Financial Derivatives and Performance of Listed Oil and Gas Companies in Nigeria

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Abstract: *This study examined effect of financial derivatives on the performance of listed oil and gas companies in Nigeria between the periods of 2015-2021. The objectives of the study were to; examine the effect of financial exchange derivative, interest rate swap, and Financial Derivative Assets on performance of listed oil and gas companies in Nigeria. Ordinary Least Square (OLS) method of data analysis was used. Ex-post facto research design was adopted in this study. The interested data were culled from the annual report of the quoted oil and gas firm in Nigeria stock exchange. Financial exchange derivative, interest rate swap, financial derivative assets and return on assets are the variables use in this study. Secondary sourced of data were employed in those study. The statistical tool used was descriptive statistics, Correlation Analysis and regression.. The findings show that Interest rate swap have significant effect on firm performance of quoted oil and gas firms in Nigeria. Financial derivative assets have positive and insignificant effect on firm performance of quoted oil and gas firms in Nigeria. Foreign exchange derivatives have a positive and statistical significant effect on firm performance of quoted oil and gas companies in Nigeria. the study concludes that financial derivatives has positive significant effect on performance of listed oil and gas firm in Nigeria The study recommends that oil and gas firm should increase their loan asset to better improve their profit. Increase their financial derivative and ensure that financial derivative assets are better utilized.*

Keywords: *financial exchange rate, financial derivatives assets, interest rate swap, total assets, returns on assets*

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1.1 Background to the Study

Increasing research attention has been paid to the financial instruments of derivative use, due to their increasing popularity with firms. Derivatives refer to the financial investment such as options and futures, which are used to hedge the financial risks from unexpected changes in interest rate, exchange rate, and commodity price. Firms use financial derivatives to hedge their exposure to various sorts of risk in order to increase their firm value. However, the effectiveness of derivative use on risk management and value creation has been debated among researchers. According to Modigliani and Miller in the 1950s, in a perfect market, risk management should not be relevant to a firm's value. In addition, Modigliani and Miller (1958) believe that risk can be actively managed by shareholders through diversifying their investments. Such theory

suggests that firms, by simply reducing the variations of their cash flows or firm values, do not create extra value to the shareholders and thus firms should not hedge.

Pandey (2005) indicates that a derivative is a financial instrument whose pay-off is derived from some other asset which is called an underlying asset. It refers to those items that do not have their own independent values; rather it has a derived value. Therefore, a derivative has a significant place in finance and risk management. Balvinder (1995) said the increasing globalization of commerce and industry is exposing firms to various financial risks, unrelated to their lines of business. According to Pandey (2005), financial derivative instruments have mushroomed very quickly from simple financial futures to a wide variety of exotic and complicated securities around the world. Derivatives markets can facilitate the management of financial risk exposure, since they allow investors to unbundle and transfer financial risk. In principle, such markets could contribute to a more efficient allocation of capital and cross-border capital flow, create more opportunities for diversification of portfolios, facilitate risk transfer, price discovery, and more public information (Tsetsekos and Varangis, 1997; Ilyina, 2004). However, financial derivative is a two-edged sword. The original intention of derivatives was hedging, but they also contained a large quantity of risk. If inappropriate use or excessive speculation, it may bring huge loss to the firms. It is against this backdrop that the study examined the effect of financial derivatives on firm performance of oil and gas firm in Nigeria

Over the last few years, companies in the emerging market have increased the use of derivative to hedge their positions. Thus the derivative market has experienced a rapid growth over the recent years. Even though information on firm derivative usages is widely available in the developed world, the empirical research regarding whether the use of derivative will increase the firm performance of a company is still subject of debate especially in the developing world. Although many foreign scholars have conducted in-depth research on insurance companies, commercial banks and other companies and industries that frequently use financial derivatives, and have achieved rich results, but due to the late start of the Nigerian derivatives market, the lack of innovation capabilities, the development speed of Nigeria's financial derivatives market is relatively lagging behind. At the same time, the difference between the regulatory legal system and the information disclosure mechanism, coupled with the development level of Nigeria's capital market, makes the reference and credibility of foreign research to Nigerian organizations decline.

Organizations are working on innovative ways to achieve profits instead of traditional methods, and hedging of systemic risks by using financial derivatives because of the uncertainty and high volatility in the global and domestic financial markets. Compared to on-balance sheet asset-liability management, managing risks by using financial derivatives, normally known as off-balance sheet activities, gives the commercial banks the flexibility to attain their preferred risk exposures without changing their original business goals. However many authors have analyzed financial derivatives with inconclusive findings. Efanga, et al. (2019) examined the impact of derivative instruments on risk management in the Nigerian banking sector, between 2014 and 2018. The inferential result suggested that financial derivative impacted positively and significantly on risk management in the Nigerian banking sector. John, (2017) examined the impact of financial derivatives on the performance of firms in the financial sector in Ghana. A

strong positive correlation between financial derivatives and controlled business risks is found. In the light of those contradictory results obtained from existing literature conducted using Nigerian data, this study sought to find out the effect of financial derivatives on firm performance of listed oil and gas companies in Nigeria. The study provided up to date knowledge of empirical evidence from samples collected from oil and gas companies most previous related studies in Nigeria did not consider

The general purpose of this study is to determine the effect of financial derivatives on the firm performance of listed oil and gas companies in Nigeria. Specifically, the study sought to:

1. Investigate the effect of financial exchange derivative on firm performance of listed oil and gas companies in Nigeria.
2. Ascertain the effect of interest rate swap on firm performance of listed oil and gas companies in Nigeria
3. Examine the effect of Financial Derivative Assets on firm performance of listed oil and gas companies in Nigeria

This paper is arrange into 5 sections, section 2, review of related literature, section 3 methodology, section 4 data collection and interpretation, section 5, conclusion and recommendation

REVIEW OF RELATED LITERATURE

2. Conceptual Review

2.1.1 Derivatives

Derivatives refer to a broad class of financial instruments which derive their value from the value of an underlying asset or market variable (Fadun, 2013). They do not have worth of their own, but derive their value from the claim they give to their owners to own some other financial assets or security. Derivatives are financial instruments used in hedging. Derivatives are just one form of hedging instruments which comes in form of contracts or agreements between two parties. The basic meaning of derivatives is to derive something from something else. A simple example of derivative is butter, which is a derivative of milk. The price of butter depends upon the price of milk, which also depends upon the demand and supply of milk. Size is an important factor influencing the decision of firms to use derivatives (Halter, 2010). Hence, the huge initial cost of establishing a derivative position can discourage small firms from using them (Kapitsinas, 2018). Nevertheless, derivatives are highly suitable in managing risks associated with the FSS operations, if appropriately employed.

Harper (2010) mentioned the uses and the functions performed by derivatives as Foreign Exchange Risk: The risk that changes with the currency exchange rate will have an adverse effect on the company's revenue. It is also known as currency risk. Interest Rate Risk: Companies can hedge interest-rate risk in various ways. Consider a company wishes to sell a division in one year but the interest rate is expected to fall in the future, then it could purchase (or 'take a long position on') a Treasury futures contract to lock in the interest rate. Thus, the

company is effectively locking in the future interest rate. Commodity or Product Input Hedge: This is the risk commonly faced by companies that are heavily sensitive to the price change of raw-material inputs or commodities. For example airline industry, it consumes lots of jet fuel. In the past, most airlines have given a great deal of consideration to hedging against crude-oil price increases.

2.1.2. Gross Profit Margin

Ratnasari and Handayani (2013) states that the Gross Profit Margin (GPM) is the ratio or balance between the gross profit of the company and the level of sales achieved in the same period. Gross Profit Margin is strongly influenced by sales prices, the higher the profitability of the company means the better. If the cost of goods sold increases, the GPM will decrease, and vice versa (Iftia, 2012).The gross profit margin ratio reflects or illustrates the gross profit that can be achieved every rupiah of sale, or if this ratio is subtracted from the 100% figure, it will show the remaining amount to cover operating costs and net profit.

2.1.3 Financial Exchange Derivative
Exchange rate implies the price of one currency in terms of another. Exchange rate is the ratio between a unit of one currency and the amount of another currency for which that unit can be exchanged at a particular time (Ngerebo-a and Ibe, 2013). In other words, exchange rate is the price of one currency vis-à-vis another and is the number of units of a currency required to buy another currency (Mordi, 2006). Exchange rate of currency is the link between domestic and foreign prices of goods and services. Also, exchange rate can either appreciate or depreciate. Appreciation in the exchange rate occurs if less unit of domestic currency exchanges for a unit of foreign currency while depreciation in exchange rate occurs if more unit of domestic currency exchanges for a unit of foreign currency.

2.1.4 Interest Rate Swap
An interest rate swap is a financial derivative contract in which two parties agree to exchange their interest rate cash flows. The interest rate swap generally involves exchanges between predetermined notional amounts with fixed and floating rates. The interest rate swaps involve the exchange of cash flows between two parties generated at two different rates of interest Adebiyi (2002). Any interest rate swap is basically a financial derivative contract where two different parties enter into an agreement in order to exchange their cash flows where the transactions are between notional amounts that are predetermined with fixed and floating rates Maigua and Mouni, 2016. The interest rate swaps are extremely important for any market, and they help the investors in their financial transactions with different parties Ibimodo (2005)

2.1.5 Financial Derivative Assets

In financial accounting, an **asset** is any resource owned or controlled by a business or an economic entity. It is anything (tangible or intangible) that can be used to produce positive economic value. Assets represent value of ownership that can be converted into cash (although cash itself is also considered an asset). The balance sheet of a firm records the monetary value of the assets owned by that firm. It covers money and other valuables belonging to an individual or to a business.

Assets can be grouped into two major classes: tangible assets and intangible assets. Tangible assets contain various subclasses, including current assets and fixed assets.[3] Current assets include cash, inventory, accounts receivable, while fixed assets include land, buildings and equipment. Intangible assets are non-physical resources and rights that have a value to the firm because they give the firm an advantage in the marketplace. Intangible assets include goodwill, copyrights, trademarks, patents, computer programs, and financial assets, including financial investments, bonds, and stocks.

2.1.2 Performance

Cole and Kelly (2011) describe performance as a continuous process for improving the performance of individuals by aligning actual performance with that desired (and with the strategic goals of the organization) through a variety of means such as standard-setting, appraisal and evaluation both informally, day-to-day, and formally/systematically through appraisal interviews and goal-setting. Job performance is defined as the value of the set of employee behaviors that contribute, either positively or negatively to organizational goal accomplishment while task performance are employee behaviors that are directly involved in the transformation of organizational resources into the goods or services that the organization produces (Colquitt, Lepine and Wesson, 2014).

For organization, performance is one of the ways to measure the extent of its effectiveness. The need for the ability to set goals and objectives to achieve its performance and how to improve the overall organizational performance is undoubtedly the most important organizational goals and objectives. Definition and measurement of performance is a challenge for researchers because organizations have many, frequently conflicting, goals (Chow et al., 2014). Sarah and Tricia (2015) indicated that performance is often used to measure the overall status of the organization and its related policies. Organizational performance can be measured by both financial and non-financial performance (Yang, Marlow & Lu, 2019). Venkatraman and Ramanujam (2016) considered three factors to corporate performance measurement, namely, financial performance (i.e. return on investment, earnings per share, etc.), operational performance (i.e. market share, product quality, etc.) and organizational effectiveness (i.e. employee's morale, work atmosphere, etc.). The dimension of employees is reflected in one form or another in all organizational diagnostic models, an aspect that reveals its importance to the success of an organization. Often management decisions may generate feelings of anger, frustration, grievance, and distrust, among employees, that may contribute to a potentially detrimental effect on the general organizational performance (Vasconcelos, 2011).

According to Lawler (2015), the relationship between organizations and employees should not only focus on the task itself. Organizations should take initiative to develop an effective motivation system to increase employees' motivation towards their work. This in turn will help to improve the efficiency and quality of work, enabling organizations to meet their performance outcomes. Urbanski (2016) used salary increment as a motivation tool and found that it effectively motivates employees and increase organizational performance. The flexibility in salary increment was also found to have a positive effect. Bhatti et al. (2011)

studied the effect of motivation on individuals and how it contributes towards organizational performance with the conclusion that organizations should define clear strategy to link performance with rewards. In this study performance was measured using gross profit margin (GPM)

2.2 Theoretical Review
Capital Structure Irrelevance Theory
This study is anchored on capital structure irrelevance theory by Modigliani and Miller (1958). This theory relates to the immateriality of hedging first posited by Modigliani and Miller (1958). The theory expresses that the capital structure of a firm comprising of equity, debt and/or preference stock is autonomous of its financial performance which is mainly affected by the company's underlying assets. Put differently, "regardless of how a company chooses to fund its operations will not affect its financial value or performance with the assumptions that there is absence of government intervention, quality and quantity of information is the same, and no taxes or other unnecessary fees are present." Little wonder Frankfurter and McGoun (1999), contend that the theory is unnecessarily impregnated, as it is impossible to have a perfect market economy. A study by Carter, Rogers and Simkins (2004) on 26 airline companies in the US between the years of 1994—2000 refutes the irrelevancy of firm hedging based on their findings that there was a 14.94-16.08% increase in the Tobin's Q ratios used to represent the value of these firms. They concluded that the cost of jet fuel significantly affected cash flow, in that high jet fuel costs led to lower cash flows.

Relevance
Jin and Jorion (2006) strongly supported this theory in their study which was a composition of a dataset of 119 U.S. companies, with 330 firm year observations in the oil and gas industry between years 1998-2001. They used a pooled-OLS estimation technique with the Tobin's Q ratio as the dependent variable, and hedging activity dummies as the independent variables. They concluded that there were no differences between the Tobin's Q ratios representing firm values of firms.. Therefore, "hedging does not confer a special advantage since investors can hedge on their own." This relationship became negatively effective on firm value when the exposures were hedged although more than 90% of the firms in the sample showed a significant relationship between exposures to oil and gas commodity prices and stock prices, in that an increase in commodity prices led to an increase in stock prices. Deducing from this theory in informing the study, it will expound on the research objective (i) and research question (i) of this study. Moreover, this theory will explicate to inform on the variable under study on Risk Management by giving more insights to its functionality on hedging

2.3 Empirical Review

Suhendra, Murwaningsari and Mayangsari (2022) analyze the effect of derivative transactions on earnings management, the role of corporate tax avoidance in moderating effect of derivative transactions on earnings management, the effect of earnings management worth pertinence of earnings, and the effect of derivative transactions Worth Pertinence of earnings. This examination utilizes information from non- monetary organizations in Indonesia and Thailand

for the period 2013 - 2017 with 91 tests of organizations. This investigation, earnings management is calculated based on the Jaggi model and the Jaggi changed model. The value relevance of earnings is calculated based on Ohlson's model. Corporate tax avoidance is calculated based on the book tax difference. The results show that subordinate exchanges have a constructive outcome on earnings management. Corporate tax avoidance has not been proven to strengthen the effect of derivative transactions on earnings management. Earnings management adversely influences the worth pertinence of earnings. Derivative transactions negatively affect the value relevance of earnings. Derivative transactions, especially those with non-hedging criteria, show a high tendency towards earnings management activities. Inter-country testing, derivative transactions have a positive effect on earnings management in Indonesia while in Thailand it does not.

Muthine, (2021) assessed the influence of swaps, options, forwards and futures on financial performance of listed commercial banks in Kenya. Four theories that were espoused in this study included risk management theory, capital irreverence theory, financial intermediation theory and normative decision-making theory to guide swaps, options, forwards and futures respectively. Descriptive research design was used when collecting data using closed ended questionnaires from the selected 11 listed commercial banks in Kenya. Required data was provided by risk managers, operations managers, operations managers and marketing managers to participate in the study. Census sampling technique was used due to the small target population hence every listed commercial bank was included. To ensure validity and reliability, pre-test questionnaires was sent to six respondents who were selected by simple random method of sampling from the non-listed banking sector. The six respondents were junior officers in risk, credit, operations and marketing departments of non-listed commercial banks in Meru Kenya. The collected data was then coded using the SPSS 24.0 software. The coded data was analyzed quantitatively using the descriptive statistics such as mean, percentage and standard deviation while inferential statistics such as person correlation analysis were used. Linear regression models were also used. Further on, the tables, graphs were used when indicating the analysis results. The study indicated that there was a linear relationship between financial derivatives and financial performance of selected listed commercial banks in Kenya. The study discovered that sales of swaps contracts was low and there were increasing costs associated with these kind of derivatives hence reducing profits. In addition, since most forwards take a long time to mature, when banks were restructuring their computerized systems, they lost client's contact information through misplacement or not correctly capturing in the new system. These results proved that the banks lacked enough qualified staff to amicably handle all issues and report on time. In addition, it was evident that the banks did not have complete infrastructure set up that is required to run financial derivatives such as futures. The study recommends that there should be an aggressive marketing initiatives in the banking sectors to enable incorporation of more clients into derivatives contracts.

Usman, Salman and Ayaz ul (2020) examined the influence of derivative usage on performance of Islamic and conventional banking sector working in Pakistan. Various studies have testified the concept of derivative usage in Islamic banks while various authors have testified it in conventional banks. This study opted 12 commercial banks and 5 Islamic banks. Data is used from 2015 to 2019. Four types of derivatives i.e. forward, options, swaps and future are used.

CAMEL method is used to evaluate the performance of banks that was used by Mohamed Rochdi Keffala (2020). The CAMEL variable are related to bank features like managerial skills, earning capital, quality of an asset, liquidity and market risk adherence. Results revealed that forwards and Swaps effects positively the bank stability in conventional banks while option and future affects negatively the bank performance in conventional bank while in Islamic mode of banking the results are different. Swaps and options increase the performance

Sulaiman and Ibrahim (2020) examined the effect of financial derivatives on the profitability of selected deposit money banks in Nigeria. Panel regression model was used by collecting data from the annual financial report of all the eight (8) banks with international authorization status in Nigeria and covers a period of five years between 2012 and 2017. The independent variable, financial derivative was proxies using financial derivative liabilities (FDL) and financial derivative assets (FDA) with loan and advances to customers (LTC) as a controlling variable. Pooled Ordinary Least Square (OLS), fixed effects and random effects tests were conducted on the variables and were also subjected to the Hausman test to choose the preferred estimator. The result indicates that the model is positive and significant. FDA and LTC have positive and significant effect on the profitability of deposit money banks in Nigeria while FDL is negative and insignificant. The study therefore concludes that financial derivative has positive and significant effect on the profitability of deposit money banks in Nigeria. Based on the findings, the study recommends that deposit money banks should increase their loan asset to better improve their profit. Limit their financial derivative liabilities and ensure that financial derivative assets are better utilized

Efanga, et al. (2019) examined the impact of derivative instruments on risk management in the Nigerian banking sector, between 2014 and 2018. Ordinary least squares (OLS) model was employed to analyze data and draw inference; data used were elicited from Central Bank of Nigeria Statistical Bulletin of 2018 and Nigerian Stock Exchange Statistical Bulletin of 2018. The study employed foreign exchange derivative as proxy for derivative instruments (independent variable), while exchange rate was employed as a measure of risk management in the Nigerian banking sector (dependent variable). The inferential result suggested that financial derivative impacted positively and significantly on risk management in the Nigerian banking sector.

3.METHODOLOGY

This research was on the financial derivatives and firm performance. However the six (6) oil and gas firm will be used as the case study. The study covers ten (10) year period of between 2012 and 2021 because most of the firms rarely involved in financial derivative prior 2012. The study makes use of secondary data which were collected from the annual statement of the selected oil and gas firm under investigation (Total Oil Mobil Oil, Anino Oil Conoil, Eterna Oil,). The data (with emphasis on financial derivative assets, exchange rate and interest rate swaps) used is gathered from different oil and gas firms for ten years period (between 2012 and 2021). Panel least square data technique will be fully utlize for the analysis of this study. Descriptive statistics like mean, histogram, skewness, kurtosis and Jarque-Bera are being used. The hypothesis earlier stated is further subjected to testing using 0.05%. The model used for this study was adapted from the work of Orie, Obiora, & Orie, (2022), who studied the effect of financial derivatives on

the performance of deposit money bank in the Nigerian Exchange Limited. Their model uses financial derivative assets, exchange rate with loan and advances to customers and deposit money bank profitability. The present model will introduce interest rate swaps and total assets. There are several measurements of bank profitability which could be gross profit ratio, profit margin, return on investment, return on equity, and profit after tax among others (Kurfi, 2003; Osayi, Kasimu and Nkwonta, 2018). The study therefore adopts gross profit margin being a direct measurement of profitability and as used in the adapted model. Therefore the model is specified as thus:

GPM= f(FED, IRS, FDA, TOA)
GPM = Gross profit margin
FED = Foreign exchange derivatives
IRS = Interest rate swaps
FDA = financial derivatives assets
TA = Total Assets
F= functional notation

Econometric form of the model being

$GPM = \beta_0 + \beta_1 FDE + \beta_2 IRS + \beta_3 FDA + \beta_4 TOA \mu$

Where

Bo= constant

Where

B_0 = Autonomous Intercept

B_1 = Coefficient of parameter FDE

B_2 = Coefficient of parameter IRS

B_3 = Coefficient of parameter FDA

B_4 = Coefficient of parameter TA

U = Stochastic error term

Decision rule
The test of hypotheses and the decision on whether to accept or reject each hypothesis was based on the result of the T-Test/T-Stat in the multiple regression analysis. The t- statistics was used to test the significant contribution from each predictor to the regression models. Hypotheses were tested at 5% (0.05) level of significance. The null hypothesis was accepted if the probability ' P-value ' of T-stat is greater than the stated 5% level of significance otherwise reject. P>0, 0.5, Accept Ho. P< 0.05, Reject Ho.

DATA PRESENTATION AND ANALYSIS
4.1 Descriptive Statistics
The Table below shows the descriptive statistics of the selected oil and gas firm that make up our sample of study.
Table 4.1. Descriptive Statistics Result

	GPM	IRS	FDA	FED	TOA
Mean	42.22917	22.94729	16.10958	64.10875	262.8877
Median	41.50000	5.605000	7.025000	33.78500	78.48650
Maximum	90.00000	98.88000	117.0000	716.0000	4435.600
Minimum	1.000000	1.130000	0.070000	1.120000	8.564000
Std. Dev.	27.47784	28.29540	25.93397	120.7024	637.9004
Skewness	0.102483	1.152139	2.461815	3.952840	6.006876
Kurtosis	1.739488	3.036035	8.370396	20.17757	39.79691
Jarque-Bera	3.261801	10.62200	106.1666	715.1371	2996.686
Probability	0.195753	0.004937	0.000000	0.000000	0.000000
Sum	2027.000	1101.470	773.2600	3077.220	12618.61
Sum Sq. Dev.	35486.48	37629.61	31610.84	684745.9	19125094
Observations	60	60	60	60	60

Source: Researchers summary of result 2023;
Note: *1% level of significance, **5% level of significance, ***10% level of significance.

It was observed from the descriptive statistics table above that the mean value of GPM which was used to proxy profitability of the sampled oil companies was 42.22 approximately while its median value was 41.50 precisely. This therefore means that oil companies with GPM of 42.22 and above are classified as above average performing oil companies whereas those oil companies whose mean value of GPM were below 42.22 were classified as below average. The maximum value of profitability (GPM) was 90.00% while the minimum value was 1.00%. This extreme large value of GPM implies that some oil companies in the sampled performed poorly while some had very good ROA when compared to the average value. This therefore means that oil companies with mean value higher or equal to 42.22 are high profitable oil companies while oil companies with the value below 42.22 are low profitable oil companies. The mean average interest rate swap for the selected oil companies stood at 22.94% approximately while its maximum and minimum values were 98% and 110% respectively.

The descriptive table above revealed that the mean value of financial derivatives assets of the oil companies was 16.10 approximately while its median value was 7.02. The maximum value of financial derivatives assets was 117.0 while the minimum value was 0.07. This means that only oil companies that actually take its financial derivatives assets position into consideration was used in this study since no oil companies had zero financial derivatives assets value. In the same vein, the mean value of foreign exchange derivatives was 64.10 while its maximum and minimum values were 716 and 1.12% respectively. The descriptive table above revealed that the mean value of firm growth of the oil companies was 262.28 approximately while its median value was 78.48. The maximum value of total assets was 4435.60 while the minimum value was 8.56. In observing the highest and lowest values for the entire four independent variables interest

rate swaps (IRS), Foreign derivatives assets (FDA), foreign exchange derivatives (FED) and Total Assets (TOA), we observed that the oil companies that form our sample differ in many respects. For example, while some oil companies are making provision for derivatives more, some are not making provision for it at all or making less provision for eventualities. Also, while some of the oil companies are profitable and having large return on their asset, others are not. This shows that our samples were not skewed to any particular direction.

Also, the Jarque-Bera (JB) Probability shows that all the variables are normally distributed at 5% level of significance except interest rate swaps that was normally distributed at 10% level. This means that no variables with outlier, even if there are, they are not likely to distort the conclusion and are therefore reliable for drawing generalization. This also justify the use of ordinary least square estimation techniques. Hence, any recommendations made to a very large extent would represent the characteristics of the true population of study.

4.2.: Pearson Correlation Matrix

Pearson's correlation matrix was applied to check the degree of association between financial derivatives and firm performance of quoted oil and gas firms in Nigeria so as to determine the nature or degree of association i.e. positive or negative correlation and the magnitude of the correlation between dependent variable (return on assets) and independent variables with other explanatory variables. Correlation coefficient measures the direction and degree of association between two or more variables. It is worthy to note at this point that correlation measures association not causality. Correlation can be positive (>0) or negative (<0). A positive correlation means that two variables move in the same direction while a negative correlation means they move in opposite direction. Therefore, in examining the association among the variables, we employed the Pearson correlation coefficient (correlation matrix) and the results are presented in the table 4.2.2 below.

Table 4.2. Correlation Analysis Result

	GPM	IRS	FDA	FED	TOA
GPM	1.000000				
IRS	0.046354	1.000000			
FDA	0.098188	-0.104104	1.000000		
FDA	-0.415948	0.016938	0.194340	1.000000	
TOA	0.076693	-0.043653	-0.117162	-0.014761	1.000000

Source: researcher's summary of correlation result (2023) using E-view 10

The result of the correlation coefficient showed mixed correlation. This association identified buttresses the point that our variables have a linear relationship. Furthermore, the strength of the relationship between variables measured by the Pearson product-moment correlation showed that the association between the variables is relatively small and was below the threshold of 0.80, suggesting the absence of the problem of multicollinearity in the predictor variables. In this section we present and discuss the Pearson correlations among the variables of financial derivative and firm performance. Table 4.2.2 shows that most of the correlation coefficients between the study's variables are relatively low, nevertheless there are still some relatively high correlations between some of those variables. The above results show that there exists a positive and a very weak association between gross profit margin (performance), interest rate swaps,

financial derivatives assets and total assets (GPM/IRS/FDA and TOA = 0.046/0.098 and 0.076) respectively while a negative correlation was documented for return on assets and financial exchange derivatives. It was discovered that a negative and very weak association exists between interest rate swaps, financial derivatives assets and total assets (IRS/FDA and TOA = -0.104 and -0.043) respectively while a positive correlation was established between interest rate swaps, and financial exchange derivatives. Other explanatory variables show negative association among themselves except financial derivatives assets that have positive relationship with financial exchange derivatives.

In checking for multicollinearity, the study noticed from the correlation table above that no two explanatory variables were perfectly or highly correlated and thereby ruled out the case of having an outlier. This indicates the absence of multi-collinearity problem in the model used for the analysis. This also justifies the use of the panel regression analysis and variation inflation factor (VIF).

4.3 Test of Multicollinearity or Variance Inflation Factor (VIF)
Variance Inflation Factor (VIF) was used to test for multicollinearity among the independent variables. This is necessary because OLS regression technique assumes the absence of multicollinearity among the independent variables to expect a high level of accuracy from the estimator.Multicollinearity was tested by computing the Variance Inflation Factor (VIF) and its reciprocal or the tolerance. Collinearity diagnostics measure how many regressors are related to other regressors and how this affects the stability and variance of the regression estimates. To further check for multi-collinearity problem or to know whether the independent variables used are perfectly correlated, we conducted Variance Inflation Factor (VIF) to check for the multi-collinearity problem. The result of the Variance Inflation Factor (VIF) is provided in table 4.2.3 below:

Table 4.3:   Variance Inflation Factor Result
Variance Inflation Factors
Date: 1/21/23   Time: 11:19
Sample: 2012 2021
Included observations: 60

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.306429	235.8558	NA
IRS	0.006677	143.8078	1.015715
FDA	1.15E-05	25.06310	1.067789
FED	0.000907	45.36027	1.040874
TOA	0.007694	19.77232	1.017280

Source: Researcher's summary of VIF result (2023)

To detect multicollinearity, we used the variance inflation factor (VIF) test to quantify its severity in our model, where the variance factors of each variable is calculated. According to the guidelines of this test, the existence of multicollinearity can be confirmed only in circumstances where the value of the variance inflation factor is more than 10. Based on the VIF test and the

Pairwise rank correlation, we found that there is no intercorrelation between our independent variables. As can be observed from the result of VIF in table 4.2.3 above, the mean value of the independent variables coefficient is less than 10. Hence, any recommendations made to a very large extent would represent the characteristics of the true population of study and thus can be used to draw conclusion.

4.4: Test of Hypotheses/ Regression Results

In order to examine the relationship between the dependent variable (GPM) and the independent variables (IRS,FDA, FED and TOA) and to test our formulated hypothesis, we employed a panel least square regression analysis since the data had both time series (2012-2021) and longitudinal properties (6 quoted oil and gas companies). Our analysis is presented in table 4.4 below:

Table 4.4 Panel Least Regression Result

Dependent Variable:GPM
Method: Panel Least Squares
Date: 1/21/23 Time: 11:18
Sample: 2012 2021
Periods included: 10
Cross-sections included: 6
Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.193261	0.553560	2.155612	0.0356
IRS	0.053903	0.081712	0.659669	0.5123
FDA	0.005638	0.003387	1.664461	0.1018
FED	-0.112106	0.030123	-3.721662	0.0005
TOA	0.070709	0.087713	0.806146	0.4237

R-squared	0.421145	Mean dependent var		1.004068
Adjusted R-squared	0.363452	S.D. dependent var		0.302707
S.E. of regression	0.276865	Akaike info criterion		0.350362
Sum squared resid	4.139319	Schwarz criterion		0.526425
Log likelihood	-5.335692	Hannan-Quinn criter.		0.419090
F-statistic	3.833146	Durbin-Watson stat		1.974526
Prob(F-statistic)	0.008177			

Source: Researcher's summary of regression result (2023).

The table 4.3.3 above shows the panel regression analysis of 6 quoted oil and gas firms in Nigeria. From the table above, the F-statistics value of 3.833 and their P-value of 0.0081 showed that the overall analysis of our variables in the regression model was generally significant at 1% level of significance and it shows that the model was well specified in explaining return on assets. From the result above, the study observed that the R. squared value was 0.421 (42.1%) and R-squared adjusted value was 0.363 (36.3%) respectively. The value of R-squared which is the coefficient of determination stood at 42% which implies that 42% of the systematic variations in individual dependent variables were explained in the model while about 58% were unexplained thereby captured by the stochastic error term. This indicates that all the independent

variables jointly explain about 42% of the system variation in return on assets of our sampled oil and gas firms in Nigeria over the 10years period while about 58% of the total variations were unaccounted for, hence captured by the stochastic error term. This reveals that about 42% return on assets can be attributable to the corporate governance variables selected for the study while about 58% were unexplained. Moreover, the F-statistics value of 3.833 and its probability value of 0.0081 shows that the return on assets model used for the analysis were statistically significant at 1% level. This confirms the appropriateness of our model used for the analysis. The Durbin Watson statistics value of 1.974 showed that the model is well spread since the value is approximately 2 and that there have not been self or auto correlation problem and that error are independent of each other.

4.5: Discussion of Findings

In testing our hypotheses, we provide the below specific analysis for each of the independent variables as follows:

***$H_0$1:* IRS has no significant effect on firm performance of quoted firms in Nigeria.**

Based on panel regression result in table 4.3.3 above, we observed that interest rate showed a positive coefficient value of 0.0539, and P-value of 0.5123. The result from the model indicates that interest rate swap which was income from borrowed fund have positive but significant influence on the return on assets of quoted oil and gas firms in Nigeria which was statistically significant. This suggests that the positive coefficient and the probability indicate that interest rate swap positively affects the return on assets of firms but the effect is statistically significant and is enough to drive performance of firms in Nigeria. This implies that 1% increase in the interest rate swap leads to a percentage increase on return on assets by 5.3% thus providing support for the importance of stable interest rate, possibly because of the profit return that determines the optimal performance. In general, when the size of interest rate derivatives is increasing it is expected that it will improve performance due to the higher degree of income it brings to the firm. As a result of this significant relationship we documented, we accepted our alternative hypothesis and therefore conclude that interest rate swap have significant effect on return on assets of quoted oil and gas firms in Nigeria.

Ho2: financial derivative assets have no significant effect on financial performance of selected oil and gas firms in Nigeria.
The study established that financial derivative assets has positive but significant effect on financial performance of quoted oil and gas firms in Nigeria having recorded a positive coefficient value of 0.0056 and p-value of 0.1018 (β_2=-0.0056, p = 0.1018> α = 0.05). The coefficient value $\beta_2$was positive showing that financial derivative assets has a positive effect on financial performance of quoted oil and gas firms in Nigeria, hence when financial derivative assets increases by one person, performance increases by 0.0056% units. This means that financial derivative assets have positive influence on the level of performance of firms even though it was statistically insignificant among Nigerian firms. Based on the results of the analysis, the study accepted the second null hypothesis and therefore concludes that financial derivative assets has positive but insignificant effect on financial performance of quoted oil and gas firms in Nigeria

H₀₃	**foreign exchange derivatives has no significant influence on financial performance of quoted oil and gas firms in Nigeria**

The analysis result of the effect of foreign exchange derivatives showed a negative coefficient value of -0.1121, t-value of -3.721 and a P-value of 0.0005. From table 4.3.2 above, we found foreign exchange derivatives (FED) to have a negative and significant effect with financial performance. This result indicates that the more foreign exchange derivatives held by the people, the more performance is improved and vice versa. The coefficient value of -0.1121 revealed that a increase in foreign exchange derivatives may lead to about 0.1121% increase in the financial performance of oil and gas companies in Nigeria. The t-value of 3.721 reveals that foreign exchange derivatives have a positive effect on the financial performance of oil and gas companies in Nigeria. The probability value of 0.0005 indicates that the effect of foreign exchange derivatives on the financial performance of oil and gas companies in Nigeria is statistically significant at 1% level of significance. Based on the significant result documented, this study therefore rejects the third null hypothesis and concludes that, foreign exchange derivatives has a negative and significant effect on financial performance of quoted oil and gas companies in Nigeria.

H₀₄:	Total assets have no significant effect on financial performance of selected oil and gas firms in Nigeria.

From the regression Table 4.3.2 above, the result of Total assets shows that Total assets have a positive coefficient value of 0.0707 and P-value of 0.4237. The result of the analysis from the model indicates that total assets have positive but insignificant influence on financial performance. This implies that a 1% increase in the proportion of total assets have will lead to a magnificent increase in the financial performance of firms. This entails that a firm with more proportion of its total assets have are more likely to improve its financial performance especially when the level of external monitoring increases. The probability value showed that the effect is statistical insignificant. As a result of this insignificant effect we documented, we accepted our fourth null hypothesis and therefore conclude that total assets have has positive but insignificant effect on financial performance of quoted oil and gas firms in Nigeria.

5. Conclusion and Recommendation

The broad objective of this study was to ascertain effect of financial derivatives on the firm performance of listed oil and gas companies in Nigeria between 2012 and 2021. This study utilized return on assets as measures of performance, while interest rate swaps, financial derivatives assets, foreign exchange derivative and total assets was employed as the regressor and Exchange Rate was included in the model as a control variable. The results of panel Model revealed that Foreign Exchange Derivative had a positive and significant impact on firm performance. The study recommends that oil and gas firm should increase their loan asset to better improve their profit. Increase their financial derivative and ensure that financial derivative assets are better utilized.

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