. Respondents are anonymous and were assured of secrecy to build up confidence, hence the honest, sincere and accurate response. Out of 1,600 questionnaires sent out, we were able to gathered 1,420 representing 88.75%.

a) Data Analysis Techniques

Interviewees Responses were collated and analysed for use. We use Chi-Square to test our hypothesis.

The Chi-Square test is given by the formula:-

$$x^2 = \frac{(F_o - F_e)}{F_e}$$

Where:.

x^2 = Chi-Square

F_0 = Observed frequency

F_e = Expected frequency

The Expected frequency (Fe) has the formula:

$$F_e = \frac{TC \; X \; TR}{TO}$$

Where:

TC = Total Column

TR = Total Row

TO = Total Observation

Also, a critical value of 5% or 0.05 level of significance was for the purpose of determining the Chi-Square (x2) value with a given degree of freedom (df).

The formula or DF is:

df = (N – 1) (K – 1)

N = Number of option in the column

K = Number of selected questionnaires

IV. Presentation and Analysis of Data Results

We analysed our data from the questionnaire which helped us answer the questions that initiated this research work.

As stated earlier, a total number of 1,600 questionnaires were distributed, and only 1,420 were successfully retrieved and were used for this research work.

Data gathered from the field study were presented in frequency distribution tables and analysed using simple percentage and Chi-Square formulas.

The population for the study is an infinite one but youths between the ages of 18 and 35 years constitute the targeted respondents of employable age and others who are graduates, secondary school leavers, and artisans.

Chi-square X2 statistical test was used to validate the statistical significance of the research findings. The formula is:

$$X2 = \frac{\Sigma (Fo - Fe)2}{Fe}$$

Where

Fo = Observed frequency

Fe = Expected frequency

Σ = Summary sign for total frequency.

a) Presentation and Analysis of Data

Out of the total number of 1,600 questionnaires distributed, 1,420 were collected as follows:

Table 4.1: Gender Distribution of Respondents

SEX	FREQUENCY	PERCENTAGE %
MALE	743	52.3 %
FE MALE	677	47.7 %
TOTAL	**1420**	**100%**

Table 4.2: Occupational Distribution of Respondents

OCCUPATION	FREQUENCY	PERCENTAGE %
STUDENTS	311	21.9%
CIV IL SERVANTS	112	14.9%
OIL COMPANY WORKERS	189	13.3%
PUBLIC SERVANTS	214	15.1%
FISH ERMEN/ FARMERS	210	14.8%
OTHERS	384	27%
TOTAL	**1420**	**100%**

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Table 4.3: Educational Qualification of Respondents

QUALIFICATION OF RESPONDENTS	FREQUENC Y	PERCENTAGE (%)
Ph.D	49	3.5%
MASTER DEGREE	78	5.5%
B .Sc/HN D	214	15%
WAEC/NECO	417	29.4%
FSLC	241	17%
NONE	421	421%
TOTAL	**1420**	**100%**

Table 4.4: Age Range of Respondents

RANGE	FREQUENCY	PERCENTAGE (%)
20 -29	413	29.1%
30 -39	449	31.6%
40 -49	2 96	20.8
50 AND ABOVE	262	18.5%
TOTAL	**1420**	**100%**

b) The Decision Rule in testing

If the calculated chi-squared (X2) is greater than the tabulated or theoretical chi-square (X2) at a given level of significance and degree of freedom (df), we accept the alternate hypothesis, by rejecting the null hypothesis.

Hypothesis 1 (Ho): Militants activities do not have a significant effect on the Nigerian economy

Table 4.5: Responses to test on Relationship between Militant activities and the Nigerian economy (QUESTION 9 - Do you think Militants activities negatively affects Nigeria's current Oil production?)

OCCUPATION	YES	N0	TOTAL
STUDENTS	210	101	311
CIVIL SERVANTS	98	14	112
OIL COMPANY WORKERS	155	34	189
PUBLIC SERVANTS	134	80	214
FISHERMEN/FARMERS	200	10	210
OTHERS	222	162	384
TOTAL (M)	**1019**	**401**	**1,420 (T)**

(Hypothetical data)

To calculate the expected frequencies (E) using E= MN, we have T.

So $\frac{1019 \times 311}{1420} = 223.18$

$\frac{1019 \times 112}{1420} = 80.37$

$\frac{1019 \times 189}{1420} = 135.63$

$\frac{1019 \times 214}{1420} = 153.57$

$\frac{1019 \times 210}{1420} = 150.7$

$\frac{1019 \times 384}{1420} = 275.56$

$\frac{401 \times 311}{1420} = 87.82$

$\frac{401 \times 112}{1420} = 31.63$

$\frac{401 \times 189}{1420} = 53.37$

$\frac{401 \times 214}{1420} = 60.43$

$\frac{401 \times 210}{1420} = 59.30$

$\frac{401 \times 384}{1420} = 108.44$

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Table 4.6: Observed and Expected Frequency Table

Observed Frequency (O)	Expected Frequency (E)
210	223.18
98	80.37
155	135.63
134	153.57
200	150.7
222	275.56
101	87.82
14	31.63
34	53.37
80	60.43
10	59.30
162	108.44
1,420	1,420

$$\text{Using } x^2 = \frac{\Sigma(210 - 223.18)^2}{223.18} + \frac{(98 - 80.37)^2}{80.37} + \frac{(155 - 135.63)^2}{135.63} + \frac{(134 - 153.57)^2}{153.57}$$
$$+ \frac{(200 - 150.7)^2}{150.7} + \frac{(222 - 275.56)^2}{275.56} + \frac{(101 - 87.82)^2}{87.82} + \frac{(14 - 31.63)^2}{31.63} +$$
$$\frac{(34 - 53.37)^2}{53.37} + \frac{(80 - 60.43)^2}{80.37} + \frac{(10 - 59.30)^2}{59.30} + \frac{(162 - 108.44)^2}{108.44}$$

$$\longrightarrow 0.78 + 3.87 + 2.77 + 2.49 + 16.13 + 10.19 + 1.98 + 9.83 + 7.03 + 6.34 + 40.99 + 26.45 = 128.85$$

At 5% (0.05) level of significance using two degrees of freedom (2df), the tabulated or theoretical chi-squared, x2 = 9.488. Calculated chi-square is greater than the theoretical chi-square (x2), we accept the alternate hypothesis which says that there is a strong significant effect of militants' activities on the Nigerian economy.

Hypothesis 2 (Ho): Militancy does not have significant effect on business activities in the Niger Delta.

Table 4.7: The analysis of question no. 11(Do you think militancy makes the Niger Delta Region unfriendly to business activities

DETAILS	MALES	FEMALES	TOTAL
YES	**245**	**179**	**424 (N)**
NO	**432**	**564**	**996**
TOTALS(M)	**677**	**743**	**1,420 (T)**

(Hypothetical data)

$$\text{Using } x^2 = \frac{MN}{T}$$

$$\frac{677 \times 424}{1,420} = 202.15 \quad \frac{677 \times 996}{1,420} = 474.85 \quad \frac{743 \times 424}{1,420} = 221.85$$

$$\frac{743 \times 996}{1,420} = 521.15$$

Therefore, calculated $x^2 = 265.48$.

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Table 4.8: Observed and Expected Frequency of Question 11

Observed Frequency (Fo)	Expected Frequency (Fe)
245	202.15
432	474.85
179	221.85
564	521.15
1,420	1,420.00

Using $x^2 = \frac{\Sigma(Fo - Fe)^2}{Fe}$ we have:

$$\frac{(245 - 202.15)^2}{202.15} + \frac{(432 - 474.85)^2}{474.85} + \frac{(179 - 221.85)^2}{221.85} + \frac{(564 - 521.15)^2}{521.15} = 9.08 + 3.87 + 1.29 + 251.24 = 265.48.$$

Therefore, calculated $x^2 = 265.48$.

At 5% (0.05) level of significance using two degrees of freedom (2df), the tabulated or theoretical chi-squared, x2 = 9.488. Calculated chi-square is more than the theoretical chi-square (x2), we accept the alternate hypothesis which says that militancy in the Niger Delta has a very strong significant effect on business activities in the Niger Delta Region and extension on the Nigerian economy.

Hypothesis 3 (Ho): Militancy in the Niger Delta has not significantly led to the loss of thousands of lives.

Table 4.9: The analysis of question no.14 (Do you agree that Militancy has led to the loss of thousands of human lives in the Niger Delta Region

AGE RANGE	YES	NO	TOTAL
20 -29	403	10	413(N)
30 -39	405	44	449
40 -49	280	16	296
50 AND ABOVE	247	15	262
TOTAL	**1,335(M)**	**85**	**1420(T)**

(Hypothetical data)

Using $x^2 = \frac{MN}{T}$

$\frac{1335 \times 413}{1,420} = 388.28$ $\frac{1335 \times 449}{1,420} = 422.12$ $\frac{1335 \times 296}{1,420} = 282.4$

$\frac{1335 \times 262}{1,420} = 246.32$

$\frac{85 \times 413}{1,420} = 24.72$ $\frac{85 \times 449}{1,420} = 26.88$ $\frac{85 \times 296}{1,420} = 17.72$

$\frac{85 \times 413}{1,420} = 24.72$

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Table 4.10: Observed and Expected Frequency of Question 14

Observed Frequency (Fo)	Expected Frequency (Fe)
403	388.28
405	422.12
280	282.45
247	246.32
10	24.72
44	26.88
16	17.72
15	24.72

Using $x^2 = \frac{\Sigma(Fo - Fe)^2}{Fe}$ we have:

$$\frac{(403 - 388.28)^2}{388.28} + \frac{(405 - 422.12)^2}{422.12} + \frac{(280 - 282.45)^2}{282.45} +$$

$$\frac{(247 - 246.32)^2}{246.32} + \frac{(10 - 24.72)^2}{24.72} + \frac{(44 - 26.88)^2}{26.88} +$$

$$\frac{(16 - 17.72)^2}{17.72} + \frac{(15 - 24.72)^2}{24.72}$$

$$= 0.56 + 3.87 + 0.69 + 0.02 + 1.88 + 8.77 + 26.88 + 0.17 + 3.82 = 46.66.$$

Therefore, calculated $x^2 = 46.66$.

At 5% (0.05) level of significance using two degrees of freedom (2df), the tabulated or theoretical chi-squared, x2 = 9.488. Calculated chi-square is greater than the theoretical chi-square (x2), we, therefore, accept the alternate hypothesis which says that militancy in the Niger Delta has significant led to the loss of thousands of human lives.

c) Analysis of Other Data

Answers to question 16 (whether militants' activities reduced Nigerian oil revenue?) revealed that 99% of the respondents agreed by saying YES.

Question 12: Do you agree to the fact that effects of militancy on business activities has rendered many unemployed in the Niger Delta Region?

Table 4.11: Responses to Question 12

RESPONSE	NO.RESPONSES	PERCENTAGE(%)
YES	930	65.5%
NO	490	34.5%
TOTAL	**1,420**	**100%**

Source: Field Study 2017

About, 65.5% of the respondents agreed that the effects of militancy on business activities had rendered many unemployed in the Niger Delta.

We also discovered that illegal bunkering in the Niger Delta Region is not wholly fuelled by militants but rather, sponsored by top government functionaries in line with question no.10 which is a yes answer of 70% and was further confirmed by discussion with the interviewees.

d) Discussion of Results

From our empirical analysis, it was discovered that militancy in the Niger Delta has in no small measure affected the economy of Nigeria due to loss of substantial amount of money as revenue which should have accrued to the Nigerian government. This study corroborated the findings of Chris (2009), Anayochuku (2009), Eni (2008) and Ledum (2009). Similarly this study has also corroborated the findings of Anayochuku

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(2009), Eni (2008) and Ledum (2009) and others that militancy activities have led to the loss of substantial human capital which will at the long run affect the Nigerian economy in no small measure.

In the area of unemployment, our study was in a total agreement with Hassan (2007) and Anayochuku (2007) that militancy has brought about unemployment to the Niger Delta Region through fear of losing one's live in a hostile environment and shut down of oil wells leading to retrenchments, etc.

V. Summary, Conclusion and Recommendation

a) Summary

The focus of this research work was to critically examine how militancy in the Niger Delta affects the economy of our dear country Nigeria.

Through the literature review, we see how millions of barrels of crude oil were lost to the nation due to the activities of militants' in the Niger Delta Region; and how these loss translates to millions of U.S Dollars. The work also shows how militancy affects investment and business activities and how it increases the unemployment rate in the region. It also revealed that violence (militancy) to some extent contributes to illegal bunkering and has also led to the loss of thousands of human lives amounting to loss of human capital. Causes of militancy in the Niger Delta were as a result of neglect, downgrading and degrading of the region by successive governments of Nigeria since independence.

Research questions were raised, and the hypothesis formulated. Survey research design; specifically questionnaires were used to collect field data. Then Chi-Square and simple percentage method were used to test the hypothesis. The result revealed that militancy has a strong significant effect on the Bayelsa State economy in particular and that of Nigeria in general.

b) Conclusion

Our findings also showed that militancy in the Niger Delta has its pros and cons such as loss of lives, unemployment and closure of businesses on the one hand and the other hand the neglect of the region which has been brought to the fore, and some youths are being empowered and trained abroad, specially by the Ministry for the Niger Delta being created during the administration of one of its illustrious sons in the person of former President of Nigeria Dr. Goodluck Obele Jonathan.

Despite the few changes, the region is still neglected, without good road network, overhead bridges, poor sanitary conditions, no portable drinking water, no standard clinic not to talk of a good hospital with drugs, etc.

The researchers at this moment concluded that militancy in the Niger Delta, has a significant strong effect on the Nigerian economy; which is not only visible on oil sector alone, but also on the other sectors. Militant activities have greatly hampered business investments and activities thereby reducing employment opportunities. It also led to unemployment of already employed workers in the region. Militancy led to loss of human lives, and it increases illegal bunkering. On the part of the government, militancy reduces the annual revenue of the federal government. It also reduces the 13 derivation fund of oil producing states and also distracts government developmental efforts.

c) Recommendations

The first way to solve any problem is to first and foremost to find out the remote and immediate causes of the problem and then find solutions to resolving the matter or crises.

In agreement with Akachukwu (2008)'s view, we observe that the problem of the Niger Delta is not just non-development of infrastructures. The existence of systemic error in administration or governance is seen to be responsible in the neglect of the Niger Delta region. Once the systemic error is corrected, things will fall in their rightful positions.

We are also of the same view with Kayoede (2007) that the Niger Delta will develop when the region is competently handled and not politicized. Fundamental approaches to solving the problem should be applied instead of merely playing with the people's misery. There should be no mushroom development, but one that the Niger Deltans needs.

Electoral malpractices also help fuel militancy and have in no small measure led to fuelling of crisis in the Niger Delta Region. A free and fair election in the area will usher in genuine political leaders in the Niger Delta Region; which will checkmate politicians from hiring and equipping these boys to help rig elections and after that dump them without retrieving the guns given them. Thus, the already angry youths having weapons of destruction in their hands, are willing to turn-in mayhem and go hay-wild to destroy lives and properties within its sphere of operation. Therefore, a properly conducted free and fair election will do well to solve this perennial problem.

Furthermore, we make the following recommendations:

a) The billions and thousands of dollars spent by the federal government of Nigeria and the oil companies operating in the country on security vote of the region should be used to develop the Niger Delta Region.
b) Youths of the region should be gainfully employed; to keep them busy during the day and sleep at night; because they will be too tired after work to embark on criminal activities.

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c) The federal government should increase the budget of the Niger Delta to enhance real development to repeal the kind of mushroom development in place now.
d) The systemic correction is necessary to bring about justice and fair play, and brings no more marginalization in fiscal federalism.
e) Credible free and fair elections without thuggery should be encouraged hence forth, which will prevent the youths from being armed.
f) Thanks to amnesty, but it should not end with a presidential handshake, but rather be assimilated into the various sectors of the economy.
g) Post amnesty programs should be put in place to cater for the trainee's rehabilitation.
h) Indigenes of the region should be allowed to have an appreciable stake in the proceeds of their oil instead of outsiders in the name of one Nigeria.
i) Military approach to the problems of the Niger Delta should be discouraged as it seems to pour fuel into the fire.
j) Finally, the researchers recommend that freedom fighters should lay down their arms and give peace a chance by using dialogue in their approach to resolving differences.

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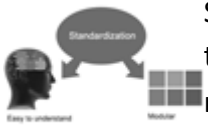

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Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Social Science Research Paper

Techniques for writing a good quality homan social science research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of homan social science then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.
Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

19. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

20. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

21. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

22. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

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Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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