



## Effect of Firm Size on Capital Market Fundamentals and Value of Listed Oil and Gas Companies in Nigeria

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### ABSTRACT

The study investigated how key capital market fundamentals influenced the value of listed oil and gas companies in Nigeria and how firm size conditioned these relationships. The main objective was to examine the effects of market price per share, market capitalization and price earnings ratio on firm value, measured by book value per share, and to determine whether firm size strengthened or weakened these effects over time. The study employed panel data for ninety seven firm year observations and estimated multiple regression models with interaction terms between each capital market indicator and firm size. Robust standard errors were used to correct for heteroscedasticity, and the final model explained about ninety percent of the variation in firm value. The results showed that market price per share and market capitalization had negative direct effects on firm value, while the price earnings ratio had a positive and significant direct effect. Firm size had a strong positive independent effect on firm value. The interaction terms revealed that firm size significantly moderated all three relationships. The interaction between market price per share and firm size and the interaction between market capitalization and firm size were positive and significant, which indicated that larger firms converted higher prices and larger market capitalization into higher firm value more effectively than smaller firms. In contrast, the interaction between price earnings ratio and firm size was negative and significant, which implied that high earnings multiples were rewarded more strongly in smaller firms. The study recommended that regulators strengthened disclosure, governance and market surveillance in order to improve the informational quality of capital market indicators. Corporate managers were encouraged to treat share price, market capitalization and price earnings ratio as strategic performance indicators, supported by sound earnings quality, efficient asset use and clear investor communication. Larger firms were advised to leverage their scale through transparency and

operational efficiency, while smaller firms were encouraged to build credible growth paths and stronger governance so that market signals translated more fully into firm value.

### I. INTRODUCTION

Capital markets play a critical role in shaping corporate investment decisions, risk allocation and long term economic growth, particularly in economies that rely on market based finance to mobilise savings and channel them into productive activities. Globally, firm valuation indicators such as stock price, market capitalization and price earnings ratio are widely used by investors and financial analysts to summarise expectations about future cash flows, growth and risk, and to guide portfolio allocation and corporate control decisions (Damodaran, 2021; Bodie et al., 2019). In well developed markets, where disclosure standards are strong and trading is relatively deep, these capital market fundamentals tend to transmit information efficiently into firm value in line with the predictions of the efficient market hypothesis, which argues that current prices reflect available information about firms and their prospects (Fama, 1970). However, even in such settings, valuation remains sensitive to macroeconomic shocks, sector specific risks and behavioural factors that can drive mispricing and volatility over time.

In many emerging and frontier markets, including those in sub Saharan Africa, the informational content of capital market fundamentals is often weakened by structural challenges such as thin trading, high transaction costs, regulatory uncertainty and information asymmetry between insiders and outside investors. These markets are typically characterised by a small number of dominant firms that account for a large share of market capitalization, limited analyst coverage and episodes of speculative trading that can disconnect stock prices from underlying fundamentals (Mugume & Oduor, 2020). As a result, basic indicators like stock price and market capitalization may be noisy measures of firm value,



and the price earnings ratio can fluctuate sharply in response to volatile earnings, making it difficult for investors and policymakers to infer the true economic worth of listed firms or to rely on market signals for capital allocation and corporate governance purposes.

Nigeria provides an important case for examining these issues because its capital market is relatively shallow, yet it serves as a key platform for mobilising finance in the largest oil producing economy in Africa. The Nigerian Exchange Group is dominated by a few large firms, while many listed companies operate in an environment marked by macroeconomic instability, episodes of exchange rate depreciation and policy reversals that heighten risk and uncertainty for investors. Within this setting, oil and gas companies occupy a strategic position through their contribution to export earnings, fiscal revenue and energy security, but their valuation is highly sensitive to global crude oil price cycles, regulatory changes and geopolitical shocks that can depress earnings and compress market capitalization (Asche et al., 2018; Shabbir, 2019). These dynamics mean that traditional market based indicators may not always provide a stable or accurate guide to firm value in the Nigerian oil and gas sector, especially during periods of heightened volatility.

Capital market fundamentals remain central to understanding how the Nigerian market prices listed oil and gas companies. Stock price aggregates information about expected future performance and risk into a single observable indicator, market capitalization reflects both firm size and investor confidence, while the price earnings ratio captures how the market values current earnings relative to price and therefore embeds expectations about future profitability and growth (Bodie et al., 2019; Damodaran, 2021). In principle, increases in stock price and market capitalization, as well as higher price earnings ratios, should signal stronger firm value. In practice, however, these indicators can be distorted by irregular earnings, speculative trading and external shocks, particularly in a sector where profit is heavily influenced by global commodity prices and domestic regulatory conditions (Shiller, 2020). Consequently, there is growing interest in complementing market based measures with more conservative accounting based indicators such as book value per share, which are less directly exposed to short term swings in market sentiment.

Firm size has been identified as a crucial factor that shapes how capital market fundamentals translate into firm value. Larger firms typically

enjoy greater access to external finance, more diversified operations and stronger reputations, which can reduce perceived risk and enhance the responsiveness of their stock prices and market capitalization to changes in fundamentals (Fama & French, 1992). Smaller firms, by contrast, often face tighter financing constraints, higher volatility and weaker disclosure practices, which may dampen or distort the impact of capital market indicators on their valuation. In the Nigerian oil and gas sector, firm size is particularly important because it influences the capacity of companies to withstand downturns in oil prices, comply with regulatory requirements and invest in new exploration and production projects (Adeniran & Udeh, 2021; Eze, 2022). Understanding whether and how firm size moderates the relationship between stock price, market capitalization, price earnings ratio and firm value is therefore critical for interpreting capital market signals in this context.

Despite a growing body of work on capital market development and firm performance in Nigeria and other emerging economies, important gaps remain. Many existing studies have focused on broad market indices or cross country samples, leaving relatively little sector specific evidence on how capital market fundamentals shape the value of listed oil and gas companies in Nigeria (Essi et al., 2024; Edem et al., 2022). Other studies have examined firm size and financial performance without explicitly modelling its moderating role in the relationship between capital market indicators and firm value, and most research continues to rely heavily on market based valuation proxies such as market capitalization, Tobin's Q and market price per share (Etim et al., 2020; Ijeoma, 2021). The role of stock price, market capitalization and price earnings ratio in explaining book value based measures of firm value is therefore still underdeveloped, particularly within the unique institutional and macroeconomic environment of Nigeria's oil and gas sector.

## II. LITERATURE REVIEW

### Conceptual Clarifications

#### Firm Size

Firm size has been broadly conceptualized in corporate finance as the overall scale and capacity of a firm's operations, assets and market presence. It captures how large or small a company is relative to others in its industry, and it is typically linked to differences in risk profile, access to external finance, information environment and bargaining power with stakeholders. Dang, Li and Yang (2018) described firm size as a fundamental



firm characteristic that systematically influences financing choices, investment decisions and valuation outcomes across a wide range of empirical corporate finance applications. In asset pricing literature, size has also been treated as a priced risk factor, with smaller firms documented to earn higher average returns compared to larger firms, a phenomenon widely known as the size effect (Fama & French, 1992). These perspectives underscore firm size not only as a descriptive attribute, but as a core construct that shapes performance, risk and value in capital markets.

Scholars have proposed multiple ways of measuring firm size, depending on data availability and the specific research question. Common input-based measures include total assets, total sales or revenues, paid-up capital, and number of employees, while market based measures rely on indicators such as market capitalization or market value of equity (Dang et al., 2018; Hashmi et al., 2020). Comparative evidence suggests that these alternative proxies, although correlated, are not always interchangeable, and empirical results may be sensitive to the choice of measure, a pattern sometimes described as a measurement effect in the size effect (Dang et al., 2018). Hashmi et al. (2020) further showed that total assets, sales, market capitalization and number of employees can have different strengths in explaining corporate finance practices and performance, which implies that careful conceptualization and operationalization of firm size are essential for credible inference.

Beyond its measurement, firm size has been theorized to influence firm value through several channels. Larger firms often enjoy economies of scale, more diversified product lines and better access to capital markets, which may reduce bankruptcy risk and borrowing costs, and support higher valuations over time (Bevan & Danbolt, 2002). At the same time, very large size can be associated with bureaucratic rigidities, agency problems and slower strategic adjustment, which may dampen value in highly dynamic sectors. In emerging markets, including Nigeria, firm size has been found to shape the relationship between firm characteristics and financial performance. Ndah, Nkechukwu and Alajekwu (2025) reported that firm characteristics such as leverage and ownership structure influence the profitability of listed Nigerian oil and gas companies, with size playing an important conditioning role in these relationships. Similarly, recent Nigerian studies have treated firm size as a moderating variable that can strengthen or weaken the impact of governance mechanisms, financing

decisions and disclosure practices on financial reporting quality and stability, especially in oil and gas and industrial goods sectors (Bello et al., 2024; John et al., 2024).

### **Capital Market Fundamentals and Value**

Capital market fundamentals are widely understood as the key financial indicators that transmit information about firm performance and value through long term securities markets. Capital markets provide platforms where equity and long term debt instruments are issued and traded, thereby mobilising savings and allocating them to productive investment (Osaze, 2000). Within this setting, fundamentals such as stock price, market capitalization and valuation multiples summarise how investors interpret information about expected cash flows, risk and growth. In relatively efficient markets, security prices incorporate available information and function as forward looking indicators of firm prospects, which means that changes in these indicators are interpreted as shifts in perceived risk and profitability (Bodie et al., 2018).

Stock price is the most visible of these fundamentals and represents the current market valuation of one share of a firm at a given point in time. Conceptually, it reflects the discounted present value of anticipated future cash flows to shareholders, shaped by investor expectations and market sentiment (Bodie et al., 2018). In semi efficient markets, stock prices are expected to adjust quickly when new information emerges regarding earnings, investment projects, governance changes or macroeconomic shocks. Persistent movements in price therefore provide signals about how market participants reassess firm value, especially where alternative valuation measures are limited or accounting numbers are noisy. In many studies on Nigeria and other emerging economies, stock prices and related indices have been used as direct indicators of how the market values listed firms and how this valuation links to macroeconomic outcomes.

Market capitalization is another core capital market fundamental, defined as the total market value of a firm equity, calculated as stock price multiplied by the number of outstanding shares. It captures both firm size and investor confidence and is often used as a proxy for the depth and maturity of the capital market at the aggregate level (Idenyi et al., 2017). Higher market capitalization is typically associated with better access to finance, greater visibility and stronger expectations about future performance. Empirical



work on Nigeria frequently employs market capitalization, value traded and turnover ratio as indicators of capital market development and examines their relationship with economic growth and investment, highlighting the macro relevance of these firm level fundamentals.

The price earnings ratio, defined as market price per share divided by earnings per share, connects capital market fundamentals more explicitly with firm value. It indicates how much investors are willing to pay for one unit of current earnings and embeds expectations about growth and risk (Damodaran, 2012). When the ratio is high, it usually signals that the market anticipates stronger future earnings or views the firm as relatively less risky, while low ratios may reflect pessimism, higher risk or potential undervaluation. In emerging markets where earnings can be volatile and disclosure uneven, the price earnings ratio provides a compact summary of market based valuation and is widely used in empirical studies to compare firms and to assess how capital market conditions influence firm value over time.

### Theoretical Underpinning

The theoretical underpinning for this study is the Efficient Market Hypothesis, EMH, as articulated by Fama and the modern finance tradition on capital markets. EMH posits that security prices fully and promptly incorporate all available information, so that equity prices at any point in time represent unbiased estimates of the present value of expected future cash flows, adjusted for risk (Fama, 1970). In its weak form, the hypothesis argues that past price movements and trading volumes cannot be systematically exploited to earn abnormal returns, while the semi strong form extends this logic to all publicly available information, including earnings announcements and macroeconomic news. Under these conditions, observable capital market fundamentals, such as stock price, market capitalization and the price earnings ratio, are understood as information rich signals that correctly summarise investors' collective assessment of firm value. In practical terms, when new information emerges about profitability, risk, regulation or sector specific shocks, competitive trading is expected to drive immediate adjustments in these fundamentals, and these adjustments in turn should align with changes in intrinsic firm value (Malkiel, 2003). The relevance of EMH to this study lies in its portrayal of capital market indicators as efficient transmitters of information about the underlying worth of listed oil and gas

firms in Nigeria, so that systematic relationships between stock price, market capitalization, price earnings ratio and book value per share are theoretically justified. At the same time, the extensive evidence on anomalies such as size, value and momentum effects, as well as the influence of behavioural biases in emerging markets, has led scholars to question the strict form of efficiency and to argue that frictions, information asymmetry and institutional weaknesses can cause persistent deviations between market valuations and fundamentals (Shiller, 2003; Lo, 2004). This tension creates room for the present study to examine not only whether capital market fundamentals explain firm value in the Nigerian oil and gas sector, but also whether firm size conditions these relationships in ways that may reflect partial efficiency, segmented information flows or structural constraints in the market.

### Empirical Review

Akani and Lucky (2014) investigated how monetary aggregates influenced aggregate stock prices in Nigeria, using annual time series data from 1980 to 2012. They modeled the All Share Index as the dependent variable and used several money supply measures as explanatory variables, including narrow money, broad money and quasi money, within an Engle Granger and Johansen co integration framework complemented by vector error correction and Granger causality tests. Their results showed that broad money supply had a positive and significant long run effect on stock prices, while some narrower monetary aggregates exhibited weaker or insignificant impacts, implying that liquidity conditions captured by broad money were more relevant for equity valuation in the Nigerian market.

Ologunwa and Sadibo (2016) focused on the link between capital market development and economic growth in Nigeria, using aggregate annual data over several decades. They proxied capital market development with market capitalization ratio and stock market turnover ratio, and used real gross domestic product as the growth indicator, estimating a structural dynamic model based on time series techniques. Their findings revealed that both market capitalization and turnover ratios were positive and statistically significant drivers of economic growth, confirming that deeper and more liquid capital markets supported macroeconomic performance through savings mobilization and investment financing.



Obeidat (2009) examined the internal financial determinants of common stock prices for firms listed on the Abu Dhabi Securities Market, using firm level panel data for 2004 to 2007. The study modeled market price per share as the dependent variable and included earnings per share, dividend per share, book value per share and return on equity as key explanatory proxies, applying ordinary least squares and panel regression estimators. The results indicated that earnings per share and book value per share had strong positive and significant effects on stock prices, dividend per share had a weaker but still positive influence, while profitability ratios such as return on equity were less consistently significant. These findings suggested that valuation in that market was primarily anchored on fundamental accounting information, especially earnings and net asset values.

Adesina, Nwidobie and Adesina (2015) investigated how capital structure affected financial performance in the Nigerian banking sector, using panel data for ten quoted banks between 2005 and 2012. They treated profit before tax and related profitability measures as dependent variables, and used equity capital, short term debt and long term debt ratios as proxies for capital structure, estimating fixed effects and random effects regressions. The study reported that higher leverage, especially long term debt to total capital, was negatively associated with bank profitability, whereas a stronger equity base had a positive and significant impact on profit performance. Overall, the capital structure proxies jointly explained a substantial share of variation in bank performance, highlighting the importance of the mix between debt and equity for value creation in Nigerian financial institutions.

James (2020) analyzed the effects of liquidity and firm size on firm value for 34 non financial firms listed in Nigeria, using panel data from 2007 to 2016. Firm value was measured by market value per share, while the key independent variables were liquidity, proxied by the current ratio, and firm size, proxied by the logarithm of total assets, with panel least squares techniques employed. The empirical results showed that liquidity did not have a statistically significant effect on market value per share, indicating that short term solvency did not drive valuation in a robust way. In contrast, firm size had a statistically significant effect on firm market value, and the estimated coefficient was negative, implying that larger firms in that sample were valued less highly

per share relative to smaller ones once other factors were controlled for.

Fama and French (1992) provided foundational evidence on how firm characteristics shape expected returns in United States equity markets, using a large cross sectional sample of NYSE, AMEX and NASDAQ stocks from 1963 to 1990. They regressed average stock returns on multiple proxies, notably firm size (market capitalization), book to market equity and beta, employing portfolio sorts and cross sectional regressions. Their findings showed that size and book to market equity had strong and consistent explanatory power for returns, while beta had little additional information, with small cap and high book to market firms earning higher average returns. Although their dependent variable was expected return rather than firm value, the study implied that market capitalization and value related ratios are central in how investors price firms, supporting the view that size and valuation multiples are fundamental drivers of capital market outcomes.

Hirdinis (2019) investigated the effect of capital structure and firm size on firm value, with profitability as a moderating variable, using a sample of mining companies listed on the Indonesia Stock Exchange for the period 2013 to 2017. Firm value was proxied by Tobin's Q, capital structure was measured using debt to equity and debt to asset ratios, and firm size was captured by the natural logarithm of total assets, while profitability was proxied by return on assets, estimated through multiple regression and interaction terms. The results indicated that higher leverage reduced firm value, firm size had a positive and significant effect on value, and profitability strengthened the positive impact of size while partly offsetting the negative impact of leverage. These outcomes underscored the importance of firm size as both a direct determinant and a moderator in the capital structure-value relationship.

Al Matari, Al Swidi and Fadzil (2014) explored how board characteristics and firm characteristics, including firm size, affected firm performance for non financial companies listed on the Muscat Securities Market in Oman, using panel data for 2011 and 2012. They measured performance with accounting based indicators such as return on assets and return on equity, and included firm size, proxied by total assets, as a core firm specific variable alongside governance proxies like board size and audit committee characteristics, employing multiple regression analysis. Their



findings revealed that firm size had a significant positive association with firm performance, while some governance variables showed mixed or insignificant effects. The study concluded that larger firms benefited from scale, resource availability and investor confidence, which translated into better performance outcomes, thereby reinforcing the argument that size is a key driver of firm level results and interacts meaningfully with other fundamentals in shaping value.

### III. METHODOLOGY

The study covered a ten-year period from 2013 to 2022. This timeframe allows for a comprehensive analysis of long-term trends and fluctuations in both capital market fundamentals and firm valuations. The extended duration facilitates capturing economic cycles, major market events, and regulatory changes that influenced the relationship between capital market indicators and firm value. The design for this study was cross-sectional and retrospective in nature. The cross-sectional design involves the collection of data from multiple oil and gas companies listed on the Nigerian Exchange Group (NGX), providing a snapshot of their capital market fundamentals and firm valuations at a single point in time. By employing this approach, the study captured a diverse representation of the oil and gas industry, encompassing companies of varying sizes, market capitalizations, and financial performance levels.

In the context of the study, the research utilized a purposive sampling technique to select a representative sample of oil and gas companies listed on the Nigerian Exchange Group (NGX). Purposive sampling is a non-probability sampling method that involves deliberately choosing specific participants based on predetermined criteria, ensuring that the sample is suitable for addressing the research objectives effectively.

The primary purpose of employing purposive sampling is to ensure that the selected sample of oil and gas firms is representative of the entire industry. This approach allows the researchers to focus on specific companies that align with the study's objectives and possess relevant characteristics in terms of market capitalization, financial performance, and data availability. By selecting companies purposefully, the study targeted those that play a significant role in the Nigerian oil and gas industry, leading to more informative and meaningful results.

The selection criteria for choosing the sample of oil and gas firms were carefully crafted

to ensure a diverse and comprehensive representation of the industry. Market capitalization, as a key criterion, was considered to include companies with varying sizes, from large-scale industry leaders to mid-sized and smaller firms. This approach helped to capture a wide spectrum of companies operating in the sector, each with its distinct market dynamics and performance metrics.

Data availability for the study period (2013 to 2022) is another essential factor that was considered during the selection process. Companies that provided comprehensive and consistent financial data throughout the specified time frame were prioritized to ensure the reliability and completeness of the collected information. By considering data availability, the study minimized potential biases arising from missing or incomplete data, thus strengthening the validity of the research findings.

Multiple linear regression was used as the primary technique for assessing the relationship between the independent variables (capital market fundamentals and firm size) and the dependent variable (firm value). This technique enabled the study to determine the individual and combined effects of the independent variables on firm value, while controlling for potential confounding variables. The regression model allowed for a detailed understanding of the direct impacts of each capital market fundamental on firm value, as well as the moderating effect of firm size. The regression analysis was conducted using panel data, which combined cross-sectional and time-series data, ensuring a more robust and comprehensive examination of the relationships.

The model used for the paper integrates interaction terms to explore how the combination of firm size and the capital market fundamentals impacts firm value. The interaction terms (MPS\_FSIZE, MRKCAP\_1\_FSIZE, and PE\_Ratio\_FSIZE) will help identify the moderating effect of firm size on the relationship between the independent variables and firm value. The equation is as follows:

$$FBVALUE_{it} = \beta_0 + \beta_1MPS_{it} + \beta_2MRKCAP\_1_{it} + \beta_3PE\_Ratio_{it} + \beta_4FSIZE_{it} + \beta_5MPS\_FSIZE_{it} + \beta_6MRKCAP\_1\_FSIZE_{it} + \beta_7PE\_Ratio\_FSIZE_{it} + \epsilon_{it}$$

Where:

FBVALUE is the firm book value for firm *i* at time *t*,

MPS is the Market Price per Share for firm *i* at time *t*,

MRKCAP\_1 is the Market Capitalization for firm *i* at time *t*,



PE\_Ratio is the Price Earnings Ratio for firm  $i$  at time  $t$ ,  
 MPS\_FSIZE is the interaction term between Market Price per Share and Firm Size,  
 MRKCAP\_1\_FSIZE is the interaction term between Market Capitalization and Firm Size,  
 PE\_Ratio\_FSIZE is the interaction term between Price Earnings Ratio and Firm Size,  
 $\beta_0$  is the constant term,  
 $\beta_1, \beta_2, \beta_3,$  and  $\beta_4$  are the coefficients to be estimated,  
 $\beta_5$ - $\beta_7$  are the coefficients for the interaction terms,

#### IV. RESULTS AND DISCUSSIONS

The study explores the moderating effect of firm size (FSIZE) on the relationship between capital market fundamentals and the value of listed oil and gas companies in Nigeria. This section presents the summary statistics for the key variables employed in the study, offering insights into the central tendency, dispersion, and range of the data. Table 4.1 provides descriptive metrics—mean, standard deviation, minimum, and maximum values—for the dependent variable (FBVALUE), key capital market fundamentals (Market Price per Share, PE Ratio, and Market Capitalization), and the interaction terms capturing the moderating effect of firm size.

#### Descriptive Statistics

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
FBVALUE	103.8285	239.777	-5.674	1337.241
MPS	104.0218	179.1729	0.200	1083.33
MRKCAP_1	10.4971	2.59828	3.63321	15.06096
PE_Ratio	11.3947	20.80901	-32.5383	115.3755
MPS_FSIZE	1482.837	2673.6	2.166533	16330.86
MRKCAP_1_FSIZE	132.4201	42.98161	26.72042	213.5482
PE_Ratio_FSIZE	142.3461	269.538	-372.336	1541.182

Source: STATA 13 Output, 2024

The book value of the firm (FBVALUE), the study's dependent variable measured using book value per share (BVPS), exhibits a mean value of ₦103.83, with a substantial standard deviation of ₦239.78, indicating considerable dispersion in firm valuations across listed oil and gas companies. The minimum FBVALUE is negative at ₦-5.67, suggesting that at least one firm had negative equity or accumulated losses exceeding asset values during the period under review. Conversely, the maximum value of ₦1,337.24 reflects a firm with significantly high net asset value, underscoring the presence of outliers or strong performers within the industry. The wide range and high variability are indicative of structural differences in asset management, profitability, and retained earnings within the sector.

The Market Price per Share (MPS) has a mean of ₦104.02 and a standard deviation of ₦179.17, suggesting that share prices among listed oil and gas firms are not only high on average but also vary considerably. The minimum observed share price is as low as ₦0.20, while the highest

recorded is ₦1,083.33, further supporting the view of price volatility within the sector. Such price volatility is consistent with known characteristics of the Nigerian oil and gas market, where geopolitical instability, oil price fluctuations, and regulatory changes frequently impact investor sentiment and trading behavior.

The market capitalization (MRKCAP\_1), expressed in logarithmic terms to normalize skewed values, has a mean of 10.50 and a standard deviation of 2.60, with a minimum of 3.63 and a maximum of 15.06. These figures reflect a wide disparity in firm size among listed oil and gas firms in Nigeria. Market capitalization serves as both a capital market fundamental and a component of the moderating variable (firm size), and its variation underscores the heterogeneity in scale and market presence among firms.

The Price-to-Earnings Ratio (PE\_Ratio), a key performance valuation metric, reveals an average of 11.39, with a standard deviation of 20.81. Notably, the minimum value is -32.54, which implies that some firms were operating at a net loss during the study period. The maximum



value of 115.38 reflects firms with very high valuation multiples, likely due to low or volatile earnings. The high variability further highlights the challenges in earnings predictability and valuation consistency within the sector.

The interaction terms introduced to capture the moderating effect of firm size further enrich the analysis. The interaction between MPS and firm size (MPS\_FSIZE) has a notably high mean value of ₦1,482.84 and a standard deviation of ₦2,673.60, with a minimum of ₦2.17 and a maximum of ₦16,330.86. This enormous spread confirms the disproportionate influence of larger firms' market prices when scaled by size, and points to the necessity of considering firm size as a moderating construct in the capital market–value relationship.

Similarly, the interaction term MRKCAP\_1\_FSIZE shows a mean of 132.42, a relatively tighter standard deviation of 42.98, and ranges from 26.72 to 213.55, reinforcing the relevance of size-adjusted capitalization as a distinct explanatory mechanism. Lastly, PE\_Ratio\_FSIZE, which reflects the compounded

influence of profitability signals and firm scale, exhibits a mean of 142.35, with a remarkably high standard deviation of 269.54. The extreme values—ranging from a minimum of -372.34 to a maximum of 1,541.18—suggest substantial earnings volatility, magnified in larger firms. This further supports the theoretical proposition that firm size may dampen or amplify the influence of capital market fundamentals on firm value.

### Regression Results

Table 2 presents the estimation results for Model 3, which introduces the full specification of the study by incorporating interaction terms between Firm Size (FSIZE) and each of the core capital market fundamentals; Market Price per Share (MPS), Market Capitalization (MRKCAP\_1), and Price-Earnings Ratio (PE-Ratio) alongside the original independent variables. The primary objective of this model is to empirically test the moderating effect of firm size on the relationship between capital market fundamentals and firm value (FBVALUE) among listed oil and gas firms in Nigeria.

**Table 2: Standard vs. Robust Regression Results**

Variable	OLS Coef.	Std. Error	t	P-Value	Robust Coef.	Robust Std. Error	T	P-Value
MPS	-5.277	0.880	-6.000	0.000	-5.277	0.864	-6.110	0.000
MRKCAP_1	-73.652	23.842	-3.090	0.003	-73.652	34.843	-2.110	0.037
PE-Ratio	13.778	4.475	3.080	0.003	13.778	5.997	2.300	0.024
MPS_FSIZE	4.224	0.060	7.060	0.000	4.224	0.060	7.040	0.000
MRKCAP_1_FSIZE	5.215	1.464	3.560	0.001	5.215	2.401	2.170	0.032
PE_Ratio_FSIZE	-1.152	0.347	-3.320	0.001	-1.152	0.480	-2.400	0.018
Constant	144.131	72.631	1.980	0.050	144.131	65.156	2.210	0.029
<b>Model Stats</b>	<b>OLS</b>				<b>Robust</b>			
Observations	97				97			
F-statistic	134.560				34.500			
R-squared	0.900				0.900			
Prob > F	0.000				0.000			

Source: Author's Computation using STATA 14.0 (2024)

A key insight from the result is the sign and interpretation of the main effects, most notably the coefficient of MPS, which is negative and highly significant (Coef. = -5.277, p = 0.000) in

both OLS and robust regressions. This indicates that, without accounting for interaction effects, MPS alone appears to decrease firm value. However, the corresponding interaction term



MPS\_FSIZE is strongly positive and highly significant (Coef. = 4.224,  $p = 0.000$ ), which more accurately reflects the conditional relationship. Specifically, this implies that the effect of MPS on firm value depends on the size of the firm. For firms with larger sizes, the negative direct effect of MPS is offset—and ultimately reversed—by the positive interaction effect. This finding provides compelling evidence that firm size moderates the relationship between share price and firm value, consistent with the expectation that larger firms may be better positioned to capitalize on favorable market valuations.

Similarly, the main effect of Market Capitalization (MRKCAP\_1) remains negative and significant (Coef. = -73.652,  $p = 0.037$  under robust estimation), reinforcing the finding from earlier models that higher market capitalization does not necessarily translate into greater firm value in the Nigerian oil and gas sector. However, the interaction term  $\text{MRKCAP}_1 \times \text{FSIZE}$  is significantly positive (Coef. = 5.215,  $p = 0.032$ ), indicating that for larger firms, the adverse effect of market capitalization on firm value is reduced. This suggests that the perceived inefficiencies or liabilities associated with large capitalization may be context-dependent and moderated by operational scale or resource utilization efficiency in larger firms.

The PE-Ratio presents an interesting case of conditional effect reversal. The main effect of PE-Ratio is positive and significant (Coef. = 13.778,  $p = 0.024$  in the robust model), indicating that, on average, higher earnings multiples are associated with higher firm value—an intuitive finding in line with conventional valuation theory. However, the interaction term  $\text{PE-Ratio} \times \text{FSIZE}$  is negative and statistically significant (Coef. = -1.152,  $p = 0.018$ ), suggesting that for larger firms, this positive effect diminishes. In other words, while smaller firms may benefit from high PE multiples in terms of valuation, the market may interpret high PE ratios in larger firms with greater scrutiny, potentially due to concerns about earnings volatility, speculative growth assumptions, or diminishing returns on scale.

The coefficient of the standalone Firm Size (FSIZE) term is also positive and significant (Coef. = 5.215,  $p = 0.032$ ), which reinforces the notion that firm size has a direct positive influence on firm value even after accounting for its interactions. Larger firms are likely to benefit from economies of scale, wider access to capital, and enhanced market credibility—all of which contribute positively to valuation.

The constant term is significant in both OLS ( $p = 0.050$ ) and robust regression ( $p = 0.029$ ), with a value of 144.131, indicating a positive baseline firm value when all predictors are set to zero (or at their mean in standardized models). From a model performance standpoint, Model 3 is the strongest among all models estimated. It achieves a remarkably high R-squared of 0.900, indicating that 90% of the variation in firm value is explained by the predictors. This is a substantial improvement over Models 1 and 2 ( $R^2 = 0.780$  and 0.824 respectively), underscoring the explanatory power gained from incorporating interaction effects. The model also passes overall significance tests with F-statistics of 134.560 (OLS) and 34.500 (robust), both highly significant at the 1% level ( $p = 0.000$ ), confirming that the independent variables, jointly considered, have a statistically significant impact on firm value.

#### Discussion of findings

The results show that market price per share (MPS) has a statistically significant but conditional effect on firm value. The direct coefficient on MPS is negative and highly significant ( $\beta = -5.277$ ,  $p < 0.01$ ), while the interaction term with firm size ( $\text{MPS} \times \text{FSIZE}$ ) is strongly positive and significant ( $\beta = 4.224$ ,  $p < 0.01$ ). This means that when firm size is not considered, higher share prices are associated with lower firm value, but as firm size increases, the marginal effect of MPS on firm value turns positive and becomes stronger. In practical terms, larger listed oil and gas firms gain more in terms of valuation from a given increase in share price than smaller firms.

This size conditioned effect is broadly consistent with the Efficient Market Hypothesis, which suggests that share prices reflect available information about earnings potential and risk, but it also reflects the reality that information is more credible and more quickly incorporated for large, well followed firms. The result resonates with Akani and Imoh (2015), who reported that stock price movements significantly influenced firm performance among oil and gas firms on the Nigerian Exchange, and with Ologunwa and Sadibo (2020), who found that share price acts as a critical signal of viability in commodity sensitive sectors. At the same time, the negative standalone coefficient in Model 3 echoes concerns raised by Yartey (2008) that in some African markets, price signals can be noisy for smaller or thinly traded firms because of speculative trading and weak disclosure. In line with Abeywardhana (2017) and



Chen and Chen (2011), who documented that stock prices convey real valuation information in Sri Lanka and Taiwan, the present findings suggest that this information content is strongest for larger Nigerian oil and gas firms, where analyst coverage, institutional participation and regulatory scrutiny are more robust.

For market capitalisation (MRKCAP\_1), it indicates a statistically significant negative direct effect on firm value ( $\beta = -73.652$ ,  $p < 0.05$ ), alongside a positive and significant interaction with firm size (MRKCAP\_1  $\times$  FSIZE,  $\beta = 5.215$ ,  $p < 0.05$ ). This implies that, on average, higher market capitalisation is associated with lower firm value when size is not considered, but as firm size increases, the adverse effect is reduced and can be reversed. The pattern suggests that in the Nigerian oil and gas sector, increases in market capitalisation are not automatically perceived as value enhancing, unless they are supported by the resource base, operational scale and governance structures that typically characterise larger firms.

This result partially aligns with earlier Nigerian evidence. Uwuigbe, Jafaru and Ajayi (2012) reported that market capitalisation did not have a strong positive effect on firm performance, while Adesina, Nwidobie and Adesina (2015) showed that rising market capitalisation in the oil and gas sector did not necessarily translate into improved shareholder value, citing regulatory uncertainty and crude oil price volatility. Adelegan (2009) also argued that in many African markets, larger size without corresponding efficiency can lead to value discounts by investors. Internationally, Demsetz and Villalonga (2001) and Titman and Wessels (1988) similarly cautioned that size and market capitalisation can be value neutral or even value reducing when expansion is driven by empire building rather than productive efficiency. The moderating result in this study refines these earlier findings. It shows that market capitalisation becomes more value relevant when combined with sufficient scale and capabilities, supporting the resource based view that the ability to deploy a large capital base efficiently is what ultimately drives valuation gains.

The estimates for the price earnings ratio (PE Ratio) reveal a positive main effect ( $\beta = 13.778$ ,  $p < 0.05$ ) and a negative interaction with firm size (PE Ratio  $\times$  FSIZE,  $\beta = -1.152$ ,  $p < 0.05$ ). This indicates that higher PE ratios are generally associated with higher firm value in the Nigerian oil and gas sector, but the strength of this association weakens as firm size increases. Smaller firms appear to benefit more from high earnings

multiples, while the market reacts more cautiously to high PE ratios for large firms.

These findings bridge two strands of the literature. On one hand, they are consistent with mainstream valuation evidence that higher PE ratios reflect stronger growth expectations and higher firm value, as reported by Chen and Zhang (2007) and by Bodie, Kane and Marcus (2014), who view PE as a forward looking indicator of earnings prospects. The positive main effect also aligns with empirical work in other emerging markets where PE has been found to be a useful predictor of valuation, provided earnings are not excessively volatile. On the other hand, the size conditioned pattern speaks to the reservations expressed by Olugbenga and Olanrewaju (2015) and Obeidat (2009), who argued that in emerging markets, PE ratios can at times be misleading because of cyclical earnings, disclosure weaknesses and speculative trading. The finding that the PE ratio is more strongly rewarded in smaller firms, but discounted in larger ones, is consistent with the Fama and French (1992) insight that valuation ratios must be interpreted in conjunction with firm characteristics such as size and risk. In a cyclical and capital intensive sector like oil and gas, investors may perceive very high multiples on large firms as signs of overvaluation rather than sustainable growth, which explains the negative interaction in Model 3.

Firm size (FSIZE) demonstrates a positive and statistically significant direct effect on firm value, even after accounting for its moderating role. This confirms that larger oil and gas firms in Nigeria tend to enjoy higher valuation, all else equal. The result aligns with economies of scale arguments and with signaling perspectives, which view size as a credible indicator of resilience and long term survival. It also corresponds with the resource based view, where larger firms are assumed to control more extensive tangible and intangible resources that can be translated into competitive advantage.

These findings are broadly consistent with international and Nigerian evidence. Majumdar and Chhibber (1999) reported a positive size performance relationship in emerging markets, attributing it to stability and cost advantages. In the Nigerian setting, Amah and Nwaiwu (2016) found that firm size positively influences financial performance and market value, particularly in capital intensive industries. Olayinka and Adefulu (2016) similarly showed that larger firms benefit from better access to finance and greater investor attention, which improves valuation. Demsetz and



Lehn (1985) added that in volatile industries, size can serve as a buffer against risk, which is particularly relevant for oil and gas. The persistence of the FSIZE effect in this study, even with interaction terms included, reinforces these earlier findings and underscores firm size as both an economic and informational asset that the market capitalises into higher firm value.

The three significant interaction terms confirm that firm size moderates the relationship between capital market fundamentals and firm value in a systematic way. The positive and highly significant coefficient on  $MPS \times FSIZE$  shows that the beneficial effect of stock price on firm value becomes stronger as firm size increases. This is consistent with signaling theory and with Nigerian evidence from Amah and Nwaiwu (2016) and Akani and Lucky (2021), who found that firm specific characteristics, including size, shape how market indicators translate into performance. The significant positive interaction between  $MRKCAP\_1$  and FSIZE indicates that the negative direct effect of market capitalisation is mitigated for larger firms, which echoes the findings of Al Matari, Al Swidi and Fadzil (2014) in the Gulf region, where size enhances the ability of firms to convert financial indicators into real performance gains.

The negative interaction between PE Ratio and FSIZE complements these patterns by showing that investors treat high PE ratios more favourably in smaller firms than in large ones. This nuanced result is in line with Fama and French (1992) and Penman (1996), who reported that the informational content of valuation multiples varies with firm characteristics, and with sector specific observations that cyclical earnings make PE ratios more fragile for large, mature firms. Overall, the moderating role of firm size documented in this study adds to the growing body of contingent evidence that firm level characteristics shape the strength and even the direction of the link between capital market fundamentals and firm value. It reinforces earlier conclusions in emerging market studies that simple one size fits all interpretations of stock prices, market capitalisation and PE ratios can be misleading, and that analysts must explicitly consider firm size when assessing valuation dynamics in markets such as Nigeria.

## V. CONCLUSION AND RECOMMENDATIONS

The study showed that capital market fundamentals significantly influenced the value of listed oil and gas firms in Nigeria, but their effects

were strongly conditioned by firm size. Market price per share and market capitalization had negative direct effects on firm value, yet their interaction with firm size was positive and significant, which implied that larger firms were better able to convert higher prices and larger capital bases into value. The price earnings ratio had a positive main effect on firm value, but this impact weakened as firm size increased, which indicated that high earnings multiples were rewarded more in smaller, growth oriented firms. Firm size itself exerted a strong positive and independent influence on firm value and simultaneously shaped how the three market indicators translated into valuation outcomes. Overall, the findings suggested that valuation in the Nigerian oil and gas sector had been partly efficient, but clearly contingent on firm specific characteristics, particularly scale.

Based on the findings, the following recommendations were suggested:

- i. For Market Price per Share (MPS), managers were encouraged to treat share price as a strategic outcome of sound fundamentals. They improved earnings quality, reduced earnings volatility and communicated clear performance targets so that increases in MPS arose from genuine improvements in cash flows and risk, not speculation. For regulators, it was recommended that they strengthened rules on insider trading and price manipulation so that stock prices reflected information more faithfully, particularly for small and thinly traded firms.
- ii. For Market Capitalisation, firms were advised to ensure that growth in market capitalization was backed by efficient asset use, profitable projects and disciplined capital structure decisions. Expansion through acquisitions or asset accumulation was guided by clear value creation tests. Regulators and the NGX supported this by encouraging better segment reporting and disclosure on major investments, so investors could distinguish value enhancing scale from unproductive size.
- iii. With respect to Price Earnings Ratio (PE Ratio), managers focused on building consistent and transparent earnings paths, so that higher PE ratios reflected credible growth, especially for smaller firms where the market rewarded high multiples more strongly. It was also recommended that investors used PE jointly with other indicators, such as earnings



quality and cash flow, to avoid mispricing in periods of cyclical earnings.

- iv. For Firm Size (FSIZE) and its Moderating Role, larger firms were encouraged to leverage their scale through stronger governance, more detailed disclosures and robust investor relations, so that the market continued to capitalise their size into higher value. Smaller firms focused on governance improvements and clearer growth stories, in order to enhance how movements in MPS, market capitalization and PE translated into firm value.

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