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Analysis of Crude Oil Prodction in Nigeria by Servicing Companies

By Oladimeji O. A., Ikotun D. O., Ademuyiwa J. A. & Olaniyan J. O
The Federal Polytechnic

Abstract- The petroleum industry in Nigeria has brought unprecedented changes to the Nigerian economy, particularly in the past five decades when it replaced agriculture as the cornerstone of the Nigeria economy. The oil industry has risen to the commanding heights of the Nigerian economy, contributing the lion share to gross domestic product and accounting for the bulk of federal government revenue and foreign exchange earnings since early 1970. However, Nigeria's considerable endowment in fossil fuel has not translated into an enviable economic performance; rather, the nation's mono-cultural has assumed a precarious dimension in the past decades susceptible to the vagaries of the international oil markets. Empirical analysis was conducted by applying the Multiple Linear Regression of the Ordinary least square techniques, the joint distribution of independent variable contribute to the success of the total production prob(F. Statistic) = 0.00122 which is less than 0.05 thereby establishing the significance of the independent variable. Conclusively, the Servicing Company relationship is not the same, also from estimated regression line only x_2(Joint Ventures AF/CARRY and x_5(Sole Risk Independent Companies) has the highest coefficient which implies that they have greater contribution to the total production.

Keywords: crude oil, foreign exchange earnings, multiple linear regression, servicing, company, total production.

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I. Introduction

Oil is a major source of energy in Nigeria and the world in general. Oil being the mainstay of the Nigerian economy plays a vital role in shaping the economic and political destiny of the country. Although Nigeria's oil industry was founded at the beginning of the century, it was not until the end of the Nigeria civil war (1967 - 1970) that the oil industry began to play a prominent role in the economic life of the country. Nigeria can be categorized as a country that is primarily rural, which depends on primary product exports (especially oil products). Since the attainment of independence in 1960 it has experienced ethnic, regional and religious tensions, magnified by the significant disparities in economic, educational and environmental development in the south and the north. These could be partly attributed to the major discovery of oil in the country which affects and is affected by economic and social components. Crude oil discovery has had certain impacts on the Nigeria economy both positively and adversely. On the negative side, this can be considered with respect to the surrounding communities within which the oil wells are exploited. Some of these communities still suffer environmental degradation, which leads to deprivation of means of livelihood and other economic and social factors. Although large proceeds are obtained from the domestic sales and export of petroleum products, its effect on the growth of the

Author α σ ρ ω: Department of Statistics, The Federal Polytechnic, Ile-Oluji, Nigeria. e-mails: adedipupo.oladimeji@gmail.com, fisikotun@gmail.com, ademuyiwajustus@gmail.com, olawalelink2007@yahoo.com

Nigerian economy as regards returns and productivity is still questionable, hence, the need to evaluate the relative impacts of crude oil on the economy. In the light of the study, the main objective is to assess the impact of crude oil on the Nigerian economy. Given the fact that the oil sector is a very crucial sector in the Nigeria economy, there is the dire need for an appropriate and desirable production and export policy for the sector. In Nigeria, though crude oil has contributed largely to the economy, the revenue has not been properly used. Considering the fact that there are other sectors in the economy, the excess revenue made from the oil sector can be invested in them to diversify and also increase the total GDP of the economy. This study comprises of five sections. Section two presents the background of the study, while the third section focuses on the research methodology. Section four includes data analysis and interpretation of results, and the final section presents and policy proposal and study conclusions.

Therefore, the purpose of this research work is to study the effect of the crude oil production in Nigeria by Servicing Companies for a period of ten years. And to deduce which of this crude oil produced in Nigeria by Servicing Companies between 2002 to 2011 has the highest production or consumption.

a) Historical Background of Oil Industry in Nigeria

Oil was discovered in Nigeria in 1956 at Oloibiri in the Niger Delta after half a century of exploration. The discovery was made by Shell-BP, at the time the sole concessionaire. Nigeria joined the ranks of oil producers in 1958 when its first oil field came on stream producing 5,100 bpd. After 1960, exploration rights in onshore and offshore areas adjoining the Niger Delta were extended to other foreign companies. In 1965 the EA field was discovered by Shell in shallow water southeast of Warri. In 1970, the end of the Biafran war coincided with the rise in the world oil price, and Nigeria was able to reap instant riches from its oil production. Nigeria joined the Organization of Petroleum Exporting Countries (OPEC) in 1971 and established the Nigerian National Petroleum Company (NNPC) in 1977; a state owned and controlled company which is a major player in both the upstream and downstream sectors [Blair 1976, pp. 98-120]. Following the discovery of crude oil by Shell D'Arcy Petroleum, pioneer production began in 1958 from the company's oil field in Oloibiri in the Eastern Niger Delta. By the late sixties and early seventies, Nigeria had attained a production level of over 2 million barrels of crude oil a day. Although production figures dropped in the eighties due to economic slump, 2004 saw a total rejuvenation of oil production to a record level of 2.5 million barrels per day. Current development strategies are aimed at increasing production to 4million barrels per day by the year 2010. Petroleum production and export play a dominant role in Nigeria's economy and account for about 90 % of her gross earnings. This dominant role has pushed agriculture, the traditional mainstay of the economy, from the early fifties and sixties, to the background.

While the discovery of oil in the eastern and mid-western regions of the Niger Delta pleased hopeful Nigerians, giving them an early indication soon after independent economic development was within reach, at the same time it signaled a danger of grave consequence: oil revenues fueled already existing ethnic and political tension and actually "burned" the country. This tension reached its peak with the civil war that lasted from 1967 to 1970. As the war commenced, the literature reflected the hostility, the impact, and fate of the oil industry. Nigeria survived the war, and was able to recover mainly of the huge revenues from oil in the 1970s. For some three years an oil boom followed, and the country was awash with money. Indeed, there was money for

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virtually all the items in its developmental plan. The literature of the postwar years shifted to the analysis of the world oil boom and bust, collectively known as the "oil shock." Starting in 1973 the world experienced an oil shock that rippled through Nigeria until the mid - 1980s. This oil shock was initially positive for the country, but with mismanagement and military rule, it became all economic disaster. The larger middle class produced by the oil boom of the 1970s gradually became disenchanted in the 1980s, and rebellious in the 1990s. The enormous impact of the oil shock could not escape scholarly attention. For almost twenty years (1970s - 1990s), the virtual obsession was to analyze the consequences of oil on Nigeria, using different models and theories. A set of radical-oriented writers was concerned with the nationalization that took place during the oil shock as well as the linkages between oil and an activist foreign policy. Regarding the latter, the emphasis was on OPEC, Nigeria's strategic alliance formation within Africa, the vigorous efforts to establish the Economic Community of West African States (ECOWAS), and the country's attempts to use oil as a political weapon, especially in the liberation of South Africa from apartheid. If many had hoped that oil would turn Nigeria into an industrial power and a prosperous country based on a large middle class, they were to be disappointed when a formally rich country became a debtor nation by the 1980s. The suddenness of the economic difficulties of the 1980s "bust years" had an adverse effect on class relations and the oil workers who understood the dynamics of the industry. As if to capture the labor crisis, writings on oil workers during this period covered many interrelated issues, notably working conditions, strikes, and state labor relations. To be sure, labor issues were not new in the 1980s, since the left-oriented scholars had made a point of exposing labor relations in the colonial era. What was new after 1980 was the focus on oil workers, unions, and class conflict [OPEC annual report 1983].

II. Literature Review

Etiebet (1999) observed that price of oil products is derived from crude oil prices and it therefore follows that prices of petroleum products should trail crude oil prices. According to the author, it is not always the case for a number of reasons. In the first place, there is always a time lag between crude oil processing and product distribution through network. Secondly, for socio-political reasons, government of both oil producing and consuming countries should invariably intervene in the market to influence products price determination. But in the actual fact, the extent of intervention depends on the specific needs of the country and the level of endowment of the products in question. The author noted that trailing oil products prices down crude oil prices has revealed that, crude oil cost is not the only cost incurred in supply and distribution of petroleum products. Other costs include refining, storing, transporting and distributing, the author asserted. Siddy (1999) asserted that the causes of price instability is attributed to scarcity caused by refinery maintenance and rehabilitation problem, low capacity utilization, supply, and demand inequality. The political change that Nigeria went through, which turned over the administration and endured a lingering economic down turn is enough reason to cause price instability of oil products in Nigeria. The author opined that trailing oil products prices down to crude oil prices has revealed that the instability in the prices of oil products was due to cost of refining, storing, transporting distributing and inefficiencies in the process. Dan (1999) asserted that Nigeria has four refineries, one of which is at Kaduna, Warri and two at Port-Harcourt with a total nominal refining capacity of 445,000 barrels per day.

The author noted that although the refineries find it very difficult to reach that (445,000) due to frequent breakdown and operating problems such as vandalisation, which has been reduced and that more products are being pumped throughout the pipelines. Mbendi (2000) argued that in theory, Nigeria's refineries capacity is sufficient to meet its domestic consumption requirement. In practice, however, according to the author, the country has experienced frequent shortage of refined products since it refineries have poor configuration and operation inefficiency. The author stated that it has been estimated that smuggling amounts to over 320,000 barrels per day largely to Benin Republic, Niger, Chad, and Cameroon. The author noted that Nigeria has become a large importer of light petroleum products, importing thousands of tons of refined products. Runl (2010) asserted that people say Nigeria is dominated by oil and they are right because Nigeria seems to be exporting noting but oil. The government revenues are so dependent on oil, which has been managed quite protectively. But it's still extremely undesirable that internally generated revenue are such a small part of Nigeria's revenue because essentially, it means that all the revenues of the government is just coming down from heaven. It's like a gift and it is easy to waste a gift. The author noted that Nigeria is poor because of oil. Ewa and Agu (2003) shared their view that the dominance of petroleum in Nigerian economy has led to instability in the economy, which as a result makes price instability of oil products to be more prevalent in Nigeria than other countries. The author observed that smuggling is attractive and profitable due to price differential. This act of smuggling oil products from Nigeria to her neighbouring countries is one of the factors which made price instability of oil products to be prevalent. in Nigeria. In summary, the works reviewed are the work of many individuals who have shown concern in the area of this study. The most reoccurring term in the works reviewed were that price instability of oil products are prevalent due to ill-refinery maintenance, and rehabilitation problems, low capacity utilization, supply and demand inequality reduction in crude oil allocation, and smuggling of petroleum products.

Nigeria is an oil producing country which depend on it oil income for most of its federal revenue. The share reached 80% in 2008 (Central Bank of Nigeria 2011).

Christtos Trisimokos (2011) attempts to estimate the short – run and long- run price and income elasticities of crude oil demand in ten IEA member- countries. Specifically, the price and income elasticities for Sweden, Demark, Spain, Portugal, turkey, Finland, Italy, Germany, USA, and Japan are estimated. Crude oil consumption is a function of four explanatory variables real oil price, real GDP per capital, oil consumption lagged one year and a time trend represent Technological improvements.

III. Methodology

Econometric is the branch of economics discipline that brings to together economic theory, mathematics, statistic and computer science with economic phenomena with a view for making economic decision. The model and definition of variable is based on the production of crude oil and how it has been produced by regime and how it contributes to the economic growth of the country spanning between 2005 and 2015.The total production of crude oil [by Regime] can be expressed as a linear function as follow;

$$Y= \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + U$$

Where Y= total production of crude oil by Regime

x_1= the quantity of crude oil produced by joint ventures
x_2 =the quantity of crude oil produce by venture AF/CARRY
x_3 = the quantity of crude oil produced by Production Sharing Companies.
x_4= the quantity of crude oil produced by Service Contact Companies.
x_5 = the quantity of crude oil produced by Sole Risk Independent Companies.

Test of significance: We use the test statistic

$$t= \frac{\beta-\beta}{S.E(\beta)}$$

Therefore, assuming normality homoscedasticity occur, the test statistic above has t-distribution with n- k degree of freedom.

Goodness of fit: The square of the correlation coefficient, R^2 is called the coefficient of multiple determination or goodness of fit.

$$R^2= \frac{\sum \hat{Y}^2}{\sum Y^2} = \frac{SSR}{SST} = \frac{ESS}{TSS} 1- \sum \frac{e2}{Y2}$$

Hypothess is to be tested
H_0: there is no significant difference between R^2 and zero Versus H_1: H_0 is not true
Symbolically H_0: $R^2 = 0$ Versus H_1: $R^2 \neq 0$

Test static: $F = \frac{R^2}{K-1} / \frac{1-R^2}{n-k} = \frac{R^2(n-k)}{(1-R^2)(k-1)} \sim F_{k-1,}$ n-k, d.f

where k-1 is the degree of freedom for estimated sum of squares and $\propto$ =level of significance

Decision: if $F_{cal} > F_{tab}$ rejecting H_0 otherwise accept H_0

Interpretation of R^2: The higher the value of R^2 , the greater the goodness of fit of the regression and If the null hypothesis, H_0 is rejected at a particular level of significance then the value of R^2 is significantly difference from zero.

The adjusted cofficient of determination ($\bar{R}^2$): In determination the adjusted, the adjusted ($\overline{R^2}$), the coefficient of determine R^2 which measures the proportion of the variation in the explanatory variables.

$$\bar{R}^2 = \frac{ESS}{TSS} = R^2 - \frac{(n-1)}{n-K} (1-R^2)$$

To test the overall significance of the parameter estimate βi, we have an hypothesis which indicates. Ho: βi's =0∀I Versus H_1 : βi ≠0∀I
Therefore the test statistic

$$F = \frac{R^2/(n-k)}{(1-R^2)/(k-1)} \sim f\alpha, \text{ k-1, n-k}$$

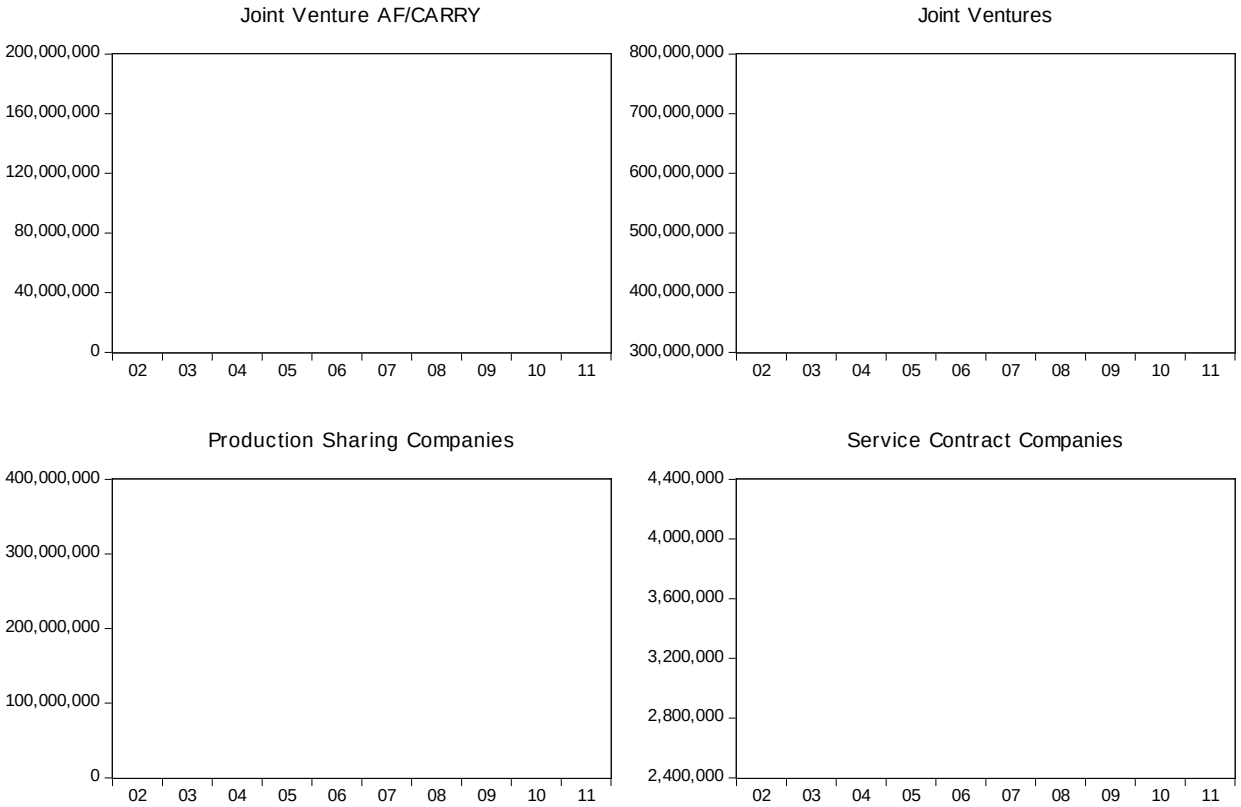
with (K-1), (n-K) degree of freedom.

Autocorrelation: One of the assumptions of the linear regression model is that errors are independent, that is, error terms are pair wise uncorrelated. This claim was tested in the study as well as multicollinearity and heteroscedasticity as the case may be.

The examination of residuals: A residual $\varepsilon i$is defined as the difference between the observed value and the fitted value,$\varepsilon i = \hat{Y}i - Y$, i= 1, 2, . . . n where $\hat{Y}$= E(Yi) The analysis of the residuals is an important technique for examining type of departure of the model from what is considered adequate.

IV. Data Analysis

The time plot of all the variables that are of interest in the study is as depicted in figure 1. It shows that the x_2, x_3 and x_5 have upward trend over period of interest in the study. This connotes that the three variables increases over the period. x_2 has an erratic movement. It increases from the initial period (2005) up to 2015 and dropped from 2008 till 2010. In addition, it later maintained a steady increase from same 2008 throughout the period of study. x_4 has downward trend between 2005 and 2006. It has an erratic movement between 2003 and 2005. It has steady downward trend i.e. dropped in 2005 till 2015 and. x_1 has an increasing trend between 2005 and 2004 and fell sharply in 2005. It rose between 2005 and 2011, but before that, it maintained downward trend from 2008 throughout the period of study. Y behaviour is undulating with no particular pattern. However, it should be noted that it maintained its straight trend from its initial period till 2015.



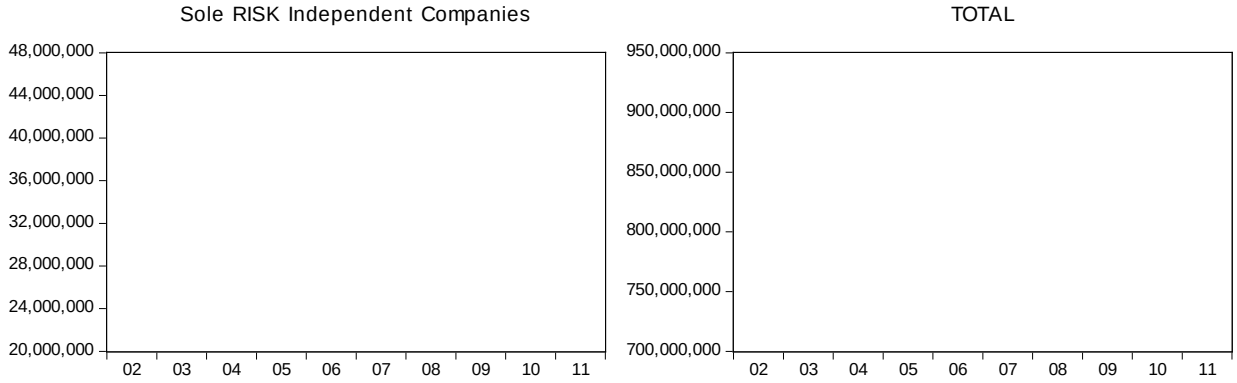


Figure 1: Time plot of variables of interest in the study

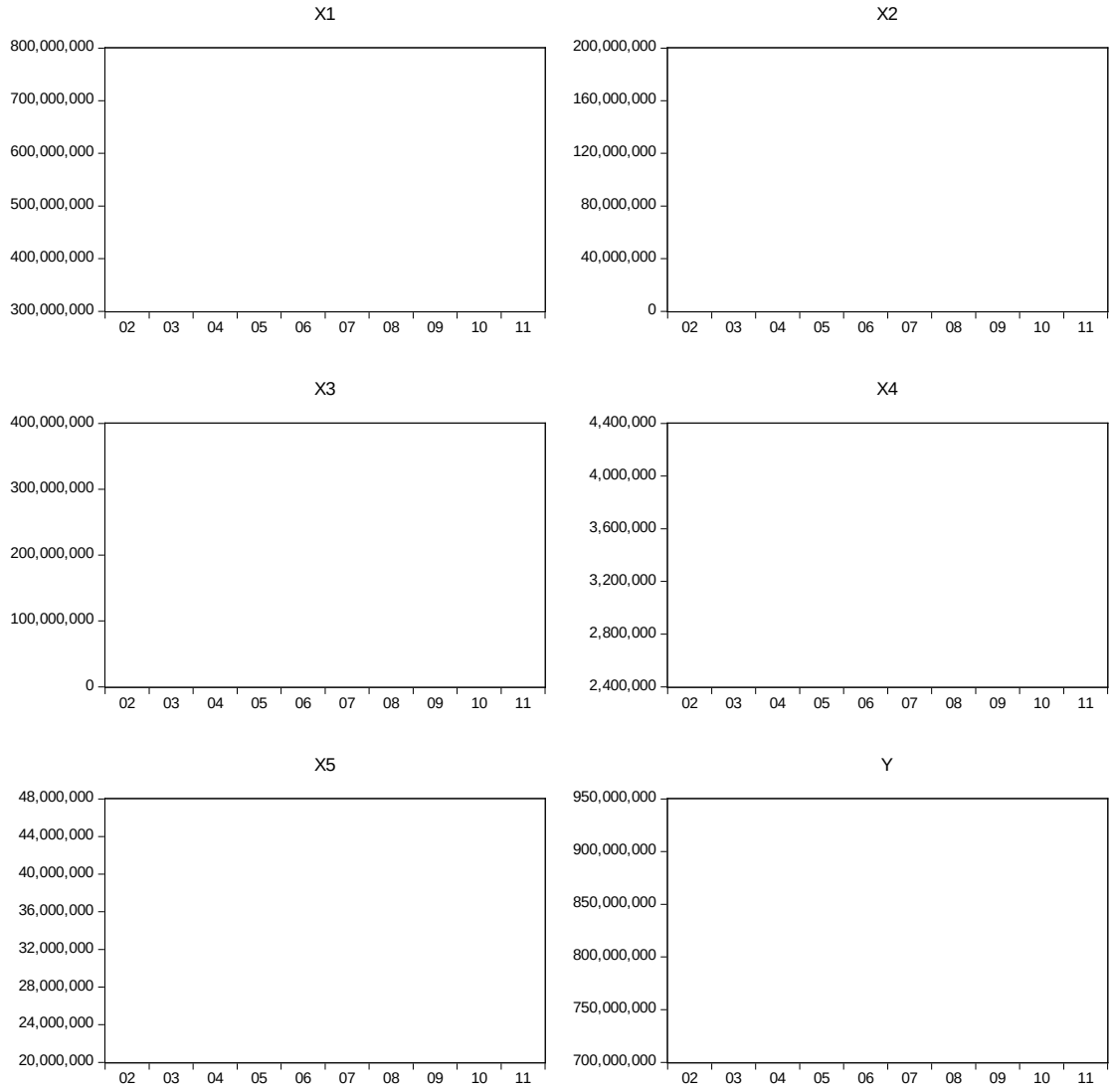


Figure 2: Bar chart of variables of interest in the study

Table 1: Establishment of relationship between the total productions of crude oil in Nigeria and Servicing Companies

	Parameter Estimates		Diagnostics	
Servicing companies	Intercept	Total Production	R-square	F-statistic
Joint Ventures	807518998.6***	0.056	0.018	0.145
Joint Ventures AF/CARRY	732411684.3***	0.921**	0.555	9.973**
Production Sharing Companies	837111357.9***	0.002	0.000	0.000
Service Contract Companies	856942733.2***	-5.454	0.002	0.018
Sole Risk Independent Companies	686269405.2***	4.353**	0.427	5.971**

Y = Total Production, x_1 = Joint Ventures, x_2 = Joint Ventures AF/CARRY, x_3 = Production Sharing Companies, x_4 = Service Contract Companies, x_5 = Sole Risk Independent Companies. From the empirical statistical point of view in the table1 and as F-statistics

(P-value) is < significant level we say it is significant and conclude that servicing companies (x's i.e joint ventures, AF/CARRY, Production Sharing Companies, Service Contract Companies and Sole Risk Independent Companies) jointly can influence the Total Production (Y).

Estimation of the parameters of the econometric model.

$$E(Y) = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5$$

$$E(Y)=19157697+0.950334X_1+0.993823X_2+0.946222X_3+7.035322X_4+0.798971X_5 \ldots\ldots(1)$$

Testing the significance of regressors: From the establishment of the regression analysis table above it was discovered that among the servicing companies; it is only joint ventures AF/CARRY and sole risk independent companies the significant variables to explain the total production.

From appendix (vii)

Testing the significance of the complete regression anova table

H_0: servicing company relationship are the same Versus

H_1: not Ho at $\alpha = 0.05$ since the overall Prob (F-statistics) is lesser than 0.05, we say the result is significant and reject H_0 and conclude that servicing company relationship are not the same.

From appendix (viii)

Testing residuals and the autocorrelation with decision

Hypothesis testing

H_0: residuals are not auto correlated versus

H_1: residuals are auto correlated at $\alpha = 0.05$

Decision rule: reject H_0 if p-value is greater than 0.05, otherwise accept H_0

From appendix (ix) based Autocorrelation result

The Breusch-Godfrey Serial Correlation LM Test result above indicates that residuals in the model are autocorrelated as the null hypothesis will be rejected since the test is significant. And the Chi square value ¡ 0.05 and meaning that the result is significant.
From appendix (x)

Test of heteroscedasticity, hypothesis testing, test statistics and decision.

Hypothesis testing

H_0: residuals are not heteroscadastic (homoscedastic) versus

H_1: not Ho at $\alpha = 0.05$

Decision rule: reject H_0 if p-value is greater than 0.05, otherwise accept H_0
Choosing the obs. R-squared (test stat. = 6.6667) and its corresponding prob. Chi-squared (5) = 0.2466 from the Heteroskedasticity Test: Breusch-Pagan-Godfrey above. The result shows that residuals in the model are not heteroscadastic i.e homoscedastic since its p-value (0.2466) ¿ 0.05. Meaning that the model is insignificant and null hypothesis will not be rejected.

V. Summary and Conclusion

This project critically examined the strength of relationship between the total production of crude oil in Nigeria and Servicing Companies (that are producing crude oil per regime). The table in appendix (I) indicates that both x_2 and x_5 have significant relationship on the production of crude oil while others do not.The coefficient interpretation goes thus that joint ventures have a very less significantly relationship with Total Production and positive relationship exist between them which mean that a unit increase of joint ventures will increases total production by 5% provided others independent variables are kept constant. Also, total production will increase by 92% given a 100% increase in joint ventures AF/CARRY while other factors are fixed. More so, a unit increase in Production Sharing Company positively increases total production by 0.2% provided that all other variable are kept constant. However, total production will fall or decrease by 54% for an additional 100% increase of service contract companies and lastly, one unit increase in sole risk independent companies is an increase in total production by 43.5% unit holding other independent variable fixed.

Model R squared (0.983853). 98% variation of total production can be explained the five independent variable. i.e joint ventures, joint venture AF/CARRY, production sharing companies, service contract companies and sole risk independently companies can influence only 98.39% on total company. More so, the R^2 indicates that the model is of good fit or nicely fitted or validity and reliably.

VI. Conclusion

It is apparent from the empirical analysis in chapter four that fitting econometric model is appropriate in establishing the functional relationship that exists between the total production of crude oil and the explanatory variables.
The estimated regression model is given below:

$$E(Y) = 19157697 + 0.950334X_1 + 0.993823X_2 + 0.946222X_3 + 7.035322X_4 + 0.798971X_5$$

However, it is on this basis that the following conclusions were made

- It shows from estimated regression line that the variable x_2 and x_5 has the highest coefficient which implies that they have greater contribution to the response variable Y (Total production of crude oil.
- The coefficient of determination (R^2=0.983853) is found to be statistical significant.
- The nature of the data almost follows the ordinary least squares assumptions because there is not heteroscedasticity.

VII. Recommendation

The joint distribution of independent variable contribute to the success of the total production prob (F. Statistic) = 0.00122 which is less than 0.05, so we now recommend that the oil production companies should proceed in their production and recruit more expert in order to enhance their production and create necessary facilities that necessitate successful production of oil in Nigeria. Federal government should assist the oil company by funding the major body of oil production at the right time as well as reducing tax rate of the company that are also working under NNPC.

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Notes

APPENDIX (I)

Dependent Variable: Y

Method: Least Squares

Date: 10/11/14 Time: 11:16

Sample: 2002 2011

Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19157697	2.06E+08	0.092982	0.9304
X1	0.950334	0.225717	4.210293	0.0136
X2	0.993823	0.180784	5.497290	0.0053
X3	0.946222	0.352672	2.683011	0.0551
X4	7.035322	15.47833	0.454527	0.6730
X5	0.798971	0.696225	1.147576	0.3151

R-squared	0.983853	Mean dependent var	8.37E+08
Adjusted R-squared	0.963668	S.D. dependent var	65082177
S.E. of regression	12405255	Akaike info criterion	35.78885
Sum squared resid	6.16E+14	Schwarz criterion	35.97040
Log likelihood	-172.9442	Hannan-Quinn criter.	35.58969
F-statistic	48.74334	Durbin-Watson stat	1.933953
Prob(F-statistic)	0.001122		

	Parameter Estimates		Diagnostics	
Servicing companies	Intercept	Total Production	R-square	F-statistic
Joint Ventures	807518998.6***	0.056	0.018	0.145
Joint Ventures AF/CARRY	732411684.3***	0.921**	0.555	9.973**
Production Sharing Companies	837111357.9***	0.002	0.000	0.000
Service Contract Companies	856942733.2***	-5.454	0.002	0.018
Sole Risk Independent Companies	686269405.2***	4.353**	0.427	5.971**

Regression **Appendix (ii)**

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.134[a]	.018	-.105	68411246.816

a. *Predictors: (Constant), JOINT VENTURES*

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	680418440550422.500	1	680418440550422.500	.145	.713[b]
	Residual	37440789527505352.000	8	4680098690938169.000		
	Total	38121207968055776.000	9			

a. Dependent Variable: TOTAL

b. Predictors: (Constant), JOINT VENTURES

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	807518998.647	81214860.664		9.943	.000
	JOINT VENTURES	.056	.146	.134	.381	.713

a. Dependent Variable: TOTAL

Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.745[a]	.555	.499	46054677.105

a. Predictors: (Constant), AF/CARRY

ANOVA[a]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21152941702056528.000	1	21152941702056528.000	9.973	.013[b]
	Residual	16968266265999246.000	8	2121033283249905.800		
	Total	38121207968055776.000	9			

a. Dependent Variable: TOTAL

b. Predictors: (Constant), AF/CARRY

Coefficients[a]

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	732411684.329	36285707.701		20.185	.000
	AF/CARRY	.921	.292	.745	3.158	.013

a. Dependent Variable: TOTAL

Notes

Notes

Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.003[a]	.000	-.125	69029735.606

a. Predictors: (Constant), PROD. SHARING COMPANIES

ANOVA[a]

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	372785275734.125	1	372785275734.125	.000	.993[b]
	Residual	3812083518278004 0.000	8	4765104397847505 .000		
	Total	3812120796805577 6.000	9			

a. Dependent Variable: TOTAL

b. Predictors: (Constant), PROD. SHARING COMPANIES

Coefficients[a]

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	837111357.869	36214404.862		23.115	.000
	PROD. SHARING COMPANIES	.002	.191	.003	.009	.993

a. Dependent Variable: TOTAL

Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.047[a]	.002	-.123	68954551.606

a. Predictors: (Constant), SERVICE CONTRACT COMPANIES

ANOVA[a]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	83366470713763.9 50	1	83366470713763.9 50	.018	.898[b]
	Residual	3803784149734201 6.000	8	4754730187167752 .000		
	Total	3812120796805577 6.000	9			

a. Dependent Variable: TOTAL

b. Predictors: (Constant), SERVICE CONTRACT COMPANIES

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	856942733.196	149437616.411		5.734	.000
	SERVICE CONTRACT COMPANIES	-5.454	41.191	-.047	-.132	.898

a. Dependent Variable: TOTAL

Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.654[a]	.427	.356	52235717.324

a. Predictors: (Constant), SOLE RISK IND. COMPANIES

ANOVA[a]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16292646653564018.000	1	16292646653564018.000	5.971	.040[b]
	Residual	21828561314491756.000	8	2728570164311469.500		
	Total	38121207968055776.000	9			

a. Dependent Variable: TOTAL

b. Predictors: (Constant), SOLE RISK IND. COMPANIES

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	686269405.245	64002592.829		10.723	.000
	SOLE RISK IND. COMPANIES	4.353	1.781	.654	2.444	.040

a. Dependent Variable: TOTAL

Notes

Appendix (vii)

Dependent Variable: Y
Method: Least Squares
Date: 10/11/14 Time: 11:16
Sample: 2002 2011
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19157697	2.06E+08	0.092982	0.9304
X1	0.950334	0.225717	4.210293	0.0136
X2	0.993823	0.180784	5.497290	0.0053
X3	0.946222	0.352672	2.683011	0.0551
X4	7.035322	15.47833	0.454527	0.6730
X5	0.798971	0.696225	1.147576	0.3151

R-squared	0.983853	Mean dependent var	8.37E+08
Adjusted R-squared	0.963668	S.D. dependent var	65082177
S.E. of regression	12405255	Akaike info criterion	35.78885
Sum squared resid	6.16E+14	Schwarz criterion	35.97040
Log likelihood	-172.9442	Hannan-Quinn criter.	35.58969
F-statistic	48.74334	Durbin-Watson stat	1.933953
Prob(F-statistic)	0.001122		

Appendix (viii)Residuals table

Obs	Actual	Fitted	Residual	Residual Plot
2002	7.3E+08	7.3E+08	-4165665	— . * — . —
2003	8.3E+08	8.3E+08	967072.	— . —* . —
2004	9.1E+08	9.1E+08	2808862	— . — * . —
2005	9.2E+08	9.2E+08	1484941	— . —* . —
2006	8.7E+08	8.7E+08	684523.	— . * . —
2007	8.0E+08	8.1E+08	-3445646	— . * — . —
2008	7.7E+08	7.7E+08	2850474	— . — * . —
2009	7.8E+08	7.8E+08	5237186	— . — * . —
2010	9.0E+08	8.8E+08	1.3E+07	— . — * —
2011	8.7E+08	8.9E+08	-1.9E+07	—* . — . —

Appendix (ix)Auto correlation result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	**4.861121**	**Prob. F(2,2)**	**0.1706**
Obs*R-squared	**8.293842**	**Prob. Chi-Square(2)**	**0.0158**

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 10/21/14 Time: 13:47

Sample: 2002 2011

Included observations: 10

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.57E+08	1.55E+08	-1.014308	0.4172
X1	0.166684	0.170197	0.979361	0.4307
X2	-0.065646	0.110131	-0.596071	0.6116
X3	0.281708	0.271260	1.038514	0.4081
X4	3.183448	10.88803	0.292381	0.7975
X5	0.759717	0.540765	1.404894	0.2952
RESID(-1)	-2.330861	1.047272	-2.225649	0.1560
RESID(-2)	-1.095442	1.409639	-0.777108	0.5184

R-squared	0.829384	Mean dependent var	2.41E-07
Adjusted R-squared	0.232229	S.D. dependent var	8270170.
S.E. of regression	7246534.	Akaike info criterion	34.42051
Sum squared resid	1.05E+14	Schwarz criterion	34.66258
Log likelihood	-164.1025	Hannan-Quinn criter.	34.15496
F-statistic	1.388892	Durbin-Watson stat	2.538704
Prob(F-statistic)	0.480429		

Appendix (x)

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.600067	Prob. F(5,4)	0.3347
Obs*R-squared	6.666760	Prob. Chi-Square(5)	0.2466
Scaled explained SS	1.833184	Prob. Chi-Square(5)	0.8717

Notes

Notes

Test Equation:
Dependent Variable: RESIDˆ2
Method: Least Squares
Date: 10/21/14 Time: 14:09
Sample: 2002 2011
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.73E+14	1.73E+15	-0.504592	0.6404
X1	1522066.	1895543.	0.802971	0.4670
X2	-719661.0	1518205.	-0.474021	0.6602
X3	2272979.	2961696.	0.767459	0.4856
X4	-86175750	1.30E+08	-0.662966	0.5436
X5	4808340.	5846812.	0.822387	0.4571

R-squared	0.666676	Mean dependent var	6.16E+13
Adjusted R-squared	0.250021	S.D. dependent var	1.20E+14
S.E. of regression	1.04E+14	Akaike info criterion	67.67583
Sum squared resid	4.34E+28	Schwarz criterion	67.85738
Log likelihood	-332.3791	Hannan-Quinn criter.	67.47667
F-statistic	1.600067	Durbin-Watson stat	1.887617
Prob(F-statistic)	0.334692		