Impact of Derivative Securities on Commercial Banks' Performance in Nigeria

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Abstract: This study was carried out to ascertain the impact of derivative securities on commercial banks' performance in Nigeria between 2014 and 2021 using aggregated annual time series data. The data for the study was sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, Security and Exchange Commission (SEC) Bulletin and Nigeria Deposit Insurance Corporation (NDIC) Annual Reports. Profit before tax of commercial banks in Nigeria was used as proxy for commercial banks' performance, foreign exchange derivative, financial derivative and money market derivative were used as proxy for derivative securities. Following unity in the order of integration, Fully Modified Ordinary Least Squares (FMOLS) was used to analyse data. The result of data analysis revealed that foreign exchange derivative and money market derivative recorded significant positive impact on performance of commercial banks in Nigeria while financial derivative had significant negative impact of performance of commercial banks in Nigeria. The study recommend that commercial banks in Nigeria should continue to use derivative securities to hedge against exchange rate fluctuations by increasing the amount of funds committed to this security to further hedge against risk inherent in foreign exchange trading and enhance profit of these banks at the same time. Also, Central Bank of Nigeria should develop local derivative financial instruments that Nigerian banks can readily access to mitigate their risky position in the financial sector.

Keywords: Derivative, Commercial bank, Nigeria Securities, Performance, Swap, Forward, Futures

INTRODUCTION

1.1. Background to the Study

There has been argument as regards the major goal of a firm being shareholders wealth maximization or profit maximization but what is important to note is that shareholders wealth maximization may be difficult to achieve without maximizing firms profit which makes firms profitability an important objective. There are lots of risks and uncertainties that tend to undermine the achievement of profit maximization if not properly taken care of. Uncertainty has been part and parcel of economic life and business in particular. Outcome of businesses are uncertain as business is all about risk which is, possible deviations from expectations and the higher the risk, the higher the return (Olowe, 2011). We operate in a situation where prices and profit can increase dramatically and later collapse, where asset prices can reach high level and fall within a moment and with the fact that risk are not equally perceived, investors, banks and even government need to look for alternative in order to minimize their risk and cost as well as to maximize their return which brings about financial derivatives.

Financial institutions encounter several risks in their operations. As institutions in financial service sector operating activities become complex, the firms in the financial service sector find themselves increasingly exposed to business risks, with the exchange and interest rate fluctuations being just some of the financial risks they face. The management of these risks is fundamental to the performance of firms in the financial services sector in Nigeria. Efanga, Umoh, Essien and Umoh, 2019 opined that derivatives are forms of risk management tools used in ameliorating and hedging against the risk inherent in banking business. Derivatives are financial instruments that derive their values from the performance of underlying entity. This underlying entity can be an asset index, or interest rate. Derivatives are used for a number of purposes, such as hedging against future price movements of securities or against speculation or getting to trade assets or market. Some of the common derivatives include forwards, futures, options, swaps and variations. Derivative exchanges perform more complex functions than real market exchange. They are also being transformed and modernized. They are compatible with qualitative changes in the shareholder's economy,

offering along with these changes, strategies and paths of socioeconomic change (F.D man, 2009).

Financial derivatives can be defined as financial instrument that are linked to a specific financial instrument or commodity, through which specific financial risk can be traded in the financial market. Financial derivatives should be treated as separate transactions rather than an integral part of the value of underlying transaction to which they are linked. Financial derivatives are used for some purposes including risk management, hedging, arbitrage between markets and speculation. Financial market's derivatives help to reduce risk thus allowing for greater fiscal autonomy and political sovereignty (Mullin and Murply 2009). According to Gay (2011), firms also use derivatives to reduce their financial distress risk and this distress risk has systematic component that is priced in the market. The nature of the banking sector expose them to various risks ranging from credit, interest rate, exchange rate among others, which makes them adopting financial derivative instruments as a mean of managing their risks. The objective of banks for using derivatives therefore is to reduce their cash flows volatility and thereby reducing their distress costs. Some banks use derivatives not just for the purpose of hedging but also for speculation about future rates and returns. It should be noted that managing financial and other risks is critical to successful corporate finance (especially banks) and financial derivative is one of such tools that could be used in managing such risks.

The use of derivative has become a necessity and innovative means of achieving perceived profits by deposit money banks instead of the usual method. It has been identified as a viable tool of managing systematic risks in an organization in order to maximize the desired profit of deposit money banks. The global growth in the use of financial derivatives in recent time, mostly by banks cannot be underemphasized (Bendob, Bentouir and Bellaouar, 2015). Deposit Money Banks therefore uses various forms of financial derivative for their asset-liability management, mostly referring to as off-balance sheet activities (in form of financial derivative asset and financial derivative liability) which help the banks to manage their risk exposures and still achieve their corporate goals of maximizing profitability.

Financial institutions derive some benefits from engaging in transactions that involves trading on financial derivatives such as swaps,

options, forwards and futures. These transactions, apart from earning profits for the banks are also major risk management strategies used by the banks to hedge against unforeseeable business situations. Generally, debates on the subject of derivatives and their effect on financial performance of the banking sector are weak in both theoretical studies and practice in Nigeria and other developing countries. Moreover, there is low level of awareness of derivative products in Nigeria. Beside high transaction costs and volatile market conditions, banks in Nigeria are reluctant to use derivatives due to the lack of awareness about derivatives products and their benefits. The study intends to fill this gap and contribute to knowledge on the benefit and adoption of derivatives to mitigate risks associated with Nigerian banking sector. It is against this backdrop that this research is poised to investigate the impact of derivative securities on financial performance of commercial banks in Nigeria.

OBJECTIVES OF THE STUDY

The broad objective of the study is to investigate the impact of derivative securities on commercial banks' performance in Nigeria. The specific objectives are to;

(i) Evaluate the impact of foreign exchange derivative on profitability of commercial banks' in Nigeria.

(ii) Investigate the impact of financial derivatives on profitability of commercial banks' in Nigeria.

(iii) Examine the impact of money market derivatives on profitability of commercial banks' in Nigeria.

RESEARCH HYPOTHESES

The following hypotheses were formulated in their null form:

H_{01}: foreign exchange derivative does not have significant impact on profitability of commercial banks' in Nigeria.

H_{02}: financial derivatives does not have significant impact on profitability of commercial banks' in Nigeria.

H_{03}: There is no significant impact of money market derivative on profitability of commercial banks' in Nigeria.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Theoretical Framework

Modern Portfolio Theory

This research is hinged on the Modern Portfolio Theory (MPT) propounded by Markowitz in 1952. This theory refers to an investment theory that allows investors to assemble an asset portfolio that maximizes expected return for a given level of risk. The theory assumes that investors are risk-averse; for a given level of expected return, investors will always prefer the less risky portfolio. Hence, according to the Modern Portfolio Theory, an investor must be compensated for a higher level of risk through higher expected returns. MPT employs the core idea of diversification, owning a portfolio of assets from different classes is less risky than holding a portfolio of similar assets. Diversification is a portfolio allocation strategy that aims to minimize idiosyncratic risk by holding assets that are not perfectly positively correlated. Correlation is simply the relationship that two variables share, and it is measured using the correlation coefficient, which lies between $-1 \leq \rho \leq 1$. This theory can be linked to derivative securities in that it is a risk hedging security that also aids in diversification of risk inherent in investment in the Nigerian financial system. Investors and financial institutions use derivative to hedge against business risk and diversify their investment to mitigate the risk inherent in the operations of such institutions.
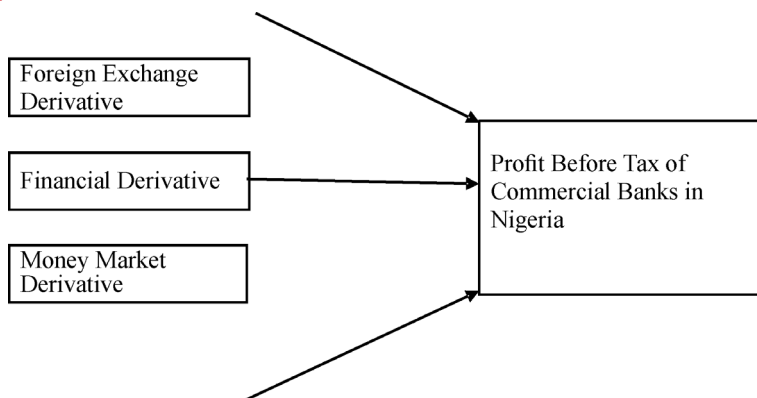
Conceptual Framework

Figure 1: Conceptual Framework

The diagram in figure 1 above depicts the conceptual framework of this research. It shows the relationship and interaction amongst the independent variables and the dependent variable. Put differently, it shows how derivative securities relates with profitability of commercial banks' in Nigeria.

LITERATURE REVIEW

Overview of Derivative Securities

Derivatives came into limelight and gain worldwide prominence in the early 1970s due to complexity and dynamism in the various environments of business. The fluctuations and unpredictability of prices of items, interest rates and exchange rate can be traced back as far as the mid 1900s. The volatility in the market was in continuum noted from 1973 when the abandonment of exchange rate came to be in the Breton Woods System. High levels of volatility continue to persist (Nguyen and Faff 2003). In the market today, there are several derivatives exchanges around the globe trading all types of derivatives securities. In many emerging markets economies, long term plans are underway to introduce derivatives exchanges (Lien and Zhang 2008). In recent times, the derivatives market have expanded at an unprecedented pace, faster than some basic indicators of international economic development (Osaze 2011).The major constraint in the trading of derivative assets are the underdevelopment of the local derivative markets, coupled with weak or inadequate regulations and the infrastructures of the market. (Shanker 1996).

Nguyen and Faff (2003) credited risk management to have emanated from the Bible in the Old Testament. He anchored his argument on the story of the Egyptian Pharaoh that had a dream of how seven cows that were very healthy ate up seven other lean and sickly cows and also how seven healthy ears of corn ate up another seven sickly ears of corn. Pharaoh was greatly disturbed by the dream he had, so he summoned Joseph to interpret the dream he had. Joseph interpreted that the dream meant that a severe famine was looming in the horizon. So to hedge against the imminent risk that was hovering around, Joseph advised pharaoh to hoard large quantities of grains. According to the bible's account, Egypt experienced the foretold famine, but Egypt didn't suffer food shortages, but prospered when every

other nation were in severe famine, thanks to the great advice from Joseph. (Genesis 42:1-57).

Developments of Derivatives in Nigeria

The Central Bank of Nigeria in 2011 introduced the use of Foreign Exchange Derivatives in the Nigerian market through certain guidelines. Those guidelines were put in place to regulate the activities of dealers authorized to transact with foreign exchange in Nigeria regarding derivatives transactions. The approved hedging products to be traded as enshrined in the guidelines include: options; forwards and swaps. The Securities and Exchange Commission of Nigeria (SEC) are saddled with the responsibility of regulating foreign exchange derivative in Nigeria (Dolapo et. al, 2017).

Classification of Derivatives

Broadly speaking, derivatives can be categorized into two, the financial and commodity derivatives. The most common types of financial derivatives are: futures, options, swaps and forwards. While types of commodity derivatives underlying asset can be gold, silver, petroleum produce or grain, etc; but the underlying assets attributed to financial derivatives includes all known and used financial securities, such as stocks, bonds and other securities that bears interest, etc.

FINANCIAL DERIVATIVE

Financial derivative is a security whose value depends on, or is derived from, an underlying asset or assets. The derivative represents a contract between two or more parties and its price fluctuates according to the value of the asset from which it is derived. It is a tradable product or contract that 'derives' its value from an underlying asset. The underlying asset can be stocks, currencies, commodities, indices, and even interest rates. Derivatives were originally designed to help investors eliminate exchange rate risks, but their utility has grown over the years to help investors not only mitigate various types of risks but also to access more market opportunities. Derivatives are now attractive to many types of investors because they help them to remain exposed to price changes of different financial assets without actually owning them. The most common underlying assets used by financial derivative

products are currencies, stocks, bonds, stock indices, commodities (i.e. gold and oil) and, more recently, cryptocurrencies. Many traders are also curious about who invented financial derivatives. Derivatives in finance date back centuries, Amadeo (2013).

USE OF FINANCIAL DERIVATIVES

Financial derivative instrument can be used for three main purposes:

(i)   To hedge a position

(ii) Speculating on the future price of an asset

(iii) To leverage a position

(i) Hedging: One of the main uses of many types of financial derivative investments is risk management and position hedging. Hedging a position is the attempt to minimise the risk of unfavourable movements in the price of an asset. This is usually achieved by taking the opposite position in the same, or a related, asset and can be viewed as an insurance policy against your main position.

Different types of financial derivatives contracts are ideal for this purpose due to their characteristic of allowing traders to profit from falling price movements by what is known as "short-selling". For example, let's say that an investor bought 100 shares in Company X at $100 per share. A year later, the share price of Company X has risen to $200 per share. However, the investor is concerned that the share price will fall for one reason or another. Instead of selling the shares, our investor may choose to hedge his position by buying a derivative product that will increase in value if the price of the company shares fall. Taking this action will insure the investor's position against a possible upcoming decline in the price of Company X's shares.

(ii) Speculation: In addition to hedging, different types of financial derivatives can be used for speculation, with the aim of profiting on the price fluctuations of an underlying asset. Unlike traditional investment products, derivative contracts allow you to profit from price decreases (short-selling) as well as increases (long-selling). Furthermore, with a derivative investment, a trader is not required to have physical ownership of an asset in order to profit from short-selling the asset.

(iii) Leverage: Perhaps the most important and attractive feature of trading with different types of financial derivative products is the ability to leverage. Leverage allows traders to open a position by only paying a percentage of its cost. Therefore, using leverage, a trader can gain exposure in a market that is several times higher than the capital they have in their investment account. Using leverage in this way allows you to increase your potential profits without increasing your starting capital. However, it is important to bear in mind that leverage also amplifies your potential losses if the market moves against you.

Foreign Exchange Derivative

Foreign exchange (FX) derivative is a type of derivative whose payoff depends on the FX rates of two or more currencies. It's just a contract to buy or sell a currency at a specific time in the future. The market for FX is measured in trillions of dollars, and includes a substantial amount of FX derivative contracts. 80% of all FX trades involve the US Dollar, which is considered to be the world's premier reserve currency. The majority of FX trades take place in the 'spot' market, which is a reference to a buyer or seller of foreign currency trading on the price quoted at the time of the trade. Such trades are usually settled within two business days of execution. Most FX derivatives are short-dated with a maturity date of less than one year, meaning that FX derivatives carry less credit risk than other types of derivative. In the case of FX derivatives, there are a number of types of transactions which are commonplace, such as forwards, swaps and options, Amadeo (2013).

Money Market Derivatives

Traditionally, money market instruments are financial products that mature in one year or less. Therefore, money market derivatives are financial products whose values come from the price of particular money market instruments, which are referred to as the underlying instruments. Participants in the money markets use a variety of derivative instruments for the purposes of trading and hedging. These are primarily interest-rate derivatives. The market in short-term interest-rate derivatives is large and liquid, and the instruments involved are used by both financial institutions

and corporates. The two main contracts used in money markets trading are the short-term interest rate future and the forward rate agreement. Money market derivatives are priced on the basis of the forward rate, and are flexible instruments for hedging against or speculating on forward interest rates. The forward rate agreement and the exchange-traded interest-rate future both date from around the same time, and although initially developed to hedge forward interest-rate exposure, they now have a variety of uses, Afolabi and Olaoye, (2017).

TYPES OF DERIVATIVES

The main types of derivatives (forwards, futures, options and swaps) are examined below.

Forward Contract: A forward is a contract involving two parties, where both parties agree to exchange the underlying asset at a predetermined future date at an earlier agreed date at a price that has been fixed. In this arrangement, both the buyer and the seller agree today to buy and sell a certain asset in the future at an agreed price. (Vashishtha and Kumar, 2010). A forward is a contract whereby two parties agree to exchange the underlying asset at a predetermined point in time in the future at fixed price. The buyer agrees today to buy a certain asset in the future and the seller agrees to deliver that asset at that point in time, in the future. Forward contract is the simplest form of derivative contract. In addition, forward contract is a cash market transaction, the price of which is determined on the initial trade date, but the delivery is made in the future. The contract must be honoured by the parties whether the real price increases or decreases. Although forward contracts can help reduce volatility in certain market; however, they are not easily transferred or cancelled, i.e. not liquid.

Futures Contract: A futures contract is an agreement between two parties which is made on the trading floor of a futures exchange to buy or sell an asset at a certain time in the future at a certain price. Futures is a standardised forward contract to buy (long) or sell (short) the underlying asset at a specified price at a specified future date through a specified exchange. Futures are standardised forwards traded on-exchange. Such contracts are traded on exchange (clearinghouse), which sets the standardised terms regarding the quality, price quotation, date and delivery (in case of

commodity). The exchanges work as a buyer or seller for the counterparty. The clearinghouse provides a mechanism that guarantees the honouring of the contract, thus ensuring very low level of default. The major types of financial futures contract include: stock future or equity futures, stock index futures, currency futures, and interest rate bearing securities such as bonds, Treasury bill futures.

Swaps Contract: These are agreements to exchange one series of future cash flows for another. Swap is a contract whereby the parties (known as counter parties) agree to exchange a predetermined series of payments, or exchange interest payments or one set of interest payment (fixed with floating or vice-versa) with another, for a specified time. A swap is like a barter or exchange. The two commonly used swaps are: interest rate swaps and currency swaps. The interest rate swaps entail swapping only the interest related cash flows between the parties in the same currency; while the currency swaps entail swapping both principal and interest between the parties, with the cash flows in one direction being in a different currency than the cash flows in the opposite direction.

Options Contract: Exchange-traded options are standardized contracts whereby one party has a right to purchase something at a pre-agreed strike price at some point in the future. The right, however, is not an obligation as the buyer can allow the contract to expire and walk away. An option is a contract that gives the buyer the right, but not the obligation, to buy (call) or sell (put) the underlying asset at or within a certain point in time in the futures at a predetermined price (strike price) against the payment of a premium, which represent the maximum loss for the buyer of an option. Both parties are under obligation to perform their contractual obligations. However, an options contract, as the name suggests, is rather an optional contract. This is because an option is the right, but not the obligation, to buy or sell something at a stated date at a stated price. What distinguishes option from forwards and futures is that, options settle only if exercised and will be exercised only if in-the-money, i.e. if the strike price is lower/higher than the current market price for a call/put. Options, if employed properly, are a cost effective and economical practice to hedge against market exposures. The main strength of options is their flexibility; but they are expensive and risky. Consequently, options afford financial services firms' a robust strategy

to protect themselves from potential negative effects of market fluctuations. Basically, there are two types of options contracts: call options and put options. A call option' gives one the right to buy; and a put option' gives one the right to sell. Options can also be classified as Over-the-Counter (OTC) options and exchange traded options. The exchange traded options contracts are customised contracts trades on recognised exchanges; whereas the OTC options are customised contracts traded privately between parties.

Financial Market and Derivatives

Financial market is a market where financial instruments are exchanged or traded, and helps in determining the prices of the assets that are traded in. And this process is called the price discovery process. Financial markets may be classified on the basis of: types of claims – debt and equity markets; maturity – money market and capital market; trade – spot market and delivery market; deals in financial claims – primary market and secondary market Linkages between the various investors and financial institutions are inherent in financial markets. Financial markets can be defined as a market in which people trade financial securities, commodities, and other fungible items of value at low transaction costs and at prices that reflect supply and demand. Market securities are bonds and stock, commodities which include metals or agricultural product.

Financial Markets according to Amadeo (2013) is simply the markets where stocks, bonds, commodities, foreign exchange and even derivatives are traded to raise cash for government or businesses, reducing companies risks and increasing investors wealth. The financial market is the avenue through which funds are generated, mobilized and availed effectively and efficiently from the all-savers camps to the users of funds. These activities involve the interplay of individuals, institutions and instruments. Financial instruments owned by individuals in different institutions to provide the needed finance for the provision of essential goods and services to bring about economic growth and development. The Financial market according to Efanga, Hanson and Ekanem, (2020) consists of two major segments, the money market and the capital market. The money market provides finance on short-term basis to individuals while the capital market provides finance to businesses, enterprises, corporate bodies, government agencies etc on long term basis.

According to Osaze (2007), Nigeria financial sector is unarguably the most important in the political economic system because it serves as the provider of the necessary lubricant that keeps the economy turning. The sector also provide funds needed for investment but allocates these funds efficiently as possible to those project that offer the best to fund owners. The health of the sector determines the wellbeing of the economy. When the sector is weak the economy suffers tremendously. It is money and managerial or technical competencies that drive economy and the financial sector not only provides the much needed money for building both managerial and technical capacities but provide fund viable growth creating and development oriented investment project.

EMPIRICAL REVIEW

Adedamola and Shittu, (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, Uwem and Ekanem (2020), conducted a study to ascertain the impact of derivative securities on the Nigerian stock market between 2014 and 2019. Data employed for this study was elicited from Central Bank of Nigeria Statistical Bulletin of 2018 and Security and Exchange

Commission statistical Bulletin of 2019. This study employed All Share Index and Market Capitalization as measure of productivity of the Nigerian stock market, while Foreign Exchange Derivative was employed as the regressor and Exchange Rate was employed as a controlled variable. This study employed Auto-Regressive Distributed Lag ARDL Model to analyze data. Inferential results pointed out that Foreign Exchange Derivative had positive impact on productivity of the Nigerian stock market within the period under review. The study recommended that monetary authorities in Nigeria should lay emphasis on the deepening of the Nigerian derivative market through the introduction and trading of derivative instruments such as swaps, options, futures and forwards amongst others as applicable in the financial systems of advanced countries.

Efanga, Umoh, Essien and Umoh (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.

Study on Financial derivatives market and the performance of Deposit money banks in Nigeria was also conducted by Osayi, Kasimu and Nkwonta (2018). The study covers financial activities of 5 year period of 10 Deposit money banks in Nigeria and deploys Ordinary Least Square linear regression model with first order autoregressive errors. The study concludes that financial derivatives have effect on the performance of Deposit money banks in Nigeria.

Financial derivative and capital structure of firms was studied by Afolabi and Olaoye (2017) with evidence from Nigeria. Descriptive and survey design was adopted where six hundred (600) respondents chosen from the academia, financial analysts and stockbrokers from Lagos, Ogun, Oyo, Osun, Ekiti and Ondo states were distributed using a convenience

sampling method. The study found that there is a positive and significant relationship between financial derivatives and capital structure of firms which thereby determines firms' profit.

Lenee and Oki (2017) studied financial derivatives and firm performance: empirical evidence from financial and non-financial firms. The study examine the effect of the use futures, swaps, forwards and options to hedge against interest rate and foreign exchange rate risks of five (5) selected financial and five (5) nonfinancial firms from UK FTSE 100 index. With the aid of Panel Least Square, the study indicates that the use of one or more of any financial derivatives to hedge foreign exchange rate risk is seems to decrease the performance of firms meanwhile, hedging interest rates risk with forward and futures found to increase firm performance.

Bendob, Bentouir and Bellaouar (2015) also conducted a research on the effect of financial derivatives use on the performance of commercial banks: empirical study in GCC Countries during 2000-2013. Nineteen (19) commercial banks in four (4) CC countries between 2003 and 2013 were studied and following the hypothesis tested with the aid of unbalanced panel regression model. The study concludes that the use of financial derivatives aid in reduction of unsystemic risks which improves the performance of commercial banks especially in the crisis period.

In another study, Olawale (2015) examined the effect of credit risk on the performance of commercial banks in Nigeria. Using the ratio of loan and advances to total deposit, the result reveals that there is a significant relationship between bank performances in terms of profitability and credit risk management which is loan performance.

Similarly, Olusanmi, Uwuigbe and Uwuigbe (2015) investigated the effect of risk management on Banks financial performance in Nigeria. The study employed Ordinary Least Square (OLS) regression technique to test the formulated hypothesis. Their findings showed the existence of a negative non significant relationship between risk management and bank's performance measured by return on equity.

Furthermore, Tijani and Mathias (2013) also investigated corporate use of derivatives and financial risk management in Nigeria with evidence from non financial firms. The study employed multivariate analysis and logistic regression tests on SPSS version 18. Their findings revealed very low

usage of derivatives. And this was traced to lack of knowledge on the use of derivatives and the underdeveloped nature of our financial market.

In yet another study, Adeusi, Akeke, Adebisi, and Oladunjoye (2013), examined risk management and financial performance of banks in Nigeria. Adopting a panel data estimation technique, their findings revealed an inverse relationship between financial performances of banks and doubt loans, and capital asset ratio was found to be positive and significant. This finding implies that the higher the managed funds by banks the higher the performance.

In the same vein, Kolapo, Ayeni and Oke (2012) examined credit risk and commercial banks' performance in Nigeria using panel model analysis. The result showed that the effect of credit risk on bank performance is cross-sectional invariant. That is the effect is similar across banks in Nigeria. Though the degree to which individual banks are affected was not captured by the method of analysis utilized.

METHODOLOGY

In this section, the research design, population and sample of the study, method and sources of data collection, measurement of variables, model specification and data analysis techniques are presented.

RESEARCH DESIGN

This study adopts the *ex-post facto* research design. This design is relevant for secondary data already available. Ex post facto investigation provides a solution to research problems by using data which are already in existence. Most importantly, the analysis when concluded can provide considerable insight into future outcomes (forecast). As rightly affirmed by Eme, and Johnson (2012*)*, ex-post-facto research design involves events that have already taken place.

METHOD OF DATA ANALYSIS

This study employed some estimation techniques which will include pre-diagnostic test such as unit root test, co-integration test and descriptive statistics such as mean, standard deviation, analytical tools like multiple regression, unit root test of Augmented Dickey –Fuller (ADF) as well

as Fully Modified Least Squares (FMOLS). The use of Ordinary Least Squares (OLS) has increased in literature over the years owing to its ability to accommodate dynamic relationship among variables. The estimate of commercial banks' performance in Nigeria is mainly on the postulation that the underlying data process is mixed in integration order. This assumption is verified by conducting the unit root tes on the time series variables. E-views 10.0 version statistical programme was employed for the analysis. The data sets was transform using natural log to ensure normality, stability and to reduce skewness and kurtosis.

MODEL SPECIFICATION

Fully Modified OLS

The Fully Modified Ordinary Least Squares (FMOLS) is an optimal single-equation method based on the use of OLS with semi-parametric correction for serial correlation and endogeneity (Phillips and Loretan, 1991). Suppose yt be an n-vector I(1) process and ut be an n-vector stationary time series. Then the Fully Modified OLS FMOLS) estimator employs both the serial correction and endogeneity corrections. To address endogeneity, the FMOLS applied methodology is employed. According to Pedroni (2001), FMOLS addresses the problem of both endogenous and omitted variables effectively. The FMOLS uses semi-parametric corrections in the estimators of the OLS methodology to rule out second-order problems due to the endogenous nature of the independent variables.

Augmented Dickey-Fuller (ADF) Unit Root test

Engle and Granger, (1987) considered seven test statistics in a simulation study to test cointegration. Engle and Granger concluded that the Augmented Dickey Fuller test was recommended and can be used as a rough guide in applied work to distinguish a unit root.

Based on the modern portfolio theory propounded by Harry Markowitz in 1952, the researcher builds a primary model to represent and capture the relationship between derivative securities and commercial banks' performance in Nigeria. The model is represented thus in its functional form as:

Table 1: Unit Root Test Result (Summary)

Variables	Levels					1st Differences					Order of Integration
	ADF t-stat	Critical Values			p-value	ADF t-stat	Critical Values			p-value	
		@ 1%	@ 5%	@ 10%			@ 1%	@ 5%	@ 10%		
PBT	-0.381332	-4.803492	-3.403313	-2.841819	0.8611	-2.364498	-3.007406	-2.021193	-1.597291	0.0284	I(1)
FED	0.318724	-4.803492	-3.403313	-2.841819	0.9577	-2.631044	-3.109582	-2.043968	-1.597318	0.0200	I(1)
FIN	0.420832	-5.119808	-3.519595	-2.898418	0.9608	-5.230277	-5.119808	-3.519595	-2.898418	0.0091	I(1)
MMD	-0.935208	-4.803492	-3.403313	-2.841819	0.7103	-2.342967	-3.007406	-2.021193	-1.597291	0.0294	I(1)

Source: Researcher's analysis (2022)

$$PDT = f(FED, FID, MMD) \qquad (3.1)$$

The econometric form of this model is specified thus:

$$PBT = \beta_0 + \beta_1 FED + \beta_2 FID + \beta_3 MMD + \mu_t \qquad (3.2)$$

Where;

PBT = Profit before tax of commercial banks' in Nigeria

FED = Foreign exchange derivative

FID = Financial derivative

MMD = Money market derivative

μt = Stochastic error term

β_0 = constant and $\beta_1 - \beta_3$ = coefficients of independent variables

DATA ANALYSIS AND DISCUSSION OF RESULTS

Pre-estimation Test

Unit Root Test

Table 1 showed the unit root test result on all the variables and it indicated that they are non-stationary in the same order. This is proven by comparing the values presented carefully in the statistical test of Augmented Dickey fuller (ADF) at 1 percent, 5 percent and 10 percent level of significance. From the test result, the variables showed differenced at once and at first difference, the variables are stationary. This means that, the variables were in the same order integrated I(1). As such, the appropriate estimation technique to employ for inference is co-integration regression. In this case, the Fully Modified Ordinary Least Squares estimation method will be used for inference.

Descriptive Statistics

The descriptive statistics presented in Table 2 shows that PBT has the highest mean value of N727.8 billion, followed by FIN which has N48.2 billion, while MMD and FED have N35.2 billion and 17.64 billion respectively. Note that the Mean describes the average value for each data series in the model. From the analysis, FED has the highest Standard Deviation as it recorded 1017.9, implying that it is the most volatile variable in the model as it has the highest percentage of dispersion from the mean, while MMD

Table 2: Descriptive Statistics

	PBT	*FED*	*FIN*	*MMD*
Mean	727.8313	1764.475	48.15291	35.21250
Median	707.3800	1642.100	44.35821	6.650000
Maximum	969.9000	3208.300	154.7300	96.60000
Minimum	440.9000	546.2000	0.000000	0.000000
Std. Dev.	185.4531	1070.945	47.04186	43.27023
Skewness	-0.074946	0.157778	1.538453	0.563821
Kurtosis	1.773731	1.457168	4.531240	1.399541
Jarque-Bera	0.508734	0.826636	3.937351	1.277683
Probability	0.775407	0.661452	0.139642	0.527904
Sum	5822.650	14115.80	385.2233	281.7000
Sum Sq. Dev.	240749.9	8028456.	15490.55	13106.19
Observations	8	8	8	8

Source: Researcher's analysis (2022)

recorded the lowest standard deviation with a figure of 4.3. The Table further reveals that three of the variables, FED, FIN and MMD with skewness values of 0.158, 1.539 and 0.564 5respectively, are skewed a little to the right, while PBT which has -0.075 is skewed a little to the left.

Kurtosis measures the peakness or flatness of the distribution of a series. The kurtosis of a normal distribution is 3. If it exceeds 3, it means that the distribution is peaked or leptokurtic relative to the normal. Conversely, if it is less than 3, it shows that the distribution is flat or platykurtic relative to the normal. Table 4.3 further reveals that only FIN with a kurtosis value of 4.541is peaked or leptokurtic. While the other variables are flat or platykurtic since their kurtosis values are less than 3.

Jarque-Bera (JB) tests whether the series is normally distributed or not. The test statistic measures the difference of the skewness and kurtosis of the series with those from a normal distribution. In JB statistic, the null hypothesis which states that the distribution is normal is rejected at 5% level of significance. From the results of the analysis presented in Table 4.3 above, all the variables had Probability values of greater than 0.05, as such, we conclude that all the variables a normally distributed. The number of observations of 8 depicts the duration or scope of this study, being 8 years.

Although these skewness and kurtosis indicate departure from normality, such points are not strong enough to discredit the goodness of the dataset for the analysis in view.

Inferential Result

Co-integration Regression Results

Table 3: Fully Modified Least Squares (FMOLS) Result

Dependent Variable: PBT			
Method: Fully Modified Least Squares (FMOLS)			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FED	0.150214	0.012522	11.99617	0.0012
FIN	-0.829235	0.176285	-4.703933	0.0182
MMD	1.024978	0.282356	3.630085	0.0360
C	468.5572	16.03283	29.22486	0.0001
R-squared	0.904609	Mean dependent var		745.9471
Adjusted R-squared	0.809218	S.D. dependent var		192.5147
S.E. of regression	84.08770	Sum squared resid		21212.23
Long-run variance	226.7779			

Source: Researcher's analysis with e-views 10 output (2022)

$$PBT = 468.5 + 0.15FED - 0.83FIN + 1.03MMD + \varepsilon_t$$

The Fully Modified Least Squares (FMOLS) result as shown in Table 31 above showed that two of the variables, FED and MMD have positive impact on the explained variable PBT, while FIN has negative relationship with dependent variable PBT. The result further revealed that a unit increase in foreign exchange derivative would bring about 0.15unit increase in profit before tax of commercial banks' in Nigeria, while a unit increase in financial derivative would bring about a 0.83 unit decrease in profit before tax of commercial banks' in Nigeria. Furthermore, a unit increase in money market derivative would bring about a 1.03unit in profit before tax of commercial banks' in Nigeria. A keen observation of the result showed that the R-squared was approximately 0.91. The high value of R-squared of 0.91 and adjusted R-squared of 0.81 revealed that the model has a goodness of fit on the estimation. This means that the explanatory variables accounted for about 91% variations in the explained variable. Put differently, about 91% variation in profit before tax of commercial banks' in Nigeria, was explained by the independent variables, while the remaining 9% may be attributed to variables not captured in the model (stochastic variables). The 0.81 value of the adjusted R-squared revealed 81 per cent systematic variations in the dependent variable as a result of the changes in the explanatory variables.

DISCUSSION OF RESULTS

This research is carried out to ascertain the impact of derivative securities on commercial banks' profitability in Nigeria with the use of aggregated annual time series data from 2014-2021. The study employed multiple regression technique, using Fully Modified Least Squares (FMOLS) which made it possible to predict the impact of the regressors on the regressand. The coefficients of the predictors which is significant at 5% level showed that FED and MMD were all positive and had significant relationships with PBT. While FIN had a significant negative impact on PBT.

Study over the years on the impact derivative securities as it influences the profitability of the banking sector in Nigeria has aroused the interest of many scholars, even though the empirical results from a number of these studies are diverse in nature of uniformity. Our finding from the analytical result will further add to the body of existing empirical documentations on this subject matter.

Below are the findings discussed individually;

(i) Foreign exchange derivative had statistically significant impact on commercial banks' profitability in Nigeria. This is an evidence that commercial banks profitability in Nigeria has benefitted from the uses of foreign exchange derivative security in hedging foreign exchange risk inherent in the banking sector. This finding is in congruence with a' priori expectation.

(ii) From the findings, financial derivative revealed significant negative impact on commercial banks 'profitability in Nigeria. The negative relationship could be because of the lack of awareness on the how to use financial derivative in hedging against risk in financial assets in the Nigerian banking sector. Another reason could be as a result of lack of depth in the market in terms of financial securities which could have been hedged against risk prevalent in such securities. This finding is in negation to a' priori expectation.

(iii) The result of this study also reveals that money market derivatives had positive and significant impact on commercial banks 'profitability in Nigeria. This means that within the reference period, money market derivative added to or put differently, contributed positively

to profitability of commercial banks in Nigeria. It suffices to say that the use of money market derivatives by commercial banks in Nigeria has assisted the banks in curbing losses pertaining to risk inherent on money market securities in the Nigerian financial system. This results also conforms to a' priori expectation.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study examined the impact of derivative securities commercial banks' profitability in Nigeria, the Fully Modified OLS was employed to ascertain the extent to which derivative securities influenced commercial banks' profitability in Nigeria. From the results obtained, there existed a significant positive relationship between foreign exchange derivative and commercial banks' profitability in Nigeria. The result also showed that financial derivative related significantly and negatively with commercial banks' profitability in Nigeria. Further investigation revealed that money market derivative had positive and significant effect on commercial banks' profitability in Nigeria. This study concluded that derivative securities have significant impact on commercial banks' profitability in Nigeria within the referenced period.

Recommendations

The study recommend that commercial banks in Nigeria should continue to use foreign exchange derivative to hedge against exchange rate fluctuations by increasing the amount of funds committed to this security to further hedge against risk inherent in foreign exchange trading and enhance profit of these banks at the same time.

Monetary authorities in Nigeria should create awareness on the importance and efficacy of financial derivative securities as hedging tools in the Nigerian financial system. Emphasis should be laid on the deepening of the Nigerian derivative market through the introduction and trading of derivative instruments such as swaps, options, futures and forwards amongst others as applicable in the financial systems of advanced countries. If this is done, the risk inherent in these assets would be mitigated and profitability of commercial banks in Nigeria would be greatly enhanced.

Money market derivative should be greatly utilized by commercial banks in Nigeria in ameliorating risk associated with money market instrument so as to enhance their profitability. Also, Central Bank of Nigeria should develop local derivative financial instruments that Nigerian banks can readily access to mitigate their risky position in the financial sector.

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