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# MODERATING EFFECT OF LEVERAGE ON FIRM AGE AND SIZE ON THE VALUE OF LISTED CONSUMER AND INDUSTRIAL GOODS FIRMS IN NIGERIA

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**Abstract:** This study investigated the moderating effect of leverage on the relationship between firm age, firm size, and the value of listed consumer and industrial goods firms in Nigeria for the period 2015 to 2024. The declining confidence of investors in the Nigerian capital market, attributed to the persistent underperformance of listed firms relative to theoretical expectations, motivates this inquiry. Using an ex-post facto research design, secondary data were sourced from the audited financial statements of 25 purposively selected firms on the Nigerian Exchange Group (NGX). Panel regression analysis, anchored on the random effects model as validated by the Hausman specification test, was employed to analyse the data. The results revealed that firm age has a positive but insignificant effect on price to book value of listed consumer and industrial goods firm in Nigeria while firm size has a negative and insignificant effect on price to book value of listed consumer and industrial goods firms in Nigeria. The study therefore concludes that firm age and firm size have insignificant influence on price to book value of listed consumer and industrial goods firms in Nigeria. The study concludes that, even when moderated by leverage, neither firm age nor firm size exerts a statistically significant influence on the price-to-book value of listed consumer and industrial goods firms in Nigeria. The study therefore recommends that management of listed consumer and industrial goods firms should redirect strategic focus toward value-enhancing mechanisms beyond firm size and age, including improved asset utilisation, sound leverage management, and stronger investor relations policies that directly drive market valuation in the Nigerian capital market.

**Keywords:** Firm Age, Firm Size, Firm Value, Price to Book Value, Board Size

## I. INTRODUCTION

Firm value is the perceived or observed value of an asset on the market within a specific period of time of an accounting year; and that is why it is also known as current value. The company's value is the investor's opinion of the company's success rate which frequently related with stock prices. The stockholder wealth maximization goal states that management should seek to maximize the present market value of the expected future returns to the owners (shareholders) of the firm (Kabiru *et al.,* 2019). The stock price is a relative and proportional value of a firm's worth. The stock's price only tells you a firm's current value or its market value. This is based on the perception that the higher the stock price, the more profitable it will be for shareholders. The market value of firms over the years has been the primary concern of business practitioners and owners of all types of organizations. This is largely due to the implications it has on the health of a firm and ultimately its survival. Firm characteristics can be defined as the wide varieties of information disclosed in the financial statement of business entities that serve as the predictors of the firms‟ quality of accounting information and performance (Abubakar *et al.,* 2018). They can also be defined as the behavioral patterns of company's operation which enables them to achieve their objectives throughout the period of their operations. Company's characteristics vary from one business entity to another. They can be determined based on the relevant information disclosed on financial statements for a particular accounting period (Obiora *et al.,* 2021). In certain circumstances, Small companies reveal less information than large ones because they are afraid of competition.

Leverage is commonly employed by a company to achieve a specific or temporary objective, such as acquisition of another business, to effect a buy-out, to purchase shares or fund a one-time dividend, or to invest in self-sustaining cash-generating assets (Rabiu *et al.,* 2023). It is the ratio of debt to equity capital of a company and can be used to determine whether a company is highly geared or lowly geared.

Over the past decades, corporate failures notably the dearth of manufacturing firms and activities in Nigeria over the past decades has been a major issue for concern. Many investors have lost confidence in injecting funds into the Nigerian market due to the issue which is a deviation from the theoretical norm and a threat to the theories

of firm and practice as it is. This was also seen by the fact that in recent years, companies, especially those listed on the Nigeria exchange group have recorded poor performance as a result of too much concentration on firm attributes which has greatly affected their firm value. However, many scholars have written on firm characteristics and firm value from the perspectives of a single sector but this study intends to consider two sectors i.e consumer and industrial sectors with leverage as a moderator. Moreso, existing studies largely treat firm age and size as direct predictors or control variables, with limited empirical attention to their moderating influence on the determinants of firm value, especially within emerging markets like Nigeria. The following hypothesis was formulated:

**$Ho_1$:** Firm age has no significant effect on price to book value of listed consumer and industrial goods firms in Nigeria when moderated with firm leverage

**$Ho_2$:** Firm size has no significant effect on price to book value of listed consumer and industrial goods firms in Nigeria when moderated with firm leverage

## II. LITERATURE REVIEW

### 2.1 Conceptual Review

#### 2.1.1 Firm Age

Firm age is an attribute which is unique within a firm and differ among different firms. Older firms are expected to have higher share prices as the value of their accounting information can be more relevant in the market (Akeem, 2014). The age of a firm was defined by Etukudo *et al* (2022) as the number of years elapsed from either the time of listing or that of incorporation. Also, Alex *et al.* (2014) referred to firm age as the difference between a given year of observation and its year of a firm's incorporation. Furthermore, Elif (2016) defined firm age in two ways. The first of which referred to it as the number of years since the firm was first listed and called the listing age. The second definition which was in line with the definitions by Ofuan and Izien (2016); and Iyappan and Ganesamoorthy (2017) refer to firm age as the incorporation age, which is measured as the elapsed number of years from the firm's year of incorporation. This study defines firm age as the number of years from the year a firm is listed on the floor of the Nigerian Exchange Group.

#### 2.1.2 Firm Size

Shaheen and Malik (2012) described firm size as the quantity and array of production capability and potential a firm possesses or the quantity and diversity of services a firm can concurrently make available to its clients. Firm size plays a significant role in explaining the kind of relationships the firm has within and outside its operating environment. Babalola (2013) argued that the larger a firm is, the more the influence it has on its stakeholders, and so large firm tends to outperform small firms. In today's world, the size of a firm is crucial to its success due to the phenomenon of economies of scale. Abdurahman *et al.* (2003) stated that the nature of the relationship that exists between firm size and profitability is a key element in business success, which may shed some light on the factors that boost profitability. Firm size as a concept has been referred to as a firm's staff strength (Roxas *et al.,* 2013). That is, the total number of employees in the firm. Yuga (2014) defined firm size as the natural logarithm of total assets. However, this study defines firm size in line with Yuga (2014) as the natural logarithm of total assets.

#### 2.1.3 Firm Value

Obaje *et al* (2023) asserts that the main goal of a firm is to increase the shareholder's welfare by increasing the value of a firm. Maximizing Market Value is essential for a company because it means increasing the prosperity of shareholders as well, which becomes the company's main goal. However, a good Market Value is able to attract other parties' interest to join the company. In other words, performance on the stock market is an index or indicator of corporate success. Any corporate entity experiencing a rise in the market price of its stocks is considered a good company by the investors. Modigliani and Millier (1958) stated that Market Value is determined by company's assets earnings power. If the company predicted good prospects in the future, the value of the stock will be higher. Otherwise, if the company has fewer prospects the stock price will be low. Market Value is an economic measure which reflects the market value of a business. In the view of Emeka-Nwokeji (2019), firm's market value is influenced by investors' perceptions of its managers' ability to anticipate and respond to future changes in the firm's economic environment.

#### 2.1.4 Price to Book Value

The price-to-book value ratio refers to a valuation ratio that is used by investment advisors, fund managers, and investors to compare a company's market value (market capitalization) to its book value (shareholders' equity). It expresses the relationship between the stock price and the book value of each share. In conventional terms, the lower the price-to-book value ratio, the better the value is. However, the value of the ratio varies from firm to firm. Thus, a benchmark is to compare with the firm average. (Kenneth & Ambrose, 2014). The book value of the

company is a critical aspect that provides information on the value of a company. The price-to-book value ratio captures the relationship between the market value of the share capital and its financial position value which is very common among investment advisors, fund managers as well as investors. This is mathematically stated as:

$$\frac{\text{Market Capitalisation}}{\text{Shareholders' Equity}}$$

### 2.1.5 Leverage

Leverage refers to the debt financing percentage in a company's capital structure. It is a measure of the use of debt versus the use of equity to finance the assets and activities of an organization (Audax, 2018). It is one of the financing decisions that firms have to make. Debt financing is mainly in the form of loan and bond but other form such as securing goods on credit also exist. High usage of debt financing leads to an increase in financial leverage and is associated with greater risk of bankruptcy. However, it is also associated with various advantages such as maintaining company ownership intact, tax deductions, and low transactional costs
(Mboi *et al.*, 2018). Leverage is mathematically expressed as:

$$\frac{\text{Total Debt}}{\text{Total Assets}}$$

### 2.1.6 Board Size

Board size denotes the total number of directors in a board who are in possession of voting rights. There are diverse findings toward board size. Some study revealed that large board size contributes positively in harnessing knowledge, opinions and quality proposals that would culminate in enhance financial performance (Rabiu *et al.*, 2023) where others favoured a small size for efficient and timely resolution on issue (Mohammed, 2019). Board size refers to the number of directors in the board. It is an important factor in determining the effectiveness of the board. Jensen and Meckling (1976) argued that a bigger size board of directors may improve the companies' board effectiveness and support the management in reducing agency cost that resulted from poor management and consequently leads to better financial results. Board of directors play important role in implementing good corporate governance measures.

## 2.2 Empirical Review

Stella and Eno (2024) investigated the effect of firm characteristics on financial leverage of listed industrial goods firms in Nigeria. The broad objective of the study was to evaluate the effect of firm characteristics on financial leverage of industrial good firms in Nigeria. The independent variables of the study was firm characteristics which was proxied by firm size, firm profitability, asset tangibility, market value and the composite effect of firm characteristics, while the dependent variable was proxied by financial leverage. Ex-post-facto research design was adopted. The population of the study consisted of thirteen (13) listed industrial goods firms listed on the Nigerian Exchange Group while a sample size of twelve (12) was taken after dropping the firm which did not meet the requirements for inclusion. The data for the study were extracted from the annual reports and accounts of the sampled companies for the years 2013 to 2022. The data were analysed with descriptive statistics, correlation and panel regression. The E-view statistical packages version 10 was used to analyse the data. The result from the Haussmann test statistics reveals that firm size had a negative and non-significant effect on financial leverage of industrial good firms in Nigeria. Furthermore, firm profitability had a positive and significant effect on financial leverage of industrial goods firms in Nigeria, firm asset tangibility recorded a positive non-significant effect on financial leverage of industrial goods firms in Nigeria, market value had a negative and non-significant effect on financial leverage of industrial goods firms in Nigeria and composite effect of firm characteristics had a significant effect on financial leverage of industrial good firms in Nigeria. The study therefore concluded that the firm characteristics have significant effect on the financial leverage of industrial goods. Based on the above conclusion from the findings of the study, it was recommended amongst others that, firms should increase their scales of operations through increase in liquidity and put these to efficient use in order to enjoy economies of scale. The study focused only on Industrial goods firms; the results could have been different if combined with other sector.

Ebiye and Lyndon (2024) assessed the impact of firm characteristics on corporate social responsibility (CSR) of listed consumer goods firms in Nigeria for the period of eleven years covering 2013 to 2023. The study adopted firm size and firm age as proxies for firm characteristics with the addition of firm growth (explanatory variables), while corporate social responsibility served as the response variable. Based on the ex post facto study design, secondary data collected from published financial statements of sampled five companies listed on the Nigerian Exchange Group were evaluated using Pearson correlation coefficient and multiple regression analysis based on OLS technique assisted by E-Views statistical software. The findings revealed that firm size and firm growth had positive but insignificant impact on CSR, while firm age had negative insignificant effect on CSR practices of listed consumer goods firms in Nigeria. The study recommended that larger firms should dedicate

specific departments or teams to CSR, while smaller firms can designate responsible individuals to CSR or outsource CSR functions if needed before implementing any CSR initiatives. Only five listed firms were considered in the course of the study and therefore could not be a good ground to generalize the results obtained.

Diriyai and korolo (2023) examined the relationship between firm characteristics structure and the quality of financial reporting of publicly traded industrial goods companies. The specific objectives of the study were to determine whether the characteristics of corporate structure - company size, liquidity, company age, and debt - have an impact on the quality of financial reporting of publicly traded industrial goods companies. An ex post facto research design was used and the study used secondary data from the annual accounts and business reports of the listed industrial goods companies for the relevant years considered (2015-2020). Ordinary least squares (OLS) regression techniques were used to examine the relationship between the variables. The study found that company size and liquidity are significantly positively associated with the quality of financial reporting by publicly traded industrial goods companies in Nigeria, while there is an insignificant positive association between firm age and the quality of financial reporting by publicly traded industrial goods companies in Nigeria and there is an insignificant negative association between Leverage and quality of financial reporting of listed industrial goods companies in Nigeria. Overall, the study concluded that there is a significant correlation between the characteristics of firm structure and the quality of financial reporting of publicly traded industrial goods companies. The study, therefore, recommended amongst others that firms should strive to improve the overall level of their assets since firms whose total assets are large seems to produce more quality reports. However, the study covers only six years including year 2020, the result may ignore global economic recession due to COVID 19, pandemic.

Obaje *et al* (2023), examined the impact of firm's attributes on share prices of the quoted consumer goods firms in Nigeria. The research design adopted by the study is correlational and ex-post facto and the population constitutes the twenty (20) consumer goods firms quoted on the Nigeria Exchange Group as at 31st December 2021 out of which ten (10) were used as sample size. Due to the data availability of the companies, the study uses purposive sampling technique. The study uses secondary data and the instrument used for the collection of the data is documentation. The data used are extracted from the annual reports of the listed consumer goods firms on the Nigeria Exchange Group. The study used linear regression model as the techniques of analysis using STATA 13.0 software. The study revealed that firm age has a significant positive impact on share prices while firm size and leverage both have insignificant negative impact on share prices of quoted consumer goods firms in Nigeria. The study therefore recommended that the management, investors and regulators of the quoted consumer goods firms in Nigeria should not place emphasis on the number of years a firm has been in operation and should devise more strategies of maintaining and improving their asset base. The sample size of only 10 firms out of 20 signifies 50% of the population which may not be a good representation of the population.

Adenle *et al* (2023), examined moderating effects of leverage on the nexus between firm attributes and financial performance of listed consumer goods in Nigeria. The study period ranges from 2013 to 2021. Fourteen (14) out of twenty-one (21) listed Nigerian consumer goods firms were purposefully chosen. This study used panel regression, correlation analysis, and descriptive statistics for the data estimation. The results indicate that board independence and firm size positively and significantly affect return on assets, while board gender diversity does not significantly impact ROA. Also, the study found that leverage has a noteworthy and positive moderating effect on the relationship between board independence, board gender diversity, firm size, and ROA. In conclusion, this research suggests that leverage moderates the relationship between firm attributes and financial performance, and it also recommends that companies should strike a balance in their financing strategies to avoid excessive debt risk. They should also, diversify their boards, and exercise caution in the use of debt financing, regardless of their size and age. The study emphasize on only one sector of the economy and not a yardstick to generalize the result to other sectors.

Rabiu *et al* (2023) evaluates the effect of firm attribute on financial performance of listed deposit money banks. The study uses secondary data extracted from the annual reports and accounts of the sampled Money Deposit Banks in Nigeria, for the period of 11 years (2011-2021). The study uses three techniques of data analysis, namely descriptive statistics, correlation and multiple regressions using STATA Package Version 14.0. The findings of the study reveal that there is negative and significant relationship between firm age and returns on asset at 1 % level of significance. The study findings reveal negative and insignificant relationship between firm leverage and firm size with financial performance. The study recommends that the debt obtained from outsiders (creditors) by listed Money Deposit Banks should be managed more effectively in order to drive positive financial performance and Management of listed deposit money banks should increase their firm size through expansion as this will improve the financial performance

Comfort *et al* (2023) examined firms' specific characteristics on the market value of listed manufacturing companies in Nigeria. This was anchored on the fact that firms' specific characteristics usually reveal the efforts of managers in the performance of entities. The *ex-post facto* research design was adopted because the study was quantitative and required secondary data. The population of this study was fifty-six (56) manufacturing companies from four (4) sub-sectors consumer goods, industrial goods, oil and gas and healthcare sub-sectors listed on the floor of Nigerian stock market as at 31st December, 2020. Forty-two (42) listed manufacturing entities were sampled for the study based on availability of data. Panel data were collected from the financial statements of the manufacturing companies sampled for the study. The variables of this study were Market Value (MV) and firms' specific characteristics. The dependent variable was firm's value measured by Tobin's Q and the independent variables, the firms' specific characteristics were Liquidity (LQ) and Operating Efficiency (OE). Inflation rate (IFR) was used as a control variable. Data were analyzed using descriptive statistics and multiple linear regression statistical tools. The fixed effect regression approach was employed in the study. From the analyses, it was revealed that LQ and OE had positive and significant influence on MV of listed manufacturing companies in Nigeria. In line with the findings, it was concluded that firms' specific factors had significant influence on the value of listed manufacturing companies in Nigeria. It was recommended that total assets of listed manufacturing companies in Nigeria should be acquired in accordance with the revenue generated over the years to raise the operative efficiency of the managers. The study suffers from limited time frame and no recourse to COVID 19 effects.

Ayuba and Mathias (2023) examined the firm characteristics and financial performance of selected Pension Fund Administrators in Nigeria. The population of the study consists of all the Pension Fund Administrators (PFAs) for the period of five years 2018 to 2022. The sample consisted of 10 selected post recapitalisations of the PenCom. A purposive sampling was used in selecting the sample size of the study. The study used secondary data extracted from the published annual reports and accounts of sampled PFAs. The panel data generated was analysed using descriptive, pearson correlation and multiple regression model with the help of STATA version 13. The result shows that the firm age has a significant positive effect on financial performance which is measured by Unit Price. The study revealed that Density of contributions, Liquidity, Firm age, Board size, and Expenditure of the fund are jointly responsible for about 97% of the changes in financial performance. Thus, the study concluded that firm characteristics have a significant effect on financial performance of PFAs. Based on these findings the study recommended that the PFAs should manage the density of contributions, firm age, board size, liquidity, and expenditure of the fund for better financial performance in the pension industry. The time coverage is of essence and this should have been increased from 5 to at least 10 years.

Douye and Gospel (2023), investigated the effect of corporate attributes (especially firm size, firm age and leverage) on social sustainability performance disclosures in Nigeria. A checklist based on the global reporting index was used in analysing social sustainability performance disclosures (SSPD) in the sustainability reports of thirty manufacturing firms. The firms were drawn from the consumer goods, industrial goods, agriculture and health care sectors of the Nigerian economy, and the data used covered the period 2010 to 2020. The study was anchored on the legitimacy theory perspective. Information on firm attributes was extracted from the annual reports of the selected firms for the same period. Regression technique with Newey West robust standard errors was used to analyse the data collected. Findings showed that firm size, firm age and leverage, each had a positive effect on social sustainability performance disclosures in manufacturing firms in Nigeria, leading to the conclusion that firm characteristics have significant effect on sustainability disclosures. The study recommend that social interactions between a firm and its societal environment increases over time, and this helps to enhance the legitimacy of the firm in its community. Limited independent variables, a good number of other variables could have been introduced.

## 2.3 Theoretical Framework

### 2.3.1 Stakeholders Theory

Stakeholder theory was developed by Freeman (1984) who argues that organizations are accountable to the shareholders as well as other stakeholders but in contrary to the traditional view that shareholders were the only stakeholders of the firm. Stakeholders are groups of individuals who may benefit or be harmed by activities of the firm. These stakeholders have contracting interest which has to be taken into account when releasing the audit reports. This is important because their varying interests can affect the firm's ability to achieve its objectives (Freeman, 1984). The stakeholder theory is defined by (Freeman 1984) as any group or individual who can influence or is influenced by the achievement of the organization's objectives. So, (Carroll 1993) add that the term stakeholder may, therefore, include a large group of participants, in fact anyone who has a direct or indirect stake in the business. Examples for direct stakeholders are the shareholders, employees, investors, customers and suppliers, all whose interests are aligned with the interests of the firm, on the other side, the indirect stakeholders are those who are indirectly affected by the functions of the firm and an example for the is the government (Kiel & Nicholson

2003). Another definition for the stakeholder theory is that "the Stakeholder theory defines organizations as multilateral agreements between the enterprise and its multiple stakeholders". The stakeholders can be divided into two groups, the internal group consists of the employees, managers and the owners while the external group includes customers, suppliers and the community, the relation between the firm and those stakeholders' group is controlled by different types of rules (Clarke 2004). In addition, (Tanko, 2020) argue that stakeholders can be identified by three different attributes, the first is their power to influence the firm, the second is the legitimacy of relationship with the firm, and the third attribute is the importance of the stakeholders claim on the firm. Stakeholders are defined as the groups or individuals whose goals are recognized by a firm or those who influence the firm's goal attainment. These groups include employees, clients, suppliers, banks, local government and agencies, political parties and community organizations. Back in the 1970s and 1980s large national firms were becoming too powerful and their power went beyond the stakeholders' including the government so this raised the awareness of the stakeholder theory that helped raise the social awareness. The theory faces a major criticism, which is that there are different types of stakeholders each with different needs and goals which are difficult to all be aligned with the goal of the firm so this causes the inability to equally solve the conflict of interests between the different groups of stakeholders (Habbash 2010). Furthermore, when managers' incentives are not aligned with the interests of the Shareholders, they use the stakeholders as a cover by claiming that this conflict is due to providing consideration to the stakeholders' goals and objectives leading to the inability to satisfy the shareholders (Uzoka *et al.*, 2020).

**2.3.2 Resource-Based View Theory**

The proponent of Resource-Based View (RBV) theory was Birger Wernerfelt (1984), published major works that were anchored on the use of resources as a differentiating performance growth level of the firm. According to Dioha *et al* (2018), the RBV is a corporate strategic model employed to analyze and determine the core resource requirements that a firm needs to possess and exploit to drive its operational efficiency in order to achieve comparative and competitive advantage for its perpetual performance. This implies that RBV theory posits that firms have heterogeneous and somewhat dissimilar performance, which necessitates them to possess varied and assorted resources that require different firms to structure uniquely dissimilar strategic plans in the development, acquirement and utilization of different mixture of resources in the management of their organization (Akenroye *et al.*, 2022). Wernerfelt (1984) conceptualized that resource-based view of the firm, is a strategic management approach used to analyze the criticality of firm's specific internal resources. This means that firm's specific internal resources occupy a pivotal place in a firm's success factors that enables an entity to achieve competitive advantage. This theory emphasizes the need for firms to look inward within its endogenous resource variables to drive the achievement of its competitive advantage instead of focusing on competitive exogenous environmental determinants (Obiora *et al.*, 2021). This means that resource-based theory is a dynamic capability theory of the firm that focuses on the primacy of utilization of internal resource determinants and combinations for sustainable competitive advantage to the benefit of all stakeholders.

The core assumption of RBV theory is that it is based on deploying strategic internal resources of the firm to achieve competitive advantage. These resources can be exploited by the firm through its specific corporate attributes and strategy to attain sustainable comparative advantage. The resource-based view (RBV) accentuates the role of strategic or unique resources as the basic driver of the firm's competitive advantage, performance and growth. This implies that the RBV is cardinal management approach and tool used to analyze sustainable competitive advantage (Akenroye *et al.*, 2022). Essentially, globalization has made firms to universally contend with one another with the deployment of their unique resources and competences that differentiate them from others in such a way as to grow their operations consistently and maintain high financial performance. The firm's strategy is anchored on the degree of their unique competitive resources and competencies to mutually influence their performance and growth. This means that the firm must leverage on the efficiencies of their respective resources that they possess and utilize to sustainably differentiate the contributions and performances of the firm for their growth and performance. Thus, the crucial characteristic of the RBV is that it is an efficiency-based explanation of performance growth determinants that differentiates one firm from the other. Therefore, to achieve the required level of financial performance, a firm's resources must be precious, uncommon, unique, incomparable and immobile across firms. The firm must combine both homogeneous and heterogeneous resources in order to develop the firm's uniqueness that makes them irreplaceable as a source of competencies and sustainable competitive advantage. These resources can be exploited by the firm in order to achieve sustainable financial performance.

In this study, resource-based view theory underpin it because firm`s comparative and competitive advantage is obtained from firm-specific resources that are unique, inimitable, incomparable and superior in use, as opposed to what other firms possess and deploy in driving their higher firm value levels of efficiency, elimination of waste, effective adaptation of methods and creating value-addition to stakeholders.

## III. METHODOLOGY

This study adopted the ex post facto research design and secondary data for the study. Population of the study consists of thirty-four (34) listed consumer and industrial goods firm operating on the Nigeria, Nigeria Exchange Group (NGX) as at 31st December 2024. The sample size is twenty five (25) and Judgmental sampling techniques was adopted. Data required for this study were obtained from audited financial statements and annual reports of the listed manufacturing firms in Nigeria 10 years (2015-2024). The inferential analyses also involve the application of the appropriate statistical technique of Panel Regression Analysis. The study adapting the model of Stella and Eno (2024)

**The Panel regression model (Stella and Eno)**

**$PBV_{it} = \beta_0 + \beta_1 FA + \beta_2 FS + \beta_2 BS + \epsilon_{it}$ ..... (i)**

Leverage as a moderator:

**$PBV_{it} = \beta_0 + \beta_1 FA*FL_{it} + \beta_2 FS*FL_{it} + \beta_2 BS*FL_{it}\ \epsilon_{it}$ ..... (ii)**

Where:

$\beta_0$ = The autonomous parameter estimate (Intercept or constant term)

$\beta_1 - \beta_3$ = Parameter coefficient of Firm characteristics

PBV = Price to Book Value

FA = Firm Age

FS = Firm Size

FL = Firm Leverage (Moderating Variable)

BS = Board Size (Control Variable)

$\epsilon_{it}$ = Stochastic Error term

**Study Variables and their Measurement**

| Variable Acronym | Variable Name | Variable types | Measurement | Source |
|---|---|---|---|---|
| PBV | Price to Book Value | Dependent | Price to Book Value ratio= market capitalization divide by shareholders' equity | Kabiru *et al* (2019) |
| FA | Firm Age | Independent | Year of Financial Report - Year of founding the firm | Ehiedu & Imoagwu (2022), |
| FS | Firm Size | Independent | Log of total assets | Etukudo *et al* (2022) |
| FL | Firm Leverage | Moderating | Total debt ratio (Total debt/Total Assets) | Rabiu *et a*l (2023) |
| BS | Board Size | Control Variable | Total number of directors on board | Rabiu *et al* (2023) |

**Source: Author's Compilation, (2025)**

**A Prior Expectation**

Prior expectation in this research is that it will indicate whether there exist a positive or negative relationship between firm characteristics variables and price to book value of listed industrial goods firm in Nigeria.

**Apriori Expectation**

| Variable Name | Variable types | A Prior Expectation |
|---|---|---|
| Price to Book Value | Dependent | |
| Firm Age | independent | Positive |
| Firm Size | Independent | Positive |

## IV. RESULT AND DISCUSSION

### 4.1: Descriptive Statistics

Descriptive statistics gives a presentation of the mean, maximum and minimum values of variables applied together with their standard deviations obtainable.

**Table 4.1: Descriptive Statistics Result**

| | PBV | FA_FL | FS_FL | BS_FL |
|---|---|---|---|---|
| Mean | 0.838344 | 80.34384 | 12.79714 | 15.45332 |
| Median | 0.825000 | 80.21000 | 11.85810 | 15.12000 |
| Maximum | 9.600000 | 186.9300 | 26.64540 | 27.12000 |
| Minimum | -0.960000 | 8.040000 | 5.080300 | 6.240000 |
| Std. Dev. | 0.818901 | 44.78228 | 4.307148 | 3.985523 |
| Skewness | 9.768438 | 0.243616 | 0.674346 | 0.093174 |
| Kurtosis | 105.8400 | 2.104988 | 3.056766 | 2.547044 |
| Jarque-Bera | 114143.4 | 10.81710 | 18.98116 | 2.498900 |
| Probability | 0.000000 | 0.004478 | 0.000076 | 0.286662 |
| Sum | 209.5860 | 20085.96 | 3199.286 | 3863.330 |
| Sum Sq. Dev. | 166.9790 | 499357.7 | 4619.330 | 3955.215 |
| Observations | 250 | 250 | 250 | 250 |

***Source: E-View 12 Output, (2025)***

Table 4.1 presents the descriptive statistics effect of firm age and firm size on firm value of listed consumer and industrial goods firm in Nigeria with firm leverage as moderating factor during the period of 2015 to 2024. The table shows that price to book value (PBV) as a measure of firm value has a mean of 0.83834, with a standard deviation of 0.81890 as well as a minimum value of -0.96000 and maximum value of 9.60000 respectively. Given that the range between the minimum and maximum is not quite wide, it implies a stable price to book value as the standard deviation indicated that there is no much slightly wide dispersion of the data from the mean value. For the other measure of firm age and firm size shows a mean of value of 80.34384 and 12.79714 with standard deviation of 44.7822, 4.307148 and a minimum and maximum value of 8.04000, 5.080300, 186.9300 and 26.64540 respectively. This implies firm age and firm size witnessed a marginal increase during the study period, as the standard deviation is not so large compared to the mean, together with the low range between the minimum and maximum values. Board size as control variable has a mean of 15.45332 with minimum value of 6.24000 and maximum value of 27.1200.

**Table 4.2: Correlation Matrix**

The correlation matrix table presents correlation relationship between dependent and independent variables and the correlation among the independent variables themselves.

Covariance Analysis: Ordinary
Date: 04/21/25 Time: 07:33
Sample: 2015 2024
Included observations: 250

| Correlation<br>Probability | PBV | FA_FL | FS_FL | BS_FL |
|---|---|---|---|---|
| PBV | 1.000000<br>----- | | | |
| FA_FL | 0.094783<br>0.1350 | 1.000000<br>----- | | |
| FS_FL | -0.024718<br>0.6973 | 0.303857<br>0.0000 | 1.000000<br>----- | |
| BS_FL | 0.003458<br>0.9566 | 0.466813<br>0.0000 | 0.641921<br>0.0000 | 1.000000<br>----- |

***Source: E-View 12 Output, (2025)***

In table 4.2 correlation analysis, which is used to quantify the association between two continuous variables. Correlation analysis estimates sample correlation coefficient, more specifically the Pearson Product Moment correlation coefficient. The result presented above confirms that firm age and firm size has a positive and negative correlation respectively which are 0.094783 and -0.024718 with price to book value while board size as control variable has a positive correlation with price to book value at value of 0.003458. There exists a weak positive and insignificant relationship between **PBV & FA_FL**; a weak negative and insignificant relationship between PBV & FS_FL.

**Multicollinearity Test (VIF)**

The Multicollinearity test was carried out to check if there is strong correlation among the independent variables that may produce misleading result.

**Table 4.3: Multicollinearity Test (VIF)**

Variance Inflation Factors
Date: 04/21/25 Time: 07:35
Sample: 2015 2024
Included observations: 250

| Variable | Coefficient Variance | Uncentered VIF | Centered VIF |
|---|---|---|---|
| C | 0.044222 | 16.49183 | NA |
| FA_FL | 1.72E-06 | 5.411017 | 1.278681 |
| FS_FL | 0.000247 | 16.77647 | 1.700927 |
| BS_FL | 0.000335 | 31.77110 | 1.974057 |

***Source: E-View 12 Output (2025)***

***Decision rule**: Centred VIF of less than 10 is an indication of absence of multi-collinearity, while the centred VIF of more than 10 is an indication of presence of multi-collinearity. As stated above, the decision rule for the multicollinearity test using the variance inflation factor is that Centred VIF of less than 10 shows the absence of multi-collinearity, while the centred VIF of more than 10 is an indication of presence of multi-collinearity. Table above clearly shows that there is absence of multicollinearity among the independent variables, given that all the independent variable (FA_FL, FS_FL and BS_FL) have a center VIF that is less than 10.

**Heteroskedasticity Test**

In order to validate the robustness of the estimates, the Heteroskedasticity test was conducted as a diagnostic check. Heteroskedasticity happens when the standard errors of a variable, monitored over a specific amount of time, are non-constant.

**Table 4.4: Heteroskedasticity Test**

Panel Cross-section Heteroskedasticity LR Test
Equation: UNTITLED
Specification: PBV C FA_FL FS_FL BS_FL
Null hypothesis: Residuals are homoscedastic

| | Value | Df | Probability |
|---|---|---|---|
| Likelihood ratio | 713.4039 | 25 | 0.0910 |

LR test summary:

| | Value | Df |
|---|---|---|
| Restricted LogL | -302.7269 | 246 |
| Unrestricted LogL | 53.97507 | 246 |

***Source: E-View 12 Output, (2025).***

Table 4.4 shows the results of the panel cross-section Heteroskedasticity regression test. The decision rule for the panel cross-section Heteroskedasticity test is stated thus:

***Decision Rule: At 5% level of Significance**
**$H_0$: No conditional Heteroskedasticity (Residuals are homoskedastic)**
**$H_1$: There is conditional Heteroskedasticity**
The null hypothesis of the test states that there is no Heteroskedasticity, while the alternate hypothesis states that there is Heteroskedasticity. The null hypothesis is to be accepted if the P value is greater than 5% level of significance. From the result in table 4.4 above with a ratio value of 713.4039 and a corresponding probability value of 0.0910 which is greater than 5%, the study therefore posits that, there is reason to reject the null hypothesis, while the alternative hypothesis that states there is conditional Heteroskedasticity problem is accepted. Consequently, based on the diagnostic probability 0.0910 the null hypothesis is rejected, thus there is conditional heteroskedasticity, indicating that residuals are not homoskedastic and as such the samples do give a true reflection of the population.

**Hausman Test**
The Hausman test is a test for model specification in panel data analysis and this test is employed to choose between fixed effects model and the random effects model. Due to the panel nature of the data set utilized in this study, both fixed effect and random effect regressions were run. Hausman specification test was then conducted to choose the preferred model between the fixed effect and the random effect regression models. The test basically checked if the error terms were correlated with the regressors. Thus, the decision rule for the Hausman specification test is stated thus; at 5% Level of significance.

**Table 4.5: Hausman Test**
Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
|---|---|---|---|
| Cross-section random | 1.177325 | 3 | 0.7584 |

***Source: E-View 12 Output, (2025)***
The Result of Hausman test shows that chi-square statistics value is 1.177325 while the probability values of is 0.7584. This implies that there is enough evidence to accept the null hypothesis which states that random effect is most appropriate for the Panel Regression analysis. It thus stands that error component model (Fixed effect) estimator is not most appropriate because the fixed effects are not well correlated with the regressors. Thus, the most consistent and efficient estimation for the study is the random effect cross-sectional model. Consequently, the result suggests that the random effect regression model is most appropriate for the sampled data because the Hausman test statistics as represented by corresponding probability value is greater than 5%.

**Langranger Multiplier Test**
The langranger multiplier test is a test for model specification in panel data analysis and this test is employed to choose between pooled effect model and the random effects model.

**Table 4.6: Breusch-Pagan Langranger Multiplier Test**s
Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: Untitled
Periods included: 10
Cross-sections included: 25
Total panel observations: 250
Note: non-zero cross-section means detected in data
Cross-section means were removed during computation of correlations

| Test | Statistic | d.f. | Prob. |
|---|---|---|---|
| Breusch-Pagan LM | 594.2052 | 300 | 0.0000 |

***Source: E-View 12 Output, (2025)***

***Decision Rule: At 5% level of Significance, if probability value is less than 5% we accepted random but greater than 5% is pooled will be accepted**
**$H_0$: Pooled Effect is more appropriate**
**$H_1$: Random Effect is more appropriate**
Based on the probability value of the Breusch-Pagan Langranger Multiplier Test at 0.0000, the null hypothesis is rejected, thus random effect is most appropriate when compared to pooled effect.

**Table 4.7: Panel Regression Result (Random Effect)**

Dependent Variable: PBV
Method: Panel EGLS (Cross-section random effects)
Date: 04/21/25 Time: 07:39
Sample: 2015 2024
Periods included: 10
Cross-sections included: 25
Total panel (balanced) observations: 250
Swamy and Arora estimator of component variances

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.849144 | 0.215076 | 3.948116 | 0.0001 |
| FA_FL | 0.002099 | 0.001452 | 1.446171 | 0.1494 |
| FS_FL | -0.010424 | 0.017052 | -0.611294 | 0.5416 |
| BS_FL | -0.002982 | 0.019172 | -0.155520 | 0.8765 |
| | Effects Specification | | | |
| | | | S.D. | Rho |
| Cross-section random | | | 0.135570 | 0.0271 |
| Idiosyncratic random | | | 0.812012 | 0.9729 |
| | Weighted Statistics | | | |
| Root MSE | 0.802500 | R-squared | | 0.529864 |
| Mean dependent var | 0.741362 | Adjusted R-squared | | 0.502211 |
| S.D. dependent var | 0.808105 | S.E. of regression | | 0.808998 |
| Sum squared resid | 161.0016 | F-statistic | | 0.816909 |
| Durbin-Watson stat | 2.176923 | Prob(F-statistic) | | 0.485580 |

***Source: E-View 12 Output, (2025)***

This study examined effect of firm age and firm size on firm value of listed consumer and industrial goods firm in Nigeria with firm leverage as moderating factor. From table 4.7 above, the coefficient of multiple determinations ($R^2$) is 0.52 and in line with the panel nature of the data used in this study, the regression model shows that the range of values between adjusted $R^2$ and $R^2$ falls between 52%, and 50% respectively. This indicates that about 52% of the total variations in price to book value (PBV) is explained by the variations in the independent variables (FA_FL, FS_FL and BS_FL), while the remaining 48% of the variation in the model is captured by the error term, which further indicates that the line of best fit is highly fitted. The panel regression result for the sampled consumer and industrial goods firm showed that there is negative relationship between firm age, firm size with price to book value a corresponding negative probability value of 0.1494 and 0.5416 which is greater than 5%. However, when taken collectively, the regressors (FA_FL and FS_FL) against the regressed (PBV), the value of F-statistic is 0.816909 and the value of the probability of F-statistic is 0.485580. This result implies that the overall regression is both negative and statistically insignificant at 5%.

**4.2 Discussion of Findings**

This study examines effect of firm age and size on firm value of listed consumer and industrial goods firm in Nigeria with firm leverage as moderating factor. The findings of this study are on the basis of formulated hypotheses, models and analysis carried out. This study found that generally, firm age and firm size have negative

significant effect on price to book value of listed consumer and industrial goods firm in Nigeria and the findings from this study are compared with that of previous studies.

Firstly, assess effect of firm age on price to book value of listed consumer and industrial goods firm in Nigeria revealed that a positive and insignificant effect on price to book value of listed consumer and industrial goods firm in Nigeria while firm size has negative and insignificant effect on price to book value of listed consumer and industrial goods firm in Nigeria. The findings do agree with the findings of Obaje *et al* (2023) who examined the impact of firm's attributes on share prices of the quoted consumer goods firms in Nigeria. Rabiu *et al* (2023) evaluates the effect of firm attribute on financial performance of listed deposit money banks. The study uses secondary data extracted from the annual reports and accounts of the sampled Money Deposit Banks in Nigeria. The work of Adenle *et al* (2023) did not align with the findings. They examined the moderating effects of leverage on the nexus between firm attributes and financial performance of listed consumer goods in Nigeria.

## V. Conclusion and Recommendations

The study was undertaken to examine the effect of firm age and firm size on firm value of listed consumer and industrial goods firm in Nigeria with firm leverage as moderator from 2015-2024. The study concludes that firm age and firm size have negative and insignificant influence on price to book value of listed consumer and industrial goods firms in Nigeria. Based on the findings of the study and the conclusion made, the following recommendations are made to management of listed consumer and industrial goods firms in Nigeria:

i. Management of listed consumer and industrial goods firms should refocus corporate strategy on value-creating mechanisms that directly influence market valuation, such as improving return on assets, strengthening earnings quality, and enhancing financial reporting transparency. Since firm age alone does not significantly drive price-to-book value, longevity must be complemented by demonstrable operational excellence and adaptive governance structures that actively respond to investor expectations in Nigeria's dynamic capital market environment.

ii. Management of listed consumer and industrial goods firms should adopt a deliberate leverage optimisation strategy, ensuring that debt levels are calibrated to enhance, rather than erode, firm value. Given the insignificant moderating role of leverage on firm size and price-to-book value, management should prioritise maintaining an optimal capital structure that reduces financial risk while simultaneously improving market confidence among investors on the Nigerian Exchange Group.

iii. Regulators and policymakers, particularly the Securities and Exchange Commission (SEC) and the Nigerian Exchange Group, should strengthen disclosure requirements and corporate governance frameworks for listed consumer and industrial goods firms. Enforcing stricter standards on board composition, related-party transactions, and periodic value reporting will help bridge the gap between firms' intrinsic worth and their market valuations, thereby restoring investor confidence in Nigeria's manufacturing and industrial sectors.

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